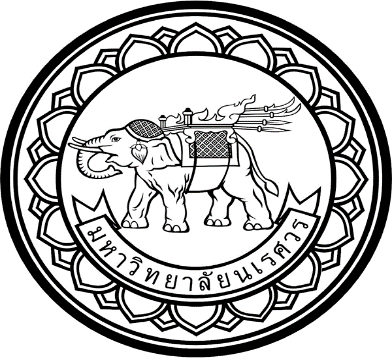
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**Thesis Proposal**

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| --- | --- |
| **Thesis Title** | Foster Factors to Rail Freight in Southern of Thailand |
| **Author** | Oranicha Buthphorm |
| **Identification** | 59032811 |
| **Programme** | Doctor of Philosophy |
| **Field of Study** | Logistics and Supply Chain |
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| **Thesis Committee Member** | Dr. Boonsub Panichakarn |
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| **Academic Year** | 2562 |

**Thesis Proposal**

**Title**  Foster Factors to Rail Freight in Southern of Thailand

**1. Background and Significance of the Study**

Presently, global economy which no frontier, economic robust by development of strong transportation which reduced costs in order to economic enhancement together with social opportunities and benefits. Railways industry plays an important role in many countries of the world since it is more economical than other mean of transport (Bramo, 2014). Rail is a vital service to global society and the transport backbone of a sustainable economy (UIC, 2015). In particular, rail transport as a result of its energy efficiency, reduced greenhouse gas emissions and lower cost per ton kilometer, is expected to play an increasingly important role in the conveyance of freight over long distance ([www.tralac.org](http://www.tralac.org)). “Sustainable transport supports inclusive growth, job creation, poverty reduction, access to markets, the empowerment of women, and the well-being of persons with disabilities and other vulnerable groups.”

As we know train and railroads affect to our lives in a variety of ways which we not may be awareness and realize, most of the commodities that manufacturers need to create the products we consume are transported around the world in efficiency way in and on rail cars. The tool for balanced national transportation system and globally competitive economy is rail, railways its used to transport large numbers of passengers and freight carry huge amounts of commodities at specified speeds. Railway traffic has increased over the last decade and it is believed to increase further with the movement of transportation from road to rail, due to the increasing energy costs and demand to reduce emission (Stenstrom et al, 2012). “The use of railroads is essential to virtually all supply chains in every industry, making them indispensable to the economy,” the report stated in its conclusion. “Not only do railway suppliers produce vital pieces of equipment to support that economic activity; they also provide additional support services such as leasing operations; distribution and logistics; as well as maintenance and repair services that generate additional economic value throughout the economy.” [Mischa Wanek-Libman](https://www.railwayage.com/author/mwanek/), Editor, Railway Track & Structures; and Engineering Editor, Railway Age

The reality is that transportation plays a broad role in shaping economies; supports cluster and agglomerations, increase productivities, enhances jobs and labor market accessibility, opens new markets for business and enhances supply chain efficiency (Dowell, 2017). For the last few decades, we’ve treated rail in New Zealand quite differently to the way we treat roads. Rail has been considered a business that needs to pay its way and make a financial profit. Investment in rail has been about supporting that by ‘turning around’ the business. By comparison, we invest in roads based on the expected impact that investment will have on the overall economy. This includes measures such as improved travel time savings and safety. The impact a road project will have on fuel tax and road user charge revenues are never even considered (Lowrie, 2017). 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).

Railways well know as long distance winners as long distances freight transport id constantly growing. The significance of rail freight over large distance is noticeably on the rise, as North America, Australia, 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)

Tracking the Power of Rail Supply: The Economic Impact of Rail Suppliers in the U.S. **A new report from Oxford Economics has found that the railway supply industry’s total contribution to U.S. gross domestic product (GDP) in 2017 was $74.2 billion, which highlights the industry’s significant economic impact, said industry stakeholders.**

A growing demand for freight transportation combined with limited capital to expand the rail infrastructure. **Increased investment in greener transport methods such as rail freight are essential for driving worldwide economic and social development.** A move to more sustainable freight and passenger transport, it says, which includes integrated port terminals, well-planned airports and consistent standards and regulations for efficient border crossings, could produce a global GDP increase of US$2.6 trillion. It also highlights various case studies worldwide, including China’s One Belt, One Road Initiative, through which its land-based ‘Silk Road’ project is already providing new trading opportunities via freight between Europe and the Far East. Simon Weedy (<https://www.railfreight.com>). 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.

To understand situation in Thailand with stand against of expansion, we analyzed historical drivers lately since 2010. For the last few decades, Thai’s Government have treated rail in Thailand very differently to the way treated roads. Demanding for rail transport in Thailand estimates is increasing (NAM, 2018), while the railway infrastructure is expanding slowly. As requirement to the railway industry to run the better solution for available capacity, typically by running additional trains and expanding tracks, and aligns with maintaining acceptance levels of efficiency and performance. There is a need increase railway infrastructure to facilitate and crate smooth transportation, hence arise economic and social benefits. P. Vanichkobchinada (2006), the demand of road freight transportation has been continuous growing. Road traffic congestion can usually be observed both in in-urban and inter-urban areas. However, such congestion is associated with higher transportation cost, more fuel consumption and environment impacts. However, generally in Thailand, agricultural products such as rice, coconut and sugar, merchandises products depend largely on track transportation. As a result, very few portions of these cargos being transported by rail, despite of its several advantages of large volumes services offered for bulky cargos. Service expansion is the significant answer in securing future demand and modal shift share.

The lack of attention, emphasis, and awareness of the advantages of rail transportation on freight transport, although has begun to change over the few years by the vast investment on railways. In order to, not only improve revenues but also to capture the global economy, The State Railway of Thailand (SRT), never the less it is vital opportunities for the SRT to catch the revenue from new freight traffic and increase its total usage modal shift shares. In 2005 SRT had 4,070 km of track, all of it metre gauge. Nearly all is single-track, although some important sections around Bangkok are double or triple-tracked and there are plans to extend this. Thailand has 4,431 kilometres of metre gauge railway tracks not including mass transit lines in Bangkok. All national rail services are managed by the State Railway of Thailand. All intercity rail transportation is managed by the [State Railway of Thailand](https://en.wikipedia.org/wiki/State_Railway_of_Thailand), a government agency responsible for rail infrastructure investment as well as freight and passenger services. The SRT has long been popularly perceived by the public as inefficient and resistant to change. Trains are usually late, and most of its equipment is old and poorly maintained. The worst financially performing state enterprise, the SRT consistently operates at a loss despite being endowed with large amounts of property and receiving large government budgets; it reported a preliminary loss of 7.58 billion baht in 2010. Recurring government attempts at restructuring and/or privatization throughout the 2000s have always been strongly opposed by the union and have not made any progress. Only two percent or less of Thailand's freight is transported by rail, despite rail being roughly half the cost of road transport and cleaner environmentally. **Navin Damrigan (NBT World, 2017), said** One of the mega projects which is contained in the national development plan that aims to move Thailand forward is Double Track railway. For this project, the current railways will be developed together while bringing in new double track line. Lindfeldt (2012), Studied the extension of single-track lines into double-track will be an important part of future rail investments in Sweden. Most Swedish railway lines are single-track and the steady growth in demand for passenger and freight transportation calls for more capacity, which in turn imposes a need for more double-track sections. Sogin et al. (2016), Studied the demand for freight rail transportation in North America is anticipated to substantially increase in the foreseeable future. The majority of the North American mainline railway network is single track with passing sidings for meets and passes. Expanding the infrastructure by constructing additional track is necessary to maintain network fluidity under increased rail traffic.

**Based on the government policy covering the Ministry of Transport and development plans at various levels, the National Council for Peace and Order (NCPO) passed a resolution in July 2014 to endorse in principle the seven-year Thailand’s Transport Infrastructure Development Strategy 2015 – 2022.** **From this derive five master plans following 1. development of intercity rail links 2. development of public transport network to solve traffic problems in Bangkok and its perimeter 3. increased road and highway capacity to link major domestic production bases with those in the neighboring countries 4. development of water transport network and 5. increased capacity of air freight services.** The State Railway of Thailand (SRT) is planning to spend nearly 90 billion baht to upgrade the existing single-track railways leading to the deep south to double tracks to cut down travel times for passengers and promote tourism to the region. Rail tracks at Surat Thani railway station will be upgraded under a multi-billion-baht project on a double-track rail network in the far South, which promises faster travel from Chumphon to Padang Besar in Malaysia as figure 1 below. (<https://www.bangkokpost.com>). The southern border provinces are cities with special economic zones. Compared to other special economic zones, other cities are different because the special economic cities in the southern border provinces are prosperous cities on both sides of both Thailand and Malaysia. (<https://www.posttoday.com/>) Linking southern Thailand, Malaysia and the Malacca Strait Until Singapore By transporting the rail system at a low cost from the railway structure in Malaysia which is already ready. The border trade numbers between Thailand and Malaysia in 2018 have been valued at over 600 billion Thai baht.

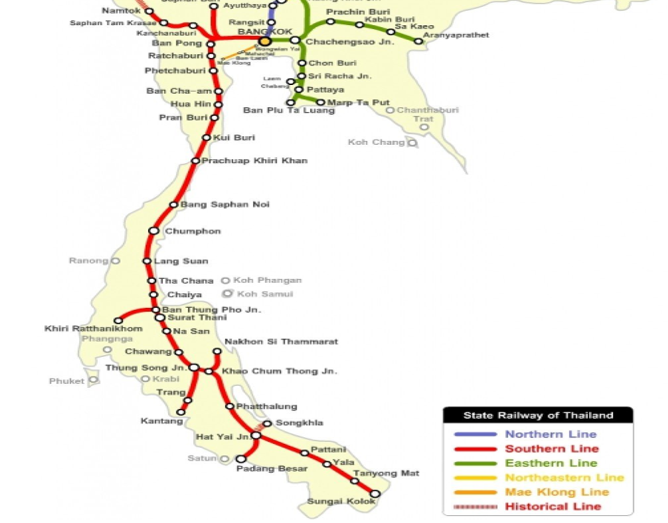


Fig. 1 Railway Doubling Master Plan

Source: State Railway of Thailand, Ministry of Transport

A survey of research documents that have been studied in the country has found that research has been carried out in the study of the southern railway lines and/or dual train for the last 38 year since 1981 as shown table 1. Analysis for identifying research history and gaps and direction for future research, presents a comprehensive Table 1, in which we summarized and classify the selected 16 research contributions. The papers are listed in chronological order, indicating the southern railway lines and/or double track research over time. Each paper is documented in detail in this review which serves as an informative guide for researchers and practitioners interested in this perspective.

Table No. 1 Categories on Literature of southern railway and/or double track railway research

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Paper | | Title | Double Track | | Southern Line |
| 1. Sirisingha, S. (1981) | | Thonburi-Samut Songkram railway: Economic and social benefits and costs | No | | Yes |
| 2. Kaewkarn, P. (1991) | | The construction of the Southern Railway and the economic and political impact | No | | Yes |
| 3. United Nations  (1996) | | Trans-Asian railway in railway in Indonesia, Malaysia, Singapore and Thailand (South) | No | | Yes |
| 4. Theera, R. (2004) | | Study of Lower Southern Railway Line – Service Extension to Satun Province | No | | Yes |
| 5. Theera, R. (2008) | | Rail extension to Satun province without alteration of existing timetable | No | | Yes |
| 6. Nimnual, S. et al. (2012) | | Behavior and satisfaction of the train passengers of Mahachai-Wongvienyai railway line | No | | Yes |
| 7. Ruankham, W. & Jongsureyapart, C. (2016) | | An analysis of positive externality from the Denchai-Chiang Rai-Chiang Khong double track railway: Chiang Rai province's perspectives | Yes | | No |
| 8. Tongpratomwong, T. (2017) | | Double Track Rail Route Development Project: Economic and Social Potential and Opportunities: A Case Study of Mueang District, Maha Sarakham Province | Yes | | No |
| 9. Phanchai, N. (2017) | | The construction of double-track train: Thanon Chira junction to Khon kaen | Yes | | No |
| 10. Chalayonnavin, A. (2017) | | Risk Management approach of state railway of Thailand on the double track railway project of Hua-Hin-Prachuap Khiri Khan Section | Yes | | Yes |
| 11. Renliang, L. et al. (2018) | Social impact assessments of the double track railways construction in the Northeast: Case studies of Mabkabao to China junction and to Khonkaen | | | Yes | No |

Table No. 1 Categories on Literature of Southern Railway and/or Double Track Railway research (continued)

|  |  |  |  |
| --- | --- | --- | --- |
| Paper | Title | Double Track | Southern Line |
| 12. Rangsarikam, C. et al. (2018) | A study of factors affecting the road selection in Udonthani to support double-track transport | Yes | No |
| 13. Poowarotpibul, R. & Chompunth, J. (2018) | An evaluation of public participation in environmental impact assessment: a case study of the construction project of double track railway on Surat Thani-Hat Yai Junction-Songkla route | Yes | Yes |
| 14. Sompracha, A. & Wararatchai, P. (2018) | Service of the state railway of Thailand: A case study of the southern route (Bangkok-Huan Hin) | No | Yes |
| 15. Peetawan, P & Suthiwartnarueout, K. (2018) | Identifying factors affecting the success of rail infrastructure development projects contributing to a logistics platform: A Thailand case study | Yes | Yes |
| 16. Kinsukol,C. & Suwanpot,S. (2019) | Delve into the benefits of the double track railway for the transportation of processed agricultural products in Isan | Yes | No |

Table 2 is derived to assist us explore the research gap through categorizing objectives research different perspectives. By using “Double Track” and “Southern Line” to classify domain of these 16 selected journal papers as shown table 1, we find that the domain of double track and southern line share of 18.75% (3 papers, Table 3), which indicates risk management and environmental impact assessment, and factors affecting the success of rail infrastructure development projects.

Table 2 Classification according research objectives categories

|  |  |  |
| --- | --- | --- |
| Research Objectives Categories | Paper (Totally selected 16 papers) | Number (%) |
| 1. Concerning construction | Kaewkarn P. (1991) | 6.25 |
| 2.Concerning Routing, Linkage | Theera R. (2004), Theera R. (2008) | 12.50 |
| 3.Concerning Development | United Nations (1996), Phanchai, N. (2017), Poowarotpibul, R. & Chompunth, J. (2018) | 18.75 |
| 4.Concerning Passenger | Nimnual, S. et al. (2012), Sompracha, A. & Wararatchai, P. (2018) | 12.50 |
| 5.Concerning Benefits, Potential | Ruankham, W. & Jongsureyapart, C. (2016), Tongpratomwong, T. (2017), Chalayonnavin, A. (2017), Kinsukol,C. & Suwanpot,S. (2019), Sirisingha, S. (1981) | 31.25 |
| 6.Concerning EIA | Renliang, L. et al. (2018), Rangsarikam, C. et al. (2018) | 12.50 |
| 7.Factors affect the success rail infrastructure | Peetawan, P & Suthiwartnarueout, K. (2018) | 6.25 |
| 8.Foster Factors to Rail Freight in Southern of Thailand | None | 0 |

In general terms, rows (1) to (7) in table 2 classify the selected research studies from seven different elements to narrow down the research issues to Foster Factors to Rail Freight in Southern of Thailand as a research gap.

Table 3 Three Literature of Southern Railway and Double Track Railway research aspect categories

|  |  |  |  |
| --- | --- | --- | --- |
| Research Perspectives | Chalayonnavin, A. (2017) | Poowarotpibul, R. & Chompunth, J. (2018) | Peetawan, P & Suthiwartnarueout, K. (2018) |
| Aim | Risk Management | EIA (Environmental Impact Assessment) | Factors affect the success rail infrastructure |
| Routing | Hua-Hin-Prachup Kirikhan | Surat Thani-Had Yai-Songkla | 14 double track projects and 9 new projects |
| Distance | 84 km. | 321 km. | 6,463 km. |
| Research Type | Qualitative Method | Qualitative Method | Qualitative Method |
| Participants | 7 responses   * SRT’s management (1), SRT engineering officer (3), SRT operation officer (3) | 30 responses   * Local Community leader, Local government officer, SRT officer, rail project consultant, Environment academia, and Private environment org. | 30 responses   * executive level of government (14), academia (12), private sector (11) |
| Model | AHP | CIPP-I | AHP and Fuzzy AHP |
| Data collection | Document study, Participation Observation, In-depth Interview | Document study, Participation Observation, In-depth Interview | Document study, Interview |
| Tool | Questionnaire (Guided Interview) | Questionnaire | Questionnaire |
| Data Analysis | Descriptive Analysis | Descriptive Analysis | AHP and Fuzzy AHP |

No previous paper is found under this classification (Table 3), hence we concluded that this research area is under-represented with insufficient study, which would be attributed to problem’s higher level of complexity.

Foster factors to rail freight in southern of Thailand; Economy, Social, technology, political; investment, regulation, subsidy, environmental; safety and security, has not been deep elucidated, so it is not obvious which one is key players in actual situation. Therefore, in this work of the study, we report investigation of the freight railway problems, current issues, demand in southern line. We also investigate and report the effect and foster factors of railway freight, as well as the sustainability factors conditions which boost and guidance the southern rail freight development plan. The results of the study will hopefully aid the State Railway of Thailand (SRT), Department of Rail Transport (DRT), freight user, freight forwarder, Multimodal Transport Operator (MTOs), Rail Communities and local business along southern line. The double track railway system will bring about appreciation of economic booster in order to gain competitive advantage from cheaper transportation, more efficiency transport, more friendly to the environment and sustainability transportation could bring us security society. The research will also provide new directions for further studies that can be explored related to this topic. Furthermore, the study aims for the enhancement of the freight railway especially in promises of economic growth and serve the rapid of increased freight demand, and integral transportation and logistics hub to serve for China Railway Plan (Belt Road Initiative: BRI) in Southeast Asia.

**2. Purposes of the Study**

The objectives of this research were:

2.1 To explore the role of railway system in southern of Thailand.

2.2 To study the current infrastructure’s problems of the rail freight in southern of Thailand.

2.3 To investigate the needs, demand, trend, rail freight boosting in southern line.

2.4 To explore the foster factors of rail freight transport in southern of Thailand.

2.5 To investigate the sustainability factors conditions that boost and support the rail freight in southern of Thailand.

2.6 To guidance the southern rail freight development plan according to create and maintain the economic and social sustainability.

Overall aim of this study is to draw on the rail expertise, field experiences and the vision of key “expert” to help define the foster factors for rail freight in southern rail line, identify issues, needs and gaps, and make recommendations for further development in the implementation of factor to southern rail freight line in according to achieve the nation’s transport strategy and boost economic in competitive advantage alternative way.

**3. Statement of the Problems**

Both freight and passenger have declined significantly, freight operations on SRT are not considered a priority and traffic has been slowly lost to the competing road carriers (UN,1996). Shipper were often disappointed by service from SRT, which lacked suitable equipment as locomotive and rolling stock, argued that there was insufficient track capability to allow for more trains carrying freight on overburdened infrastructure. Thailand far away for confident of FDI and Logistics Service Providers to use the services. By lack of poor physical interconnectivity and integrated, multimodal transport, modal-shift share still in plan and no progressing in evidences, effecting the competitive position of Thailand.

Heavy investment in road assets over the past 30 years together with more efficient and cost effective road transport operators have resulted in a strong primary and secondary highway network and customer responsive operations throughout Thailand. Unfortunately, the comparable investment in either hardware or software for railways has not taken place. The road mode dominates and rail is left with either an uneconomic role of carrying subsidized passengers or trying to serve commercial goods markets with limited capacity and poor infrastructure. The result of this imbalance has left Thailand with limited rail inter-regional interconnectivity, high logistics cost, poor service to key shippers, poor track and equipment condition resulting in poor rail service standards and higher transaction costs than other economic competitors like People‟s Republic of China (PRC) or Malaysia. Huge investment in road, no investment in rail fact the ministry of transport of Thailand for more than 50 years. Rail is poor infrastructure and administrative is left behind with no attention and focus that rail is the most advantages of transportation. Thailand’s internal transport cost is roughly 1.5 to 2 times more than Asian country as Japan, Malaysia, and People’s Republic of China 27%, with 59.7%, 39.6%, 33.5%, and 27% respectively. To induces the demand of rail freight service in Thailand includes low or fare cost bulky cargos freight over long distance to keep cost reduction and maintain physical interconnectivity logistics to port, ICD production center and consumers (ADB Consultant’s Report, 2013).

Thailand is currently still in trap of a middle-income country and Thailand has been plans to become a developed country. Focusing on Thais’ GDP and economy, which will need to boost and raise up the transport foundation; infrastructure to improve and generate opportunities to catch chance and escape from the middle-income country. Rail infrastructure have a lot of advantage could bring the reducing transportation cost, friendly environment and benefits to social by increasing jobs.

Government‟s key objective is “ to increase efficiency and upgrade standards for international shipping in terms of speed, safety and punctuality and to support economic development within a framework of regional cooperation and to reduce the country‟s overall logistics cost” 7 . As other countries modernize their railway infrastructure and operations, continued improved trade will also rely on Thailand improving its physical interconnectivity – both through enhanced traditional railway connections as well as potential high speed railway connections - to other countries in the region. The opportunities to enhances rail freight infrastructure be trade logistics to south of Thailand with Malaysia, Singapore and Indonesia and the world. Hence People’s Republic of China (PRC) has been increasing and expansion of economy to the world by rail investment in biggest project One Belt One Road (OBOR) it’s no question for the most advantages transportation tool to create chance, enhances economy and political power is rail. Rail will make Thailand has the potential to become logistics hub of Southeast Asia or rail can be obstacles trade in the whole region and no frontier beyond (Fig. 2).

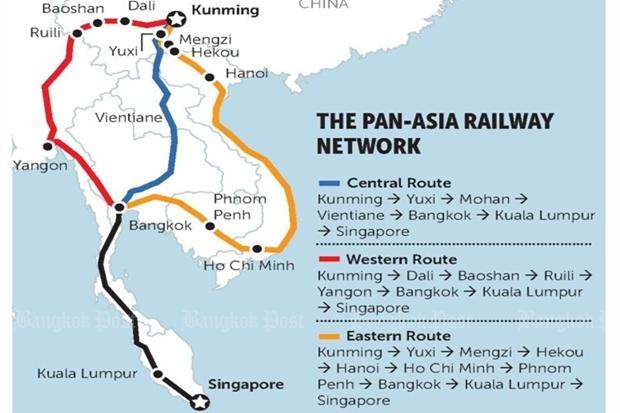


Fig. 2 The China’s pan-Asia railway network

Source: <https://www.bangkokpost.com>

**4. Scope of the Study**

The information are included in the scope as following: the purpose of the study, data collection, the duration, and the geographical location covered in this study.

The purpose of the study as investigates, explore the demand, foster factor and guidance in order to generate sustainable transport of rail freight of southern line of Thailand.

Data collection, will conduct in two stages, pilot study on secondary data verifying theories regarding railway demand, factors according to rail freight boosting economic development and sustainable, final stage; the field data to collect data with target participants in primary stakeholder and secondary stakeholder sample; freight user, rail suppliers, local chamber, industries, NGOs, media etc. in the province which line located.

The duration of this study, commence on January 2019 to Dec. 2020.

The geographical location of this study covered and focus on Southern Line in Thailand from Nakhon Pathom to Padang Besar (Thai). The 1st phrase is from Nakhon Pathom-Chumporn and 2nd phrase from Chumporn to Padang Besar (Thai), distance in totally is 959 km. as shown in below table (Table 4). The State Railway of Thailand (SRT) has started dividing the five routes into 13 contracts from the previous five contracts, in line with the order of a government-sponsored panel tasked with supervising the procurement processes of all state agencies. The CSCS Consortium was responsible for project management and construction supervision for Nakhon Pathom – Chumphon section. (<https://dc-asia.dorsch.de/> ) The progress of the Southern Railway Project is currently underway with an average of 28% of construction progress, consisting of 33% in Nakhon Pathom - Hua Hin period, 30% in Hua Hin - Prachuap Khiri Khan and 30% in Prachuap Khiri Khan - Chumphon period (https://www.posttoday.com).

Table 4 Southern Railway Railroad Double Track Project

|  |  |  |  |
| --- | --- | --- | --- |
| Route | Distance (Km) | Station | Expected completed |
| 1. Nakhon Pathom- Hua Hin | 165 | 28 | 2018/2022 |
| 2. Hua Hin - Prachuap Khiri Khan, | 90 | 12 | 2018/2022 |
| 3. Prachuap Khiri Khan - Chumphon | 167 | 21 | 2018/2022 |
| 4. Chumphon - Surat Thani | 168 | 22 | n/a |
| 5. Surat Thani- Hat Yai, | 324 | 56 | n/a |
| 6. Hat Yai - Padang Besar (Thai). | 45 | 6 | n/a |
| Total | 959 | 145 |  |

Currently, the construction started on March 2018 for the 1st phrase and devided to 5 railway contractual as following; 1) Nakhon Pathom -Nong Palai, 2) Nong palai-Huahin 3) Hua-hin – Prachuap Kirikhan 4) Prachuap Kirikhan- Bang sapan noi and 5) Bang sapan noi -Chumporn, with the distance are 93 km, 76 km, 84 km, 88 km and 79 km. respectively, as shown in fig. 3 below.

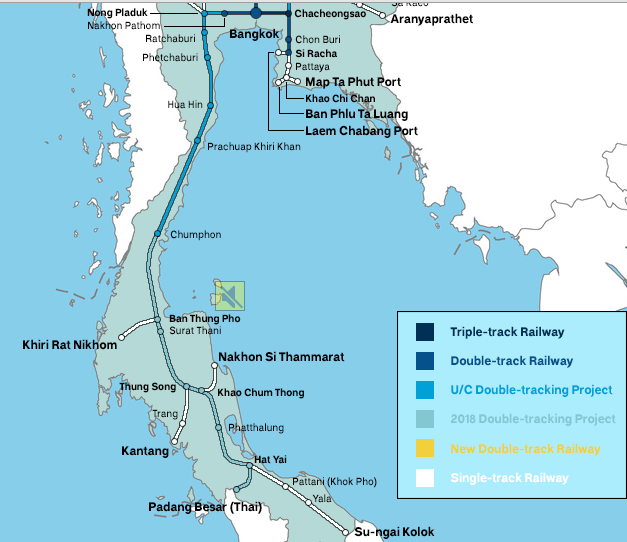


Fig. 3 Doubling Track of Southern Railway Line

Source: [https://www. skyscrapercity.com](https://www.bangkokpost.com)

The Nakhon Pathom - Hua Hin route cover a distance of 169 km.  It was divided into two civil - works sections; from Nakhon Pathom to Nong Plalai and from Nong Plalai to Hua Hin.  Construction of the two sections will take 36 months. The Hua Hin - Prachuab Khiri Khan route cover a distance of 84 km.  It was handled by one civil contractor; from Nong Kae Station to Kan Kradai Station. Construction of the whole line in this portion will take 30 months. The Prachuab Khiri Khan - Chumphon route covers a distance of 168 km.  It was divided into two civil - works for this route: from Prachuab Khiri Khan to Bang Saphan Noi which will take 33 months of construction and from Bang Saphan Noi to Chumphon which will take 36 months of construction. (<https://dc-asia.dorsch.de/projects/>)

Padang Besar Railway Station (Thai), which connects to northernmost station of the West Coast line Padang Besar railway station located on the border town of Padang Besar, Perlis State, Malaysia. Padang Besar Railway Station also has a cargo yard which is used as a dry port for northern Malaysia and the Economic Triangle. Trilateral Economic Zone Development Program, Indonesia, Malaysia, Thailand (https://th.wikipedia.org/wiki), which is essential in generating freight for rail, Padang Besar (Thai). Even, Sungai Kolok Railway Station Located on Asia Road 18, the first station of the Southern Railway and the last station of the Southern Railway With the boundary of Rantupan Yang Malaysia and has the largest distance from Bangkok Railway Station up to 1,142 kilometers. However, Sungai Kolok Train Station had the same train route already connected to the Malaysian Paseum Railway Station since 1978 just cancel the operation for 22 years according to prevent illegal smuggling by carrying rice from Thailand to Kelantan coast and transport Kelantan oil into Thai side. Even though, on Apr 2019, the joint meeting of the leaders of the 3 plan for economic development cooperation in Indonesia - Malaysia - Thailand to drives for restoration of train operation the route from Sungai Kolok to Malaysia, hopes to boost border trade value and economic development, Is a consequence of driving economic development and society in the sub-region after links between the southern border areas of Thailand with the development of the East Coast Rail Line (ECRL) in Malaysia (Fig.4).



Fig. 4 Connecting Doubling Track of Thai and Malaysia Railway Line

Source: <https://forum.lowyat.net/topic/4096370/+0>

The opportunity to connect regional development along the Belt and Road Initiative of China (Fig. 2) by opening a new economic corridor consisting of Pattani - Yala - Narathiwat -Perak - Kelantan Is a new connection strategy of "Economic Corridor No. 6" and discussing the opportunities to connect the free telecommunication zone, supports electronic commerce through international connections (<https://mgronline.com>). To link more train routes than before in Thailand set the Hat Yai - Kuala Lumpur route, with expansion the Kelantan - Sungai Kolok - Hat Yai route logically throughout the system. The border trade numbers between Thailand and Malaysia in 2018 have been valued at over 600 billion Thai baht. If the said route is opened will increase border trade value and the overall economic development even better. With the reason above, thereby this study will only focus on the double track routing from Nakhon Pathom to Padang Besar (Thai).

To receives a comprehensive whole picture of the foster factors of rail freight in southern line in Thailand, the primary data will be collected from three types of stakeholder; key stakeholder, primary stakeholder and secondary stakeholder are should be distinguished according to the data collection will be conducted to their specific power position in the process. 1) the key stakeholder for the rail freight in southern line are State Railway of Thailand and Department of Rail Transport they are the high power to deploy railway strategy, regulation and high influence in this double track rail freight in southern line project. 2) the primary stakeholder are freight user and suppliers, private sector collective transport operators; depot, warehouse, distribution center, seaport and airport, which high interested, receives direct impact and requires to managed closely to the project. 3) the secondary stakeholder are local communities, regional/local business, local business associations, owners and occupants of properties affected by the schemes, media, trade agency, union, national environmental NGOs, who will be participants and give a richness information of this study. This study will not cover other problems that are not consider as one of the foster factors of rail freight in southern line of Thailand. The other part or stakeholder which not fall apart of above participants are not within the scope of this research. The study would be done through the Non-participation observation, deep-interview, and focus group. By their strategy the researcher will be able to know the foster factors of rail freight in southern line of Thailand.

Secondary data, which is studied from the thesis, books, and publications related to the factors that support railroad freight transportation at the local, national and international levels. Both domestically and internationally Including the study of relevant theories as a reference and data base to support the concepts in this study. The said information is collected from various sources such as academic documents, textbooks, thesis reports and thesis.

**5. Key Words**

Rail Freight, Foster Factor, Southern Rail Line, Double Track, Sustainable Transportation, Economic Booster

**6.** **Related Works and Studies**

**For a broad overview of research problems and phenomenon studied regarding of railway, railway double track, railways freight and its co-ordination with foster factors to boost the economic be sustainable transportation, we refer to factors by following; economic, social and cultural, technical, political and environmental**

6.1 Economic foster factor

Economic factor analysis was conducted in many studies. For instance, Rostow (1960), “the introducing of the railroad has been historically the most powerful single initiator of take-offs” having “three major kinds of impact on economic growth during take-off period” namely, lowering transport cost, and bringing new areas and products into the market, developing a major new export sector; and leading on to the development of modern coal, iron and engineering industries. Presently, Martin (2018), focused on the massive construction of impact of the railroad on the geographic, economic and political future of the US., railroads even helped shape the physical growth of cities and towns and made suburban living feasible. In Europe, Bogart et al. (2017), analyzed the railways caused population to significantly increase in parishes close to stations, and in one likely to gain new occupation, growth would have been substantially lower in England and Wales without railways. Eijgenraam and Ossokina (2006), mentioned cost-benefits analysis to study of structure and quantify the main effects of a large multifunctional land use project around the railway station Amsterdam, South WTC, welfare effects in which tunneling the transport infrastructure and urban construction above tunnel. The existence of diverse and numerous investigated since Fremdling (1977), the German railroad contributed to economic growth from 1840s to 1870s. The emergence of modern Germany iron industry was due to the railroads demand from iron products.

In Asia, Tang (2013), conducted the relationship between railways and firm activity across Japan, he found that rail access corresponds to lower firm number total and average firm capitalization increase after controlling for market size and geography. Besides, Cui, Pittman and Zhao (2018), to continued success of Chinese economic growth will depend to no small extent on the ability of its railway system to continue expanding its capacity to carry both coal from mines and manufactured product for export.

In Thailand, Economic factor analysis was conducted the research studies. Since 1991 until present day, Kaewkarn, P. (1991), analyzed the need of the Thai government to maintain sovereignty over the Malayu districts. And the southern border provinces of Thailand that are threatened by Western imperial countries. The need to intensify southern districts closer to the central government and the need to provide an important mechanism of political and administrative measures and economy in order to meet the Thai national integration policy. Vanichkobchinda, P. (2007) Greater Mekong Subregion (GMS), GMS freight distribution center under “the North-South and East-West Economic Corridor Development Plan.” A broadened freight service in Thai railway would support the trade in GMS, and this in fact becomes a highly prospective opportunity for the Thai government to consider granting investment. Some analyzed on railways double track as Tangpathomwong, T. (2017) analyzed Double Track Rail Road Development Project: Economic Potential and Social Economic Case Study: Mueang District, Maha Sarakham Province, found that railway development is a significant for investment and industrial business in Mahasarakham especially railway station located where it suitable for urban growth boundary. On social, life quality, and environment will affect in every stage in this project. Due to the construction, migration issues, expropriated land, road safety, and noise pollution. Soonest, Peetawan, W. (2018) conducted the studied of railways double track projects included in this research were double tracking the existing railways and the construction of new routes. Most projects were in the preparatory stage. The researchers extracted 24 factors from the literature review and categorized them into five dimensions. AHP and fuzzy AHP were deployed and leading success factors were identified. It was found that a rail development master plan has the highest influence on a project's success.

6.2 **Social and cultural** factor

Social and cultural was contributes much awareness of railways construction after completion. Research into spirit and cultural are considered. Jin and Shen (2017), for example, studied the vigorous development of post war Japan Railway culture, the fighting spirit of innovation become aware of another window of Japanese society and culture. Similarly, Smith (1994), analyzed the acceptance of high levels of the congestion on public transport particularly commuter rail transport which have been a persistent feature of urban railways in Japan since WWII, may reflect the subjugation of individual will to the implicit aim of preserving social harmony. Phuvarojphibun, R and Chompan, J (2018), evaluated of public participation in EIA A case study of the double track railway construction project Surat Thani - Hat Yai - Songkhla Junction. To enhance knowledge and understanding in the process of public participation Including project owners with accurate and clear disclosure aware of sincerity and transparency until the complete of process in order to achieve comunities acceptance and well understand.

6.3 **Technical** factor

The railway systems in most countries were established over a hundred years ago, when competition from other land- based modes of transport was almost non-existing. Railway technology is old with roots back in the 19th century and more than 170 years of history since the opening of a developed form of passenger railway between Liverpool and Machester, Smith (1986). Major challenges arise is currently a focus on digital transformation in railways (Pierigud, [2018](https://www.tandfonline.com/doi/full/10.1080/21650020.2019.1566022)) for instance, within safety (Parkinson & Bamford, [2016](https://www.tandfonline.com/doi/full/10.1080/21650020.2019.1566022)) freight transport (Green, [2017](https://www.tandfonline.com/doi/full/10.1080/21650020.2019.1566022)) and maintenance (Tute, [2018](https://www.tandfonline.com/doi/full/10.1080/21650020.2019.1566022)).

6.4 **Political** factor

Railways are significant for the realization of innovation, creativity, and development. With Thailand, Tungtongjit, P. (2009) focused on Logistic Development, with Special Reference to Improving the Rail Network Development Strategy of The Ministry of Transport. The development of the railway network had efficient transportation modes for direct links between the railway system and major seaports, and international airports. Moreover, the State Railways of Thailand must become part of the National Transportation Development Plan with the Department of Royal Highways, in integrating the railway system with the national and international highways. Railways contribute to social enthusiasm in addition to market competitiveness by conveying millions of consumers as well as personnel to urban places and villages around the world, Adoh (2018) in Nigeria the vibrant fortune of rail transport operations and development has been on decline since mid1970"s. the remarkable role politics of policies inconsistency and somersault plays, the detriment of realisation of a vibrant railway system in Nigeria were highlighted, the railways institution to the apron string of the Federal department of Transport immensely contributed to the stunted growth in technologies and operations in the railways, Adeleye (2017). Kurosaki and Okuda (2013), studied on-rail competition in Korea: A comparison with Railways in Japan and Europe. They recommended to implement sufficient investigation and analysis regarding the policy and its potential results and implications in advance. If the government of promoted the new scheme, it is also recommended that the government should take sufficient to plan and prepare the appropriate rules and regulations for smooth operations, since it took more than two decades to establish the correct regulation in Europe. Yu et al. (2017), investigated the growth impact of transport infrastructure investment: A regional analysis for the China (1978-2008), found that there is significant spatial variation in the productivity effects of transport infrastructure in China, that transportation investment will yield the highest economic returns, which is in line with “the emergence of new economic center” theory. Moreover, Ezhelya (2018), investigated the political and economic aspects of the development of the railways transport of China from 1949 to 2016, mentioned flexible investment policy, promote the steady development of the national railway transportation system.

6.5 **Environmental** factor

Liu et al. (2019), conducted the studies of Health and climate impact of future United States land freight modelled with Global-to-Urban Models, said overall air pollutant emission and health impacts from the freight truck-rail system will be greatly reduced from 2010 to 2030, while long term climate forming will be continue increase if petroleum is the fuel source. Carbon tax could shift freight shipment from trucking to energy efficiency rail, providing a great reduction in long term forcing among all policies (24%). Increasing urban compactness reduce freight cost but increase populations (13%) exposure/unit emission, occurring slight health benefits over the current urban sprawl trend.

Wang et al. (2019), studied Accessing the impact High-Speed Rail on domestic aviation Co2 emission in China. Found that challenging to decarbonizing, through mode substitution for air transportation, HSR generated a cumulative net saving of between 1.76 and 2.76 million tons of CO2 from 2012 to 2015., equivalent to 3.2% -5.1% of 2015 domestic aviation emissions. Regulation. Likewise, Shibayama (2017), analyzed the for long-distance transport as urban and regional transport, transportation infrastructure damaged by various types of natural diasters. Earthequakes, tsunamis, affected the land transport infrastructure to a larger and direct damage triggered by the natural diaster.

Nagurney et al. (2010), investigated on environmental impact assessment of transportation networks with degradable links in an era of climate change, they said construct environmental link importance indicators that allow for the ranking of links in transportation networks in terms of their environmental importance, should they be removed/destroyed.

**7.** **Research Procedures of the Study**

7.1 Field data and participants

This study will involve semi-structured interviews and the field data and **participants are** stakeholders of this field study as shown in table 4 below;

Table 4 Railway double track project stakeholder classification

|  |  |  |
| --- | --- | --- |
| **Key**  **Stakeholder** | **Primary Stakeholder** | **Secondary Stakeholder** |
| 1. Dept. of Rail Transport (DRT) | 1. Shipper, Manufacturer | 1. Local Communities, local community organizations, Local Government, Local Business, local government |
| 2. State Railway of Thailand (SRT) | 2. Private sector collective transport operators; depot, warehouse DC, seaport and airport, Transportation business, Customs Brokerages Logistics Service Providers (LSP), Multimodal Transport Operator (MTOs), seaport and airport | 2. Local Chamber, Commerce Affair, Thai Federation Industry |
| 3. Ministry of Transportation (MOT) | 3. Railway Suppliers: Local, domestic and International | 3. Local NGOs, Local Media |
| 4. Local railway | 4. Railway Subcontractor | 4. Local Education Institute |

The participants will be purposefully selected by their expertise fields and some by stratified purposeful sampling and opportunistic. Key informant interviews are "qualitative, in-depth interviews of 15 to 35 people selected for their first-hand knowledge about a topic of interest. The interviews are loosely structured, relying on a list of issues to be discussed. Key informant interviews resemble a conversation among acquaintances, allowing a free flow of ideas and information. Interviewers frame questions spontaneously, probe for information and take notes, which are elaborated on later" (USAID 1996). The qualitative sample size, for grounded theory suggested 30-50 interviews, phenomenology method recommends 5 – 25 participants but ultimately, the required number of participants should on when saturation is reached.

7.2 Variables in the Research

Independent Variables are

* Rail Freight Demand Forecasting
* Current Multimodal infrastructure
* Investment aspect; Economic, Social and culture, Technical, Political, and Environmental
* Key Stakeholder
* Primary Stakeholder
* Secondary Stakeholder

Dependent Variable is Foster Factors to Rail Freight in Southern of Thailand

7.3 Research Instruments and Instrument Development

##### As be field data, the purpose and the variables of this study, according to achieve the goal of investigate and explore the richness and valuable information, researcher will conduct qualitative method by in -depth interviews, focus group and non-participation observation. The research instrument for obtain data are below;

Table 5 Data, Method, and Research Instruments

|  |  |  |
| --- | --- | --- |
| Data Type | Method Techniques | Research Instruments |
| Primary Data | Non-participation observation | Recording tools with Checklist, anecdotal records, Notetaking, photographs, audio, and film (have permission) |
| Direct personal investigation by in-depth interviews | Interview questions with semi-structured interviews, opened end questions and scale questions |
| Focus group | Interview questions and recording the responses by tape recording and notetaking |
| Secondary Data | Contribute the information of background information | Published data in a various publication of central state or local governments, technical and trade journals, books, magazines and newspapers, reports and publications of various associations connected with rail industry, public records and statistics, historical documents.  and probing for information from various databases from library and through internet |

Primary Data Instrument Development, in formerly, running of real study, a small-scale study to refine the research topic and study methods.

The pilot protocol questions can be strengthened through piloting the interview, in order to verify flow and limitation in the interview design for the modification and adjust the interview guide respectively in early embarking to this study.

7.4 Data Collection

7.4.1 Data Collection of the primary data, this case study research, will conduct by in- depth interview, focus group and non-participation observation, with the expertise field of all stakeholder by quota, stratified and opportunistic purposeful and will collect data from stakeholder by the techniques and number of participants as following tables;

Table 6 Primary Sources for Data Collection

|  |  |
| --- | --- |
| Primary Sources | Key Participants |
| **Key Stakeholder** |  |
| **DRT, SRT, MOT and Local railway staff** | 12 |
| **Primary Stakeholder** |  |
| In-depth interviewing of manufacturing | 10 |
| In-depth interviewing of logistics private sector; warehouse, DC, CY, Depot, trucking business, customs brokerages | 7 |
| In-depth interviewing of railway suppliers; local, domestic and International | 4 |
| In-depth interviewing of railway subcontractor and consultant | 6 |
| **Secondary Stakeholder** |  |
| In-depth interviewing of office of commercial affair | 5 |
| In-depth interviewing of chamber | 5 |
| In-depth interviewing of the federation of Thai Industries | 5 |
| In-depth interviewing of the institution in education | 2 |
| In-depth interviewing of National environmental NGOs | 1 |
| In-depth interviewing of media | 1 |
| Focus group with community leader, regional/local business | 5 |
| Non-participation observation on the double track railway station and communities along southern line |  |

For the purpose of research, and in order to achieve the objectives will be collected and will be used both primary and secondary data. The primary data will be collected in three methods.

1) an in-depth interview method, will be carried out with expertise in field all the participants of stakeholder by identify stakeholder groups from national, facility and beneficiary levels and individual identify in groups, additional interviewees may be recruitment during data collecting. The way to approaches to conducting qualitative interviewing by the informal conversational interview, employing guided interview and open-ended interview. The steps necessary for conducting an in-depth interview include preparing for data collection, conducting the interviews by unstructured interview to Semi-structured interview, transcribing and analyzing the data, and disseminating the study results. Therefore, researcher will develop interview guide in advance and conduct at least one test interview. These test interviews may be undertaken with peers or volunteers. Adjusting the questions after the initial interviews allows the interview guide to be fine-tuned during the interview process. It is also important to schedule the interview at a time and place that are convenient for the participant. Depending on the subject matter and context, interviews last from 30 to 60 minutes each. In-depth interviews can take place anywhere the respondents are at work, home, a public location, a research facility or by telephone. Each interview will Conducting interviews until no doubts are found or there is no information New born, also known as Saturated data So will stop the interview. To ensure Transcribing data from qualitative interviews is very time-consuming. The researchers will transcribe the interview as soon as possible after completion, start identifying analytical structures and find similarities and differences between different interviewees’ experiences. As part of ensuring trustworthiness in qualitative data-driven explorations, member checking, also known as respondent validation or participant validation, can be used. Member checking is a method of returning an interview transcript or debriefing the analytical results with participants for agreement (Lincoln and Guba [1985](https://www.tandfonline.com/doi/full/10.1080/0142159X.2018.1497149); Creswell [2013](https://www.tandfonline.com/doi/full/10.1080/0142159X.2018.1497149)).

2) The focus group, will be conducted with the local community leader with a small group of between 6 and 12, will conduct by asking them questions about their experiences with or ideas about a rail freight service factors or related topics. Start with recruiting the expertise who are willing to provide their opinions, share their feelings and attitudes about rail freight service factors. The video recording will be suit conduct method and note-taker. Once participants left their statements, facial reactions, nonverbal cues, and other responses, assembling the puzzle is reviewing.

3) The non-participation observation will be conduct to determines what people do given different scenarios and environmental factors, the effective video record observations, Note-taking, take photographs and analyze behaviors and inferences will be uses to collect data.

7.4.1.1 Research Instruments

With this study is a qualitative research, although the main instrument is the researcher, since the researchers will need to spend time building a personal network in the communities interacting with people, observes, and in order to identify suitable informants for interviewing.  Researchers roles to separate personal opinions and judgments from accurate observations, stereotypes, and effective recording of wording, meanings, and opinions of research participants. The researcher will use a non-directive style of interviewing using open-ended questions allowing the participants freedom to control pacing and subject matter of the interview. In additional, will be used more directive style of questioning will be used as needed when requires more clarification of information that the participants will be providing.

Another instrument used in this research was an interview form which is a guideline. Question in the interview In-depth analysis is a tool created by the researchers by studying the issues question from the review literature, related theoretical concepts used to explain the factors that support rail freight transportation in the southern railway by creating open-ended questions that cover the key areas of research and scope of education which is something that needs to be studied and to achieve the objectives set with sorting question, with the content of the question can be adjusted according to the nature of the informant. By using the vertical principle questions that are easy to understand is a question that allows information providers to fully express their views in the interview and must not be the leading question. By the tools that the researcher used, an interview form consists of 5 aspects which are at Appendix A.

The questionnaires will initially “field test” a sample with 2 key participants to access the type of questions for use throughout the study and to ensure that the data from the questions are valid and reliable. Reliability will be assessed through test-retest reproducibility by asking some of the participants to complete the questionnaire on more than one occasion. Acceptability will be determined by asking the participants how they found answering the questionnaire during the validity testing.

After in-depth interview, focus group and Non-participation observation, the content will analysis and display with content analysis,

A sample of interview questions and observation form are at Appendix.

7.4.1.2 Role of researcher, The Role of researcher in this study necessitates the identification of personal values, assumptions and biases at the study. From this perspective, bias and subjectivity are not inherently negative but they are unavoidable; as a result, it is best that they be articulated up-front in a manner that is clear and coherent for readers (Sutton and Austin, 2015).

7.4.1.3 The transcribed verbatim before data analysis can begin. As a rough guide, it can take an experienced researcher/transcriber 8 hours to transcribe one 45-minute audio-recorded interview, a process then will generate 20–30 pages of written dialogue. Field notes allow the researcher to maintain and comment upon impressions, environmental contexts, behavior, and nonverbal cues that may not be adequately captured through the audio-recording; they are typically handwritten in a small notebook at the same time the interview takes place. Field notes can provide important context to the interpretation of audio-taped data and can help remind the researcher of situational factors that may be important during data analysis.

Data validation

Verify the reliability and validity of the information gathered by checking the data against other sources.

7.4.2 Data Collection for secondary data; document review, can obtain from published data in a various publication of central state or local governments, technical and trade journals, books, magazines and newspapers, reports and publications of various associations connected with rail industry, public records and statistics, historical documents. The sources of unpublished data are many; may be found in letters, unpublished biographies and autobiographies and scholars and research workers, trade associations and other public/private individuals and organizations.

Table 7 The secondary data sources

|  |  |
| --- | --- |
| Secondary Data | Sources |
| Document review from the Regulatory Authorities the State Railway of Thailand on issues below;  - SRT’s Strategic rail, Rail Freight Demand Forecasting   * SRT’s Freight, Rail Freight Demand Forecasting * SRT’s Infrastructure, Current Infrastructure * SRT’s Regional state railway * SRT’s Local rail traffic | * Annual Report * SRT’s Official Website * Newspaper * Online News * Publications report * Textbooks * Thesis |
| Document review from the Regulatory Authorities the Department of transportation of Thailand on issues below;   * Freight Dept. * Infrastructure Dept. Current Multimodal infrastructure * National Funder | * Annual Report on Current Infrastructure * Rail Freight Demand Forecasting * Official Website * Newspaper * Online News   - Publications report |
| Document review from Regulatory Authorities The **Port Authority of Thailand** (PAT); Songkhla on issues below;  - Strategic and policy   * Operation and Freight Dept. * Infrastructure Dept. Current Multimodal infrastructure | * Rail Freight Demand Forecasting * Annual Report * PAT Official Website * Newspaper * Online News   - Publications report   * Textbooks * Thesis |
| Document review from the Regulatory Authorities the Airport of Thailand on issues below;  - Strategic and policy   * Operation and Freight Dept.   - Infrastructure Dept. Current Multimodal infrastructure | Annual Report   * Rail Freight Demand Forecasting * Annual Report * AOT’s Official Website * Newspaper * Online News   - Publications report   * Textbooks * Thesis |
| Document review from the Regulatory Authorities the Customs of Thailand on issues below;  - Strategic and policy   * Operation and Freight Dept. * Infrastructure Dept. Current Multimodal infrastructure | - Rail Freight Demand Forecasting   * Annual Report * Customs of Thailand’s Official Website * Newspaper * Online News * Publications report * Textbooks * Thesis |
| Document review from the Ministry of Industry on issues below;  - Strategic and policy   * Operation and Freight Dept. * Infrastructure Dept. Current Multimodal infrastructure | * Rail Freight Demand Forecasting * Annual Report * MOI’s Official Website * Newspaper * Online News   - Publications report |
| Document review from the Ministry of Industry on issues below;  - Strategic and policy   * Operation and Freight Dept. * Infrastructure Dept. Current Multimodal infrastructure | * Annual Report * Official Website * Newspaper * Online News   - Publications report   * Textbooks * Thesis |
| * Documents reviews on Effect on Economic, Social and culture, Technical, Political, and Environmental * Statistics, historical documents of Thailand’s railway and Global | - Trade journals, books, magazines and newspapers, reports and publications of various associations connected with rail industry, public records and statistics, historical documents, Textbooks  Thesis |

7.5 Data Analysis and Management

The primary data will be collected in three ways, an in-depth interview

, the focus group and the observation.  the most important part of data analysis and management is to be true to the participants. It is their voices that trying to hear, so that can be interpreted and reported on for others to read and learn from. Qualitative data from in-depth interviews or focus groups that a semi-structured guide or module of questions elicits verbal responses from subjects, either one on one or in small groups. One to two hours on average, from recordings then transcribed, with no names or identifying information. Transcribed text is also cleaned, quality reviewed against the original audio. Finalized content is stored in word processing files on password protected computers. Files can be securely uploaded into a variety of qualitative analysis programs. The process will be conduct with 1) Data Preparation and Basic Data Analysis and 2) qualitative Data Analysis Methods

Data Preparation and Basic Data Analysis

1. Getting familiar with the data and start looking for basic observations or patterns. This also includes transcribing the data.
2. Revisiting research objectives and identifies the questions that can be answered through the collected data.
3. Developing a framework as coding or indexing, by identifies broad ideas, concepts, behaviors, or phrases and assigns codes to data. Coding is helpful in structuring and labeling the data.
4. Identifying patterns and connections that can answer research questions, and finding areas that can be explored further.

Qualitative Data Analysis Methods

Narrative analysis method will be used to analyze the field data, from in-depth interview, focus group discussion and non-participant observation from the fields.

**8. Table 9 Research Plan**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Topics | Dec’19 | Jan’ 20 | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec |
| 1 | Further proposal, further draft of 1st publish | x |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Final Proposal, further work 1st publish |  | x |  |  |  |  |  |  |  |  |  |  |  |
|  | Proposal Defense, Final 1st publish,  submit 1st |  |  | x |  |  |  |  |  |  |  |  |  |  |
| 3 | Research Tools Quality check |  |  |  | x |  |  |  |  |  |  |  |  |  |
| 4 | Data collection |  |  |  |  | **x** | **x** | **x** |  |  |  |  |  |  |
|  | Data collection, Data Verify |  |  |  |  | **x** | **x** | **x** |  |  |  |  |  |  |
| 5 | Data Analysis, draft for int’l conference |  |  |  |  | **x** | **x** | **x** |  |  |  |  |  |  |
|  | Discuss conclusion, draft ch 4-5,  final paper for conf. |  |  |  |  |  |  |  | x |  |  |  |  |  |
| 6 | Draft for 2nd paper, Submit for conf. |  |  |  |  |  |  |  |  | x |  |  |  |  |
|  | Final for ch 1-5, final for 2nd paper |  |  |  |  |  |  |  |  |  | x |  |  |  |
| 7 | Submit 2nd paper, prepare for defense |  |  |  |  |  |  |  |  |  |  | x |  |  |
| 8 | Dissertation Defense, Modification |  |  |  |  |  |  |  |  |  |  |  | x |  |
| 9 | Format checking, Final Dissertation |  |  |  |  |  |  |  |  |  |  |  |  | x |

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……………………………………………………………………………………………………………………………………….

Appendix A.

A sample of in-depth interview questions and focus group discussion (A)

1. Can you please describe………..?
2. Can you imagine………..?
3. What do you think about?
4. Please say more about the double track railway.
5. Can you give me more detail about your experiences about railways?
6. What is it about?
7. Tell me more about?
8. What is your experience with ….?
9. What caused you to……..?
10. What featured of the train do you particularly like/dislike?
11. What is the best/worst…..?
12. Why did you…………..?
13. How do you feel about that?
14. Was this what you expected?
15. Would you tell me more about that?
16. What will you like to have happen?
17. Ideally, how would you like to be treated by………?
18. Do you think that was the right thing to do?
19. Did you feel happy about that?
20. Is that important to you?
21. If there anything else that you would like to say?

………………………………………………………………………………………………………………………………..

**A sample of in-depth interview questions guide (B)**

The interview consists of 5 parts which are as follows;

**Part 1 interviewee data**  
Name………………………………

Gender………………….…………

Age……………………...…………

Education……………….…………

Job Position…………….…………

Work Experience……….…………

Part 2 Open-ended Questions regarding the Attitude of Rail Freight In various areas as follows

2.1 From your point of view what do you think about rail transport?

2.2 Do you think about role or the important of railway according to National’s strategy?

2.3 What do you think about current railway effect to rail freight demand?

2.4 From your point of view, do you think that railway double track could boost the rail freight demand?

2.5 If not what the obstacle will face for the railway double track construction?

Part 3 Open-ended Question Regarding the Attitude of Factors in Supporting the Southern Line Rail Transit In various areas as follows

3.1 Economic Factor

- What is your understanding on the double track railway construction site selection and project construction information?

- Do you think that the double track railway launched from and to generate economic growth to the residents who live around the railway track (visibility)?

- Are you interested in the development of double track railway project in Sothern Line?

- Do you think the social and cultural caused the double track railway and rail freight?

- Do you think the rail freight will bring the lowering transport cost?

-Do you think the railway will bring new products into the market with lower transportation cost?

- Do you think the double track railway will lead on the development of local economic?

- Do you think the rail freight development will bring new occupation?

- Do you think the railway will lead the product demand in local and cross-border to Malaysia?

- Do you think the railway will increase export volume?

3.2 Social and cultural

- Are you interested in the development of double track railway project in Southern Line?

- Do you think the public participation is important?

- Are you worried about the double track railway construction in your city?

- Do you think the double track railway will impact to your living and community?

- Do you think the cultural caused the double track rail freight?

- Do you think the railway will affect to your customs and cultural?

3.3 Technical/Technology

- What do you think about railway technical and technology?

- Do you think the technology is bring railway freight sustainability?

- Do you think technology will bring the transportation more flexibility, accessibility and affordability?

3.4 Political

- Do you know about the national’s policy on railway development?

- Do you think political will lead rail freight increasing?

- What do you think about political and rail freight in locally?

3.5 Environmental

- Do you think the environment issue affect to the railway?

- Do you know the railway is lowest emission build to the air?

- Do you know rail freight can contribute to sustainability transport development?

- Do you think railway will lead risk to local environment?

Part 4 The sustainability factors condition which boost and foster the railway system in Southern Line.

- In your opinion do you think, what other sustainability factors condition which boost and foster the railway system in Southern Line.?

- What modes more attractive than rail?

- How likely you are to switch to rail in the future?

- How your experience with rail freight service in past and present?

Part 5 Open-ended questions about suggestions and opinions on the factors that support the southern railroad.

5.1 In the context of Thailand, are there other factors that are driving the rail transportation?

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5.2 Other suggestions

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………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

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Interviewer

Date………Month………….Year…………………

Start Time……………..Finish Time……………

……………………………………………………………………………………………………………………………………….

Appendix C

Observation Form

Foster Factors to Rail Freight in Southern of Thailand

Observation receiver: ……………………………………………………………………………

Observer: ………………………………………………………………………………………………..

Place……………………………………………………………………………………………………….

Date…………..Month………………..Year……….………

|  |  |  |
| --- | --- | --- |
| Time | Activities | Behavior |
|  |  |  |
|  |  |  |
|  |  |  |
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