Integrating Inland Waterways and Coastal Shipping as Part of Logistics Network: Experience of Thailand

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Thailand’s Energy of Consumption by Sector in 2017

- TRANSPORTATION: 40.03%
- MANUFACTURING: 34.93%
- CONSTRUCTION: 13.46%
- COMMERCIAL: 7.99%
- RESIDENTIAL: 0.16%
- AGRICULTURE: 3.28%
- MINING: 0.14%

Thailand’s Inland Transportation by Transport Sector in 2016

- Roadways, 81.12%
- Inland Waterways, 8.39%
- Coastal Waterways, 8.48%
- Railways, 1.99%
- Airways, 0.02%

Thailand's Domestic Logistics Costs Composition

- Cost of Inventory: 37%
- Cost of Transportation: 54%
- Cost of Management: 9%

Source: Thailand’s Logistic Report 2016, NESDB
Thailand's Domestic Logistics Costs by Transport Sector

Source: Thailand’s Logistic Report 2016, NESDB
Thailand's Coastal Transport Framework

Coastal Transport

A. Domestic Coastal Transport

B. Ocean Transport/ Maritime Transport

C. Short-Sea Transport
Composition of Thailand Coastal Transportation

Source: Composition of the Coastal Transportation
The Management Efficiency for Transportation

Source: Concept of Efficient Transportation System Development
Development of Coastal Transport Linkages

Modify from the transportation that mainly depends on roadways to modal shift – Intermodal Linkages

Source: 2017 Management Annual Report, OTP, Ministry of Transport
Development of Coastal Transport Linkages

- Hub-and-Spoke (Make logistics cost decreased.)
- Intermodal Transportation
- Network Structure
Hub and Spoke Management

Source: Hofstra University
Improve of Coastal Transport Linkages

Infrastructures Development for HUB + SPOKE Concept

1. Distribution Center: DC
2. Inland Container Deport: ICD
3. Container Yard: CY
4. Container Freight Station: CFS
5. Truck Terminal
Improvement of Coastal Transport Linkages

Reasons for Failure

1. No proper study of Demand & Cargo Movement Flow.
2. Lack of Effective Management.
3. No proper study of extra cost & time for the hub system.
Improvement of Coastal Transport Linkages

Key Success

1. Thorough study of cargo movement flow.
2. Demand + Supply study.
3. Effective and efficiency management system otherwise may result.
   - Extra cost.
   - Time-consuming.
Intermodal Transport and The Freights Segments Closest It

Thailand's Domestics Logistics Costs by Transport Sector - 5 years

Thailand’s Inland Transportation by Transport Sector in 2016

Source: Ministry of Transport
Domestic Cargoes Volume by Commodities

Quantities (million tonnes)

- Chemicals, 2.26, 0%
- Fertilizers, 3.96, 1%
- Other Minerals & Building Material, 22.76, 5%
- Cement, 23.49, 5%
- Sand, Gravel, Clay & Slag, 50.90, 10%
- Metal Products, 25.72, 5%
- Ores and Metal Wastes, 37.97, 8%
- Petroleum Products, 31.76, 7%
- Solid Mineral Fuels, 29.73, 6%
- Live Animals, 2.40, 0%
- Rice, 27.93, 6%
- Maize, 4.70, 1%
- Cassava, 30.65, 6%
- Sugar Cane, 105.75, 22%
- Rubber, 3.99, 1%
- Wood, Timber, 6.58, 1%
- Other Agricultural Products, 17.94, 4%
- Animal Fodder, 3.03, 1%
- Sugars, 11.69, 2%
- Other Foodstuffs, 10.37, 2%

Source: Information and Communication Technology, Centre Ministry of Transport
Domestic Cargoes Volume by Transport Sector

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Road</th>
<th>Rail</th>
<th>Inland Waterways</th>
<th>Coastal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live Animals</td>
<td>2.40%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Rice</td>
<td>33.90%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Maize</td>
<td>5.35%</td>
<td>0%</td>
<td>0.90%</td>
<td>0.90%</td>
</tr>
<tr>
<td>Cassava</td>
<td>56.29%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Sugar Cane</td>
<td>103.73%</td>
<td>0%</td>
<td>5.91%</td>
<td>17.70%</td>
</tr>
<tr>
<td>Rubber</td>
<td>4.05%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Wood, Timber</td>
<td>6.89%</td>
<td>0%</td>
<td>1.15%</td>
<td>0%</td>
</tr>
<tr>
<td>Other Agricultural Products</td>
<td>18.20%</td>
<td>0%</td>
<td>3.13%</td>
<td>0%</td>
</tr>
<tr>
<td>Animal Fodder</td>
<td>4.57%</td>
<td>0%</td>
<td>0.76%</td>
<td>0%</td>
</tr>
<tr>
<td>Sugars</td>
<td>12.85%</td>
<td>0%</td>
<td>2.15%</td>
<td>0%</td>
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<tr>
<td>Other Foodstuffs</td>
<td>18.56%</td>
<td>0%</td>
<td>1.73%</td>
<td>0%</td>
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<tr>
<td>Solid Mineral Fuels</td>
<td>42.99%</td>
<td>0%</td>
<td>7.18%</td>
<td>0%</td>
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<tr>
<td>Petroleum Products</td>
<td>71.97%</td>
<td>0%</td>
<td>12.04%</td>
<td>0%</td>
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<tr>
<td>Ores and Metal Wastes</td>
<td>40.20%</td>
<td>0%</td>
<td>6.73%</td>
<td>0%</td>
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<tr>
<td>Metal Products</td>
<td>26.90%</td>
<td>0%</td>
<td>4.50%</td>
<td>0%</td>
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<tr>
<td>Sand, Gravel, Clay &amp; Slag</td>
<td>61.81%</td>
<td>0%</td>
<td>10.34%</td>
<td>0%</td>
</tr>
<tr>
<td>Cement</td>
<td>55.92%</td>
<td>0%</td>
<td>5.54%</td>
<td>0%</td>
</tr>
<tr>
<td>Other Minerals &amp; Building Material</td>
<td>22.88%</td>
<td>0%</td>
<td>3.83%</td>
<td>0%</td>
</tr>
<tr>
<td>Fertilizers</td>
<td>6.96%</td>
<td>0%</td>
<td>1.15%</td>
<td>0%</td>
</tr>
<tr>
<td>Chemicals</td>
<td>5.17%</td>
<td>0%</td>
<td>0.53%</td>
<td>0%</td>
</tr>
<tr>
<td>Equipment, Other Manufactured Articles</td>
<td>50.79%</td>
<td>0%</td>
<td>1.48%</td>
<td>0%</td>
</tr>
<tr>
<td>Miscellaneous Articles, Containers</td>
<td>27.97%</td>
<td>0%</td>
<td>4.68%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: Information and Communication Technology, Centre Ministry of Transport
Domestic Cargoes Volume via Coastal Waterways

- Petroleum Products, 37.308, 73%
- Miscellaneous Articles, Containers, 9.711, 19%
- Equipment, Other Manufactured Articles, 0.003, 0%
- Chemicals, 0.823, 2%
- Fertilizers, 0.060, 0%
- Other Minerals & Building Material, 0.113, 0%
- Cement, 0.258, 1%
- Sand, Gravel, Clay & Slag, 0.039, 0%
- Metal Products, 0.765, 2%
- Ores and Metal Wastes, 0.183, 0%
- Rubber, 0.064, 0%
- Maize, 0.173, 0%
- Wood, Timber, 0.077, 0%
- Other Agricultural Products, 0.759, 1%
- Sugars, 0.010, 0%
- Animal Fodder, 0.138, 0%
- Other Foodstuffs, 0.061, 0%
- Cassava, 0.028, 0%
- Rice, 0.286, 1%
- Solid Mineral Fuels, 0.035, 0%

Source: Information and Communication Technology, Centre Ministry of Transport
A) The River Transport in Thailand has length of 4,000 KM. consist of,

1. 2,500 KM of River and Canal of Inland.
2. 950 KM of International Rivers (Mekong River).
3. 625 KM of Lake.
River and Coastal Freight System Network

Source: Marine Department
B) Thailand Coastal Transport: 2,600 km. long; consist of Gulf of Thailand: 1,660 km., Andaman Sea: 954 km.; cover 24 provinces in Thailand. Proper type of vessel must deployed for suitable type of cargo ie;

1. General or Conventional Cargo Vessel
2. Bulk Carrier
3. Container Ship
4. Oil + Gas Tank Vessel
Currently, Thailand’s Coastal Port & Channel has 2 groups

1. 386 of coastal port & channel and large channel responsible by the Marine Department, Ministry of Transport.

2. 129 of coastal port & channel transfer to the Local Administrative Authorities in each Province.
Commercial Port for Thailand’s Cargo Coastal and International transport was divided into 2 ports.

1. Sea Port: located in the coastal of approximately 2,420 km.

2. River Port: located on the river which divided into
   2.1) Government Port
   2.2) Private Port
River Port of Thailand

Most of The River Port is

- Private Port
- Located in Bangkok & Ayutthaya Province
- 61 ports that have a capacity for a 500 tons vessel.
Management of Ports in Thailand

**Port Management** is divided by 4 groups:

1. Managed by **Port Authority of Thailand**:
   1.1) Bangkok Port
   1.2) Lamchabang Port
   1.3) Ranong Port
   1.4) 2nd Chiang Saen Port
   1.5) Chiang Khong Port
Management of Ports in Thailand

2. Managed by Industrial Estate Authority of Thailand
   2.1) Map Ta Phut Industrial Estate Port

3. Managed by The Treasury Department
   3.1) Songkhla Deep Sea Post
   3.2) Phuket Deep Sea Port
   3.3) Ranong Port
   3.4) Thathong Port
   3.5) Kantang Port

4. Managed by Private Sector
### Summary of Coastal Transport Volume in Major Coastal Routes

<table>
<thead>
<tr>
<th>No.</th>
<th>Route</th>
<th>Kind of Goods</th>
<th>Quantities (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ayutthaya - Koh Sichang</td>
<td>BULK CARGO</td>
<td>32,369,566</td>
</tr>
<tr>
<td>2</td>
<td>Chonburi - Gulf of Thailand</td>
<td>CONTAINER</td>
<td>7,571,499</td>
</tr>
<tr>
<td>3</td>
<td>Chachoengsao - Chonburi</td>
<td>BULK CARGO</td>
<td>4,035,223</td>
</tr>
<tr>
<td>4</td>
<td>Surat Thani - Chonburi</td>
<td>CONTAINER</td>
<td>871,322</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BULK CARGO</td>
<td>91,774</td>
</tr>
<tr>
<td>5</td>
<td>Surat Thani - Ayutthaya</td>
<td>BULK CARGO</td>
<td>825,519</td>
</tr>
<tr>
<td>6</td>
<td>Songkhla - Gulf of Thailand</td>
<td>BULK CARGO</td>
<td>641,076</td>
</tr>
<tr>
<td>7</td>
<td>Surat Thani - Chachoengsao</td>
<td>BULK CARGO</td>
<td>386,488</td>
</tr>
<tr>
<td>8</td>
<td>Prachua - Chachoengsao</td>
<td>BULK CARGO</td>
<td>265,148</td>
</tr>
<tr>
<td>9</td>
<td>Surat Thani - Gulf of Thailand</td>
<td>BULK CARGO</td>
<td>200,779</td>
</tr>
<tr>
<td>10</td>
<td>Chumphon - Samut Sakhon</td>
<td>BULK CARGO</td>
<td>165,088</td>
</tr>
<tr>
<td>11</td>
<td>Ayutthaya - Songkhla</td>
<td>BULK CARGO</td>
<td>98,139</td>
</tr>
<tr>
<td>12</td>
<td>Chonburi - Rayong</td>
<td>BULK CARGO</td>
<td>90,277</td>
</tr>
<tr>
<td>13</td>
<td>Chonburi - Songkhla</td>
<td>BULK CARGO</td>
<td>71,521</td>
</tr>
<tr>
<td>14</td>
<td>Prachua - Rayong</td>
<td>BULK CARGO</td>
<td>35,314</td>
</tr>
<tr>
<td>15</td>
<td>Si Racha - Ayutthaya</td>
<td>BULK CARGO</td>
<td>34,947</td>
</tr>
<tr>
<td>16</td>
<td>Nakhon Si Thammarat - Samut Songkhram</td>
<td>BULK CARGO</td>
<td>32,478</td>
</tr>
<tr>
<td>17</td>
<td>Rayong - Ayutthaya</td>
<td>BULK CARGO</td>
<td>32,097</td>
</tr>
<tr>
<td>18</td>
<td>Ayutthaya - Narathiwat</td>
<td>BULK CARGO</td>
<td>28,094</td>
</tr>
<tr>
<td>19</td>
<td>Samut Songkhram - Pattani</td>
<td>BULK CARGO</td>
<td>25,164</td>
</tr>
<tr>
<td>20</td>
<td>Prachua - Ayutthaya</td>
<td>BULK CARGO</td>
<td>19,789</td>
</tr>
<tr>
<td>21</td>
<td>Ayutthaya - Chachoengsao</td>
<td>BULK CARGO</td>
<td>11,084</td>
</tr>
</tbody>
</table>

Source: Marine Department 2015 and Additional Interview by Consultants  **Total**: 47,902,386
1. Shallow Channel

2. Narrow and Sharp Curves
Thailand Coastal Port Challenges

A) Maritime Transport Challenges

1) Lack of Dedicated Coastal port at Laem Chabang Port

2) Difficulty on development of new coastal port due to:
   - Environmental
   - Lack of support from nearby communities

3) Lack of supporting facilities such as Rest areas/ Bollard/ Discharging equipment. Rest areas in waterways areas of Ban Don and Bang Pra Kong. Coastal port still lack of equipment for goods especially for the private port. For river port have only basic cargo handling equipment.
Thailand Coastal Port Challenges

4) Lack of Line Buoy and navigator sign such as Chao Phra Yha River, Pha Sak River, Mae Klong waterways (Presently, line buoy with Mae Klong waterways do not match.)

5) High bridge and bunting causes take more time to wait for the proper water level for passing.

6) The hindrance on the river such as water hyacinth, water weeds, fish cage etc. that effect on navigation.

7) Lack of crew.

8) No Front Area in front of port cause double stacking.

9) Port cannot support large vessel.
Thailand Coastal Port Challenges

B) Port Infrastructures & Supporting Facilities Challenges:

1) Lack of road network & linkage with port.
2) Lack of railway network & linkage with port ie: the Phachaub Port, Kantang Port, Nakornluang Port.
3) Lack of Industrial Support in the area: No 2-way traffic, Extra cost for empty positioning cost ie. Sonkhla Port, Phuket port, Ranong Port.
4) Conflicts with communities nearby port due to Air Pollution, Water Pollution, Noise Pollution etc.
C) Rules + Regulations

1) Obsolete law, no standard port charges tariff of the private port.

2) Complicated laws such as
   - Customs laws – no bonded movement, has to do customs declaration at the port of entry.
   - Environment law – takes a long time (3 to 5 years) to get approval for construction.
     Causing delay and uncompetitiveness to investor.

3) City planning does not conducive to the development of the port areas.
Thailand Coastal Port Challenges

D) Regulatory Policy Challenges

1) Lack of Proper Management; Govt Agencies, especially local authorities has no experience/expertise to manage port.

2) Under utilization and never achieve original objective in setting port ie. Phuket Port, Krabi Port, Pattani Port, Narathiwat Port.

3) Lack of planning, follow-up and lack of continuity of the coastal transportation system development.
4) Lack of integration between Govt agencies: different agenda/target & conflict of interest.

5) Government has insufficient support measures + motivate for new investor.

6) Lack of budget for dredging the waterways.
Laem Chabang Port Improvement plan

1) Dedicated Wharf for Coastal transportation for International transportation.

2) Rail system to connect Laem Chabang Port with Bangkok Port for better container repositioning and reduce storage cost.

3) Increase rail frequency and capacity between Lat Krabang ICD and Laem Chabang.
High Light of Thailand Master Plan for Development of Transportation System #3 (2017-2036)

Master Plan for Development of Transportation System during 2017 - 2036

- Increase Waterway Transport shares from 11.44% to 19%
- Development of Laem Chabang Phase 3
  - Increase thru-put from 7M teus to 18m teus & To be Gateway of Asia and World's no.10 port
- Improve capacity and land connectivity of seaport in Gulf of Thailand and Andaman Sea
- Development of Ferry Service within Gulf of Thailand
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Thank You