Thailand Rail Freight Demand and Opportunities:

Southern Line Approach

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Abstract

In recent years, the Thailand railway has been subject to lack of infrastructure and transportation strategy major reform, with railways advantages, Thai government aims to boost the economic opportunities through Thailand and linkages through Asean. The Railways Southern line which cross to Malaysia border through Singapore and the global, the rail freight demand project to increase and bring huge opportunities along southern and domestic strengthened considerably. We study the expect of rail freight demand and opportunities with these reforms on the efficiency levels of a panel of southern line railways (2022–2051). The novelty lies in the incorporation of a multi-dimensional rail demand and trend, opportunities and challenges index — capturing the elements of rail freight powers and activities — into an economic framework alongside with variables issues. Our results suggest that the infrastructure railway reform can lead southern of Thailand gain enormous economic opportunities, market openness, cost-reducing benefits of rail freight reform depend on the degree of (actual or desired), and the intensity of network usage.

Keywords: Rail Freight Demand, Economic Opportunities, Infrastructure and Strategy, Southern of Thailand

**1. Introduction**

Railways well know as long distance winners as long distances freight transport is constantly growing. The significance of rail freight over large distance is noticeably on the rise, the goal is to get the freight to its intended destination as quickly efficiency as possible. Rail freight transportation is based on the realization of added values of the entire rail freight system, while the realization of added values is based on the collaboration between subsystems of the entire freight system (Feng et al, 2015). Chen and Qin (2014), considered logistics industry and rail freight is induced variables, social economic activities. In conclusion, it is clear that rail transport Is an intelligent and sustainable driver of GDP. The reality is that transportation plays a broad role in shaping economies; supports cluster and agglomerations, increase productivities, enhances jobs and labour market accessibility, opens new markets for business and enhances supply chain efficiency (Dowell, 2017). Meanwhile, Aschauer’s (1989), studies established on a statistic links between economic growth and transport infrastructure in various countries in the past few decades. Railroads constitute an important mode of transport for both freight and passengers. In the United States, for example, railroads are responsible for 35.6% of total intercity freight transport and enjoy approximately 30% of total revenues of all carriers ([Assad](https://www.sciencedirect.com/science/article/abs/pii/0191260780900175#!) ,1980).

At nation level, the economy depends on the efficient movement of freight, freight mobility plays an important role in a country’s competitiveness, economic growth and regional connectivity. A based infrastructure well-established transportation system facilitates the trouble-fee cargo movements in customer satisfaction and cost-efficient manner from origins to destinations. Road, rail air and pipelines, there are handle such freight transport.nonetheless, orad and rail are the two basic modes of carrying most of the country’s inland freight transport (Ramanathan, 2001; Shen et al., 2009). In the main, railway perspective advantage higher than road transport, in terms of long haul and mass scale traffic movements. In addition, rail transport also contributes less note worthy towards depletion in comparision to road transport (Chapman, 2007; Givoni et al., 2009; Nelldal and Anderson, 2012). A nation’s effective railroad transport infrastructure bring smooth trade and decrease transportation cost decreasing and road congestion encourage national integration and suburban development. The rail freight transport demand are arises in nature as usually considered as an input to the manufacturing production just like the demand for many other inputs as financial, labour, energy, tool and equipment by the corporation, it is derived from the products’s demand spatially differentiated of consumable and production located. Economic activity and rail price are two significant determinants of demand rail freight, among other elements factors (FitzRoy and Smith, 1995; Productivity commission; 2006).

Thailand locates geographic in a beneficial position, as the hub of northern South East Asia. Thailand is in the deep of an ambitious railway development drive aimed at halting the country away from automotive to more eco-friendly train transportation while transforming into a regional rail hub. Thailand has the probable to shift system for trade in the full-length region and beyond. Virtually all significant trade movements among the high value countries of the region, People’s Republic of China (PRC), Malaysia, Singapore and Thailand transit through Thailand. Requires of a combined transport system is now affecting the aggressive position of Thailand compared to its neighbours. Thailand on track to develop into regional rail hub, Government’s key aim is to boost efficiency and upgrade standards for international shipping in terms of velocity, safety and reliability and to aid economic growth within a framework of regional cooperation and to scale down the country’s overall logistics cost. As other countries modernize their railway infrastructure and operations, continued enhanced trade will also base on Thailand improving its physical interconnectivity – both through increased conventional railway networks as well as potential highspeed railway connections - to other countries in the region. The Thai government's focus on improving the sectors including infrastructure development, the restructure of the rail freight market under the transport infrastructure development strategies 2022 will see the development of the cargo transport market via railways and increase the role of rail freight, particularly in key economic zones as well as the remote areas (<http://economists-pick-research.hktdc.com/>.) The opportunities of railway dual track development, the development of dual tracks will result in the following changes to the logistics management system and the economic, social and environmental aspects with the development of double tracks helps to enhance the reliability of the rail management in Thailand. Stimulate the economy and increase the ability to support the volume of goods transported. Reducing production costs can increase the competitiveness of Thailand.

Freight transport, the ability to more goods from origins to destinations is a basic component of the worldwide economy. In the past decades, freight transport has increased rapidly and it is predicted that the high growth rates will continue in the coming decades (IEA, 2002). Efficient freight transport is an important driver of national competitiveness and is especially pertinent in Thailand, where transport cost contributes 13.4% (2018) logistics cost (<http://www.nesdc.go.th/>), compared to the global average of 39% (Rodrigue, Comtois and Slack,2009).

Thailand is perceptive to get better of these troubles by developing its rail system to support the continued growth of rail freight transport regularly using rail on inter-city networks. The frustration of Thailand’s freight railways to capture the market is attributable to a shortage and laggard of policy direction regarding the role of the rail in the surface freight transport industry, caused by the absence of sufficient market intelligence to inform policy. The empirical literature on rail freight dates back to the 1980s. however, the studies of rail freight demand are relatively scarce in comparison to passenger demand studies. The objectives of present study is to provide, a direction for the Thailand’s Southern rail reform argument in Thailand is visualise, based, firstly, short-run and long-run elasticities of rail freight transportation demand, secondly, on the upcoming opportunities of rail freight flow in Southern Market of Thailand.

**2. Literature Review**

2.1 Southern of Thailand Rail Freight: An Overview

Rail transport in Thailand has been dependent since 1951 on the State Railway of Thailand (STR) and rail transport is going more and more important in Thailand. In 1951, the government lead by Chom Phon Por Pibulsonggram, as Prime Minister, has agreed to manage the train operation separately, so they have proposed a draft law to Parliament Railway of Thailand, and have enacted a statutory enactment, to be announced in the Government Gazette, dated 30 June 1951, the Royal Train as it changed to the type of public enterprises under the name of "The Train Operation of Thailand" from 01 July 1951 onwards, operating under the Act., of the railway company 1951. Thai railways transport both bulk freight (primarily oil products and construction materials) and containerized freight. Most of the freight movement is between Bangkok and sea ports (in particular, between the deep water port of [Laem Chabang](https://en.wikipedia.org/wiki/Laem_Chabang) and the container terminal in [Lad Krabang](https://en.wikipedia.org/wiki/Lad_Krabang), in Bangkok's eastern suburbs). The Thai Economy is finally showing signs of recovery after a long recession, anyway it still not clearly how the economy will equally and create fare in the future. The ability to reduce transportation costs by 4 times from double track trains reduce costs as much as possible, making logistics operators and consumers are turning their attention to rail freight. National policy on the development of the railway system for competitiveness and competitive advantage.

Figure 1, the statistics of volume and trend of Thai rail freight from 1986-2016, which found that on average the volume has increased, but if compared with all transportation, it can be seen that the percentage of rail transportation is lower. Thailand’s Rail Freight Transport data was reported at 11,970 Ton in 2016. This records an increase from the previous number of 10,895 Ton for 2015. Thailand’s Rail Freight Transport data is updated yearly, averaging 8,889.000 Ton from 1982 to 2016. The data reached an all-time high of 13,774 Ton in 2004 and a record low of 5,226 Ton in 1986. Thailand’s Rail Freight Transport data remains active status in CEIC and is reported by Ministry of Transport. The transportation of goods within Thailand for the years 2001 to 2004 has been sharply increased, anyway in the years 2005 to 2007 was slightly decreased, but again in the year 2009 to 2016 the number has been continuously growing at 5.4% and 4.3% respectively.

Fig. 1: Thai rail freight volume statistics 1986-2016

Source: The State Railway of Thailand

While the Thai railways structure is lacking restoration to be in a position ready to support the transportation of goods and passengers resulting in a decrease in the volume of rail transportation during 2011 and 2014. Due to limitations on various traditional factors, problems and obstacles of Thai rail transportation Roads and rail systems freight is still ineffective and unable to meet the needs of users. Thai railways transported around 11 million tons of freight per year in 2007 to 2012, which was around 2% of the total amount of freight moved by all modes of transportation. While it is possible for freight trains to travel between Thailand and the neighbouring countries (Malaysia and Laos), the amount of international rail freight presently constitutes only a minuscule portion of Thailand's foreign trade. The figure below gives the information of rail FCL freight of southern of Thailand in 2012-2017.

Fig. 2: Volume of rail transport in southern of Thailand 2012-2017

Source: The State Railway of Thailand

Figure 2, this statistic shows the southern freight rail volume of Thailand is highest volume in 2012 and 2017, it allows comparisons between the number of freight transportation from 2012-2017. While the southern volume was very low. In addition to increased cross-border trade, there is another significant trend in logistics that is happening globally, especially in the Asia-Pacific region. As shown in table 1, the commodity of containerized and bulky freight of southern rail freight commodity and value the general containerized is the highest volume and follow by Thai-Malaysia containerized to Singapore.

Table 1. Southern Rail Freight by Commodity (Fiscal 2012-2017)

|  |  |  |  |
| --- | --- | --- | --- |
|  | Commodity | Freight volume (Ton) | Freight value (USD) |
| Containerized | Agricultural products (rice, corn, nut, sugar, flour) | 79,361 | 1,652,863.53 |
| Thai-Malaysia | 935,839 | 4,584,057.34 |
| General Container | 1,063,258 | 6,823,160.59 |
| Military police equipment | 38,119 | 551,140.50 |
| Household | 168 | 257.65 |
| Misc. | 240,352 | 1,039,004.31 |
| Bulky | Bag cement | 10,276 | 116,322.82 |
| Cement powder | 173,026 | 2,702,710.25 |
| Sand | 4,103 | 13,210.95 |
| Total | | 2,544,502 | 17,482,760.90 |

Source: The State Railway of Thailand

As the suggestion alternative solution to achieves the development, which could be the main linkages to the implementation of intermodal transportation, the linkages routes from Bangkok to southern Thailand to Malaysia and have the opportunity to link to Singapore in the future will transportation of goods from the southern region, such as rubber, palm, oil and fruit to China more easily, also able to transport related products in the automotive industry and electronics from Malaysia to Bangkok in order to easily distribute to various markets.

2.2. Governing Rail Freight Infrastructure Strategy in South of Thailand

Thailand has approaching to strategy for the development of the Thai transportation system for 20 years. The mission is to develop the Thai transportation system in the future. Supports lifestyle changes Travel behaviour, there are 3 related issues which are Green Transport, Transport Efficiency, and Inclusive Transport (Office of Transport and Traffic Policy and Planning, 2017). These developments are being promoted by the need for greater management efficiency as well as by the movement to internationalize and to rationalize distribution systems. As other industries, transportation and distribution business is faced with the need for structural reform. The rail freight carriers now face more hurdles than before as the demand for consumer-friendly distribution systems grows. By information technologies have been developed over decades as a way to boost transportation effectiveness and efficiency, the trend is commitment between manufacturer industries, which have embraced supply chain management principles in the expectation to optimization in whole aspect of their operation from sourcing, purchasing, procurement to production to shipping. So, since these developments, customers now more hope to receive cargos faster even while freight carriage fees have tended to decline. In the other hand, the volume of rail freight goods transported in Thailand shows no signal of increasing. Although, the challenges for railways freight carriers if far from steadiness. The deregulation of the freight transport policy execution emptiness that has lasted for almost five decades.

Shortcoming of freight wealth, rail freight, which is cheaper as only roughly half the cost of road transport, safer, and more environmentally-friendly than road transport, accounted for only 1.39 percent of freight tonnage carried in 2017. SRT aims to boost its share of cargo transport to six percent with its double track expansion by 2022, as shown in Table 1, for the phrase 1 route no. 1-3 and phrase 2 will operate on 2024. Expansion of SRT's freight service, which could benefit more money than the heavily subsidized passenger service, has been neglected for more than 50 years in favour of Thailand's roads. The government goal to enhance the Southern Economic Corridor (SEC) to spur economic growth in the southern provinces, which have space for investment in local raw materials as rubber and palm to create value-added products. The government looks set to introduce the SEC development a double-track rail system strategy, its chances will boost income in the region, the economic climate in the southern region is relatively unenthusiastic because of lower rubber prices in recent years. Chumphon could be developed as a centre for fruit distribution, while Surat Thani is envisioned as a bioeconomy centre.

Table 2 Southern double track expansion project

|  |  |  |
| --- | --- | --- |
| Route | Distance (Km) | Expected completed |
| 1. Nakhon Pathom- Hua Hin | 165 | 2022 |
| 2. Hua Hin - Prachuap Khiri Khan, | 90 | 2022 |
| 3. Prachuap Khiri Khan - Chumphon | 167 | 2022 |
| 4. Chumphon - Surat Thani | 168 | 2024 |
| 5. Surat Thani- Hat Yai, | 324 | 2024 |
| 6. Hat Yai - Padang Besar (Thai). | 45 | 2024 |
| Total | 959 |  |

Source: The State Railway of Thailand

The State Railway of Thailand (SRT) is planning to spend nearly 90 billion baht to enhance the current single-track railways leading to the deep south to double tracks to cut down travel times for passengers and encourage tourism to the region. [Thailand](http://www.nomadicnotes.com/thailand/) currently has a good network of railways so most improvements will be made by double-tracking and futuristic presenting lines. There are a few high-speed proposals, including a Shinkasen-style bullet train. Regulation studies and creating a master plan for the development of the railway network to support the special economic zone to support the development of railway infrastructure in various regions and increase service capabilities, promote the rail system to be the main travel network provides to connect the transportation of goods covering important economic areas. Railways Infrastructure line in South of Thailand, the project will be integrated with the SRT's ongoing double-track upgrades in Nakhon Pathom to Chumphon, which will benefit rail passengers and freight heading to the southern provinces of Surat Thani, Songkhla, as well as the Malaysian border town of Padang Besar.

2.3 Previous studies on rail freight demand

2.4 Thailand Previous studies on rail freight transportation

**3. Methodology**

3.1 Conceptual Framework

**4. Analysis and Findings**

4. Thailand Southern Freight Demand and Trend

Transportation demand forecasting can be viewed from two different conceptual standpoints. One such approach would take the view that demand for freight transportation and therefore demand for rail transportation is derived from overall economic activity. (Nazem, 1976). The forecast measure in the demo model is quite an advanced amount, there are just a couple of interesting notes about the trend is after double rail track project completed (2022),the trend of rail freight slightly increasing dramatically and are many advantages of rail freight, which are not found in road transport;  rail freight is has a lower fuel costs compared to road transport, a safe, efficient and environmentally friendly transport solution with cheaper transportation cost though high capable of hauling large loads room for more items, reliable and stable departure and arrival times, on time delivery with avoid traffic and driving bans and. Obviously, rail transport can be a very efficient solution for logistics and supply chain.

Even in the past 6 years, the southern railroad freight volume was slightly stable, meanwhile the government policy that aims to increase the proportion of rail transportation to 30% of the logistics system in order to reduce the cost of transportation. As SRT, Railways Infrastructure project in South of Thailand, Southern of Thailand railroad’s projected demand for freight transportation from 2026 to 2051 as shown in table 2 below.

Table 3 Expected Freight Trend in Southern Railways Line

|  |  |  |
| --- | --- | --- |
| Route | Million Ton | Year |
| Nakhon Pathom- Hua Hin | 1.28 | 2034 |
| Hua Hin - Prachuap Khiri Khan | 2.91 | 2026 |
| Prachuap Khiri Khan - Chumphon | 2.06 | 2037 |
| Chumphon - Surat Thani | 1.84 | 2051 |
| Surat Thani- Hat Yai | 1.86 | 2031 |
| 2.88 | 2041 |
| 4.47 | 2051 |
| Hat Yai - Padang Besar (Thai) | 1.53 | 2030 |
| 1.93 | 2040 |
| 2.38 | 2050 |

Source: The State Railway of Thailand

Nakhon Pathom to Chumphon, which will benefit rail passengers and freight heading to the southern provinces of Surat Thani, Songkhla, as well as the Malaysian border town of Padang Besar. This statistic displays the projected values of rail freight transportation in the Southern between 2030 and 2050. Rail freight movements are expected to rise from 1.53 million tons in 2030 with the Department of Transportation (DOT) predicting an 55.55% increase in total freight demand by 2050 to 2.38 million tons, rail stakeholders must eschew entrenched business models in favour of collaboration and embrace new digital technologies if they are to compete with intermodal container shipping. In 2017, Southern of Thailand’s surface railways freight transport moves 525,052 tonnes of freight over an average transport distance of 542 km, delivering 230 million tonne-km to the southern economy. The total freight bill to provide this work as USD17.482 million, excluding externalities of approximately USD0.48 million (SRT).

Ministry of transport frequently do not have adequate resources to facilitates reform. The Thailand experiences confirms that an overly compartmentalised approach to freight transport reform leaves a heritage of impairment that produce modal biases in the movement of freight. The most commonly cited example is overuse of, and excessive investment in, road transport at the expense of rail. Over the longer term, it puts at risk the economic, environmental and social benefits that may only be realised by taking a more holistics approach (Australian Government Productivity Comission 2005).

The dawn of the new millennium will not change the fact that Thailand’s logistics market is an essential part of the national economy. The drive for environmentally friendly transportation systems will certainly increase and with the event of innovation and technology, customers will even have more perception to demanding the optimum transportation services. So that, logistics and freight carriage are to face the challenges of this new business external environment, of course they need to work toward to reformation and rationalization of the whole logistics system, also devise new techniques and strategies assist to be survivors.

5. Rail Freight Challenges and Opportunities

In the southern of Thailand, the agricultural manufacturing discarded further, especially from the dropped in oil palm following the seasonal pattern and high base effect last year (2018) after the deficiency. Furthermore, the manufacturer producing and export sectors remained contracted in line with the instability of external demand resulting from global economic slack which also frustrated the figure of foreign tourists (https://www.bot.or.th). The business community also submitted proposals calling on the government to increase production capacity for the agricultural sector, promote the food and agricultural processing industries, stimulate trade and investments, and improve public health services and water management systems. The decline of global economic expansion continued to point on the value of the rubber exporting to China and Japan dropped, whereas the production of crude palm oil seriously declined following the reduction output. On the other hand, the increased demand cause production of rubber glove remained growth. Restrictions on uncomfortable product handling and the delay in the construction of the double track causing loss to the economy.

In terms of economics, the proportion of logistics costs in 2018 is 13.8%, when Thailand aims to reduce the numbers in 2020 to 13.20% and within 2025 aiming to reduce to 9.50%. and the   
government aims that from the current proportion of rail transport from 2 to 5 in 2020 and in 2025, the proportion of rail transport is 10 percent. At present, the rail transport has support for border trade. And trade through that territory and connecting with that neighbouring country with Malaysia.

Fig. 3 Padang Besar cross border trade volume 2012-2017

Source: SRT

From the pie chart it is clear that the majority of rail freight prefer to use containerized with 91.77 percent and just 8.19 percent of agricultural product with only 0.04 percent of miscellaneous commodity. The opportunities from railways double track will boost southern economic region through this new scheme of infrastructure, as shown in fig. 3, the number of cross border container volume aims to enhance according to the linking to the south of Thailand and beyond to Malaysia and Singapore and bridging the South China Sea and the Bay of Bengal, the new transport infrastructure will also connect with China’s ambitious Belt and Road Initiative that will link China with Southeast Asia, India, Russia, Europe and Central Asia, opening unprecedented access to new markets.

A aphorism in China that "Where there is a railway There is gold (https://www.thaipost.net), the Chinese “Belt and Road Initiative” (BRI), aims to boost the economic links between China and Africa, Asia, Europe, Latin America and the Middle East. Its focus is on driving the economy and trade, the BRI as an ambitious effort to boost regional cooperation and connectivity, Thailand and with new railways infrastructure point in southern will stands to gain enormous benefits from China’s belt and road initiatives. And this will result in the long-lasting growth of the economy of Thailand, overabundance of new business chances is available along with this huge initiative. In particular, variety business opportunities for foreign companies to Thailand which should be seen as multinational trade treaties, the privileged legal environment in the EEC, as well as this opens great opportunities to participate in these developments from Thailand as Southeast Asia’s investment hub furthermore the Thai Kra Isthmus canal project connects the Gulf of Thailand with the Andaman Sea across southern Thailand and provides an alternative to transit through the Straits of Malacca (<https://pugnatorius.com/obor/>).

**5. Conclusion**

5.1 Summary

Railway, its large transportation capacity, low pollution, reliability, energy saving, which facilities people’s lives and solves many transportation-related problems. This chapter shows the rail freight demand and opportunities into southern railways line. A number of key ideas emerge from this novelty, first, For the rail freight are increasingly involved in policies promoting more efficient logistics and they support non-road transport such as railways and waterways. The infrastructure reform of Thailand development transportation strategy for 20 years ( 2017-2036), the Southern line railways improvement double track will bring a huge rail freight with cross border volume demand, as routing will boost rail freight demand from 1.53 million ton in 2030, predicting an 55.55% increase in total freight demand to 2.38 million tons in 2050. Next, we have shown that the domestic containerized and containerized to Malaysia can increasing with the enhancement of railway double track and will boost economic of Southern of Thailand in the time project respectively.

5.2 Implication

5.3 Limitation

5.4 Future Research Direction

References

Essen, H. van O. Bello, J. Dings, R.van den Brink (2003) To shift or not to shift, that's the question. The environmental performance of freight and passenger transport modes in the light of policy making. Delft, CE, March, 2003. <http://www.ce.nl/publicatie/to_shift_or_not_to_shift%2C_thats_the_question/66>

Rich, J., O. Kveiborg, C. Hansen (2009) On structural inelasticity of modal substitution in freight transport. Journal of Transport Geography (2009)

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