Terminal & Port Infrastructure: Connectivity & Data Transparency

Capt. Rahul Ranjan Pathak
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Ports & their Functions

- To a mariner Port is place for ships to load & unload freight & passengers safely.
- To a shipper or passenger, a port is the interface between land & water transport.
- To the national economist, a port is a gateway to all the benefits of international trade.
- To the port manager, the port is a business that can be used, if well managed to profit.
- To a supply chain manager it is one step in the total process.

“Port has variety of functions that meets the needs of its many stakeholders in different ways.”
Appraising Port Functions

Nautical Infrastructure & Marine Services
(Nav. Aids, Channel, Pilot age, Towing, Mooring/Unmooring)

Berth Infrastructure – Terminal Services
(Opening, Un-stowing, Stevedoring, Stowing, Closing holds)

Handling Ashore
(Transport to/from storage)

Legend
Movement of ship
Movement of goods

- Temporary storage
- Security
- Checking, Marking, Weighing
- Transshipment
- Insurance, Custom Clearance
- Processing, storage, distribution
- Supply, water, bunkering
- Firefighting, medical, waste disposal
- Administrative & commercial documentation, etc.

Ship arrives

Nautical Infrastructure & Marine Services

Ship departs

Goods arrive from hinterland

Goods depart to hinterland

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## Port Development Model

<table>
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<th>Model</th>
<th>Infrastructure</th>
<th>Superstructure</th>
<th>Cargo handling</th>
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<tr>
<td>Public Service Port</td>
<td>Public</td>
<td>Public</td>
<td>Public</td>
</tr>
<tr>
<td>Private Service Port</td>
<td>Private</td>
<td>Private</td>
<td>Private</td>
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<tr>
<td>Tool Port</td>
<td>Public</td>
<td>Public</td>
<td>Private</td>
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<tr>
<td>Landlord Port</td>
<td>Public</td>
<td>Private</td>
<td>Private</td>
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## Port Development Model Analysis

<table>
<thead>
<tr>
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<th>Strengths</th>
<th>Weaknesses</th>
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<tr>
<td><strong>Landlord Port</strong></td>
<td>• Cargo Handling in Private Hands</td>
<td>• Conflict of Ambitions</td>
</tr>
<tr>
<td></td>
<td>• Strong Market Leadership</td>
<td>• Over capacity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Possible footloose operations</td>
</tr>
<tr>
<td><strong>Tool Port</strong></td>
<td>• Large investments</td>
<td>• Double entity</td>
</tr>
<tr>
<td></td>
<td>• No redundancy</td>
<td>• Conflict of interest – Management &amp; Operations</td>
</tr>
<tr>
<td><strong>Public Port</strong></td>
<td>• Unity of command &amp; management</td>
<td>• Private sector out of the port business.</td>
</tr>
<tr>
<td></td>
<td>• Long-term View</td>
<td>• High Political Influence</td>
</tr>
<tr>
<td><strong>Private Port</strong></td>
<td>• No Political Influence</td>
<td>• Monopoly</td>
</tr>
<tr>
<td></td>
<td>• High Efficiency</td>
<td>• Possible deviation from the core business to more profitable activities.</td>
</tr>
</tbody>
</table>
**Nodes of Infrastructure for Port**

- Success of port is a function of all the 3 major Nodes
- Minimum capacity of any node determines Capacity of Port

Ports in India have failed to get all nodes right at a single point of Time

<table>
<thead>
<tr>
<th>Port Superstructure (Land side &amp; Intermodal extension)</th>
<th>Berth Infrastructure (shore Interface)</th>
<th>Nautical Infrastructure (Sea or water connection)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logistics &amp; Value added services</td>
<td>Terminal Services</td>
<td>Marine Services</td>
</tr>
<tr>
<td>• Cargo storage &amp; processing</td>
<td>• Berthing</td>
<td>• Conservancy &amp; protection</td>
</tr>
<tr>
<td>• Information processing</td>
<td>• Tie-up services</td>
<td>• Access &amp; navigation</td>
</tr>
<tr>
<td>• Estate &amp; rental services</td>
<td>• Stevedoring &amp; wharf handling</td>
<td>• Pilot age &amp; towage</td>
</tr>
<tr>
<td>• Repair services</td>
<td>• Bunkering &amp; supply</td>
<td>• Vessel traffic management</td>
</tr>
<tr>
<td>• Other logistics &amp; value added services.</td>
<td>• Quay transfer operations.</td>
<td>• Dredging &amp; maintenance</td>
</tr>
</tbody>
</table>

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Port Performance

(Can be considered under 3 broad categories)

Physical Performance
(Output of existing assets & facilities)

Quality Performance
(Port reliability, flexibility & application of rules)

Financial Performance
(Profit & Loss contribution of each Category of port ops. & services)

Indicators

• Berth Performance Indicators (essentially concerns with Ships’ waiting time & time in port)
  • Berth throughput
  • Waiting time
  • Service Time
  • Time in Port
  • Grade of waiting
  • Berth Occupancy ratio
  • Berth working time ratio.

• Handling Operation Indicators (Use of resources)
  • Ship Output – Working ship output, Berth Ship Output & Port ship output
  • Gang Output

• Storage Operations Indicators (amount of Transit space)
  • Dwell Time
  • Average Dwell Time

• Quality Of Service Indicators
  • Working Hour
  • Indicator.
  • Punctuality ratio
  • Reliability ratio.

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Port Competitiveness – Decision factors

- Marketing & Technical upgradation
- Complementary & Value added services
- Overall Cost Leadership
- Manpower
- Adaptability & resources
- Experience & Knowhow
- Performance
- Hinterland Connectivity
- Physical Assets
- Port & Distribution costs
- Nautical Constraints
- Location
- People
- Customer
- Finance

Source: Mantrana Research

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Indian Scenario
The concerns

- Poor Infrastructure
  - Lack of long term view on Port Infrastructure
  - Investments on wrong location (i.e. that are in cities, cannot be expanded beyond certain limit)
  - Too much regulation – TAMP
  - Shortage of storage space.
- Connectivity – Both on Road Rail
- Lack of Dedicated freight corridors
- High investment costs & limitations of existing infrastructure.
- Lack of skilled labor
- High risk investment & Political/bureaucratic hindrances
- Delays in Infrastructure development projects
<table>
<thead>
<tr>
<th>Port</th>
<th>Traffic (Mn Tons)</th>
<th>Road</th>
<th>Railway</th>
<th>Hinterland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolkata Port Trust</td>
<td>12.5</td>
<td>NH-2, NH-6 &amp; NH-34</td>
<td>Majherhat Junction</td>
<td>Entire Eastern India &amp; two land-locked neighbouring countries. Nepal and Bhutan</td>
</tr>
<tr>
<td>Haldia Dock Complex</td>
<td>34.9</td>
<td>NH-6, NH-41</td>
<td>Rajgoda, Panskura</td>
<td>North Bengal &amp; North Eastern States, Nepal &amp; Bhutan</td>
</tr>
<tr>
<td>Paradip Port Trust</td>
<td>56.0</td>
<td>NH-5, SH-12</td>
<td>Cuttack</td>
<td>Jharkhand, Madhya Pradesh, Orissa, Andhra Pradesh, Uttar Pradesh, Chhattisgarh, Bihar &amp; West Bengal</td>
</tr>
<tr>
<td>Visakhapatnam Port Trust</td>
<td>68.0</td>
<td>NH-5</td>
<td>Chennai-Howrah</td>
<td>Orissa, Chhattisgarh, Maharashtra &amp; Karnataka</td>
</tr>
<tr>
<td>Ennore Port Ltd.</td>
<td>11.0</td>
<td>NH-4, NH-5 &amp; NH-45</td>
<td>Chennai-Kolkata-Gudur</td>
<td>Karnataka, Andhra Pradesh</td>
</tr>
<tr>
<td>Chennai Port Trust</td>
<td>61.5</td>
<td>NH-4, NH-5 &amp; NH-45</td>
<td>Chennai Fort</td>
<td>Karnataka, Andhra Pradesh</td>
</tr>
<tr>
<td>Tuticorin Port Trust</td>
<td>25.7</td>
<td>NH-7, NH-7A &amp; NH-45B</td>
<td>Tuticorin Harbour</td>
<td>Kerala, Karnataka &amp; Andhra Pradesh</td>
</tr>
<tr>
<td>Cochin Port Trust</td>
<td>17.9</td>
<td>NH-17, NH-47 &amp; NH-49</td>
<td>Ernakulam Junction</td>
<td>Karnataka, Tamilnadu</td>
</tr>
<tr>
<td>New Mangalore Port Trust</td>
<td>31.6</td>
<td>NH-13, NH-17 &amp; NH-48</td>
<td>Mangalore</td>
<td>Maharashtra, Kerala and Tamilnadu</td>
</tr>
<tr>
<td>Mormugao Port Trust</td>
<td>50.0</td>
<td>NH-17, NH-17A &amp; NH-17B</td>
<td>Vasco Da Gama</td>
<td>Karnataka, Maharashtra</td>
</tr>
<tr>
<td>Mumbai Port Trust</td>
<td>54.6</td>
<td>NH-3, NH-4, NH-8 &amp; NH-17</td>
<td>Raoli Junction, Wadala</td>
<td>Entire North-West India &amp; West Bengal</td>
</tr>
<tr>
<td>Jawaharlal Nehru Port Trust</td>
<td>64.3</td>
<td>NH-4B, NH-17 &amp; SH-54</td>
<td>Panvel</td>
<td>Entire North, Central &amp; North-West India</td>
</tr>
<tr>
<td>Kandla Port Trust</td>
<td>81.9</td>
<td>NH-8A</td>
<td>Palanpur, Gandhidham</td>
<td>Entire North, Central &amp; North-West India</td>
</tr>
</tbody>
</table>
## Port Connectivity – Non-Major Ports

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<th>Railway</th>
<th>Hinterland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mundra</td>
<td>51.8</td>
<td>NH-8A</td>
<td>Adipur</td>
<td>Entire North, Central &amp; North-West India</td>
</tr>
<tr>
<td>Pipavav</td>
<td>6.1</td>
<td>NH-8, NH-8D, NH-8E</td>
<td>Surendranagar</td>
<td>Entire North-West India</td>
</tr>
<tr>
<td>Gangavaram</td>
<td>13.95</td>
<td>NH-5</td>
<td>Chennai-Visakhapatnam-Howrah</td>
<td>Eastern, Western, Southern and Central India</td>
</tr>
<tr>
<td>Krishnapatnam</td>
<td>15.56</td>
<td>NH-5</td>
<td>Chennai–Kolkata</td>
<td>Karnataka, Tamilnadu</td>
</tr>
</tbody>
</table>
Infrastructure Planning, GOI

Initiative:

- Construction of new berths through PPP. Concession agreement is being formulated.
- Empower major ports & prepare perspective plan for 20 years & action plan for 7 years
- Improving Rail-Road connectivity to Major ports & introducing several measures to simplify and streamline procedure related to security and customs are been initiated.
- Investment of over 50,000 crore Rs in port infrastructure

Structure:

- Encourage the private sector to take the lead in port development activities and operations
- Many Major ports now operate largely as landlord ports - International port operators have been invited to submit competitive bid for BOT terminals on a revenue share basis.
- Significant investment on BOT basis by foreign players including Maersk (JNPT, Mumbai) and P & O Ports (JNPT, Mumbai and Chennai), Dubai Ports International (Cochin and Vishakhapatnam) and PSA Singapore (Tuticorin)

Policy:

- 100% FDI under the automatic route is permitted for port development projects.
- 100% income tax exemption is available for a period of 10 years.
- Tariff Authority for Major Ports (TAMP) regulates the ceiling for tariffs charged by Major ports/port operators (not applicable to minor ports).
- A comprehensive National Maritime Policy is being formulated to lay down the vision and strategy for development of the sector till 2025

Source: infrastructure planning, GOI
Comparative Example on East Coast
Rail Network – East Coast

- Common Rail network for Passenger & freight
- Haldia & Paradip have rail till port but are congested
- Gopalpur – rail passes from a distance

Iron ore mines
Coal mines

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Marine Side Connectivity

Haldia
• Congested Railway line reaches port.
• Low draft cannot call large ships (Poor Marine Connectivity)

Paradip
• Congested Railway line reaches port.
• Low draft cannot call large ships (Poor Marine Connectivity)

Gopalpur Port, India
• Excellent Marine Connectivity
• Private developer, can get latest equipments installed
• Poor land connectivity
### Summary India

None of the Nodes has optimum planning

<table>
<thead>
<tr>
<th>Connectivity Hinterland to Port</th>
<th>Backup Area</th>
<th>Equipments / Berth / Handling rate</th>
<th>Draft</th>
<th>Output of Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Based Infrastructure</td>
<td>Port Infrastructure</td>
<td>Marine Infrastructure</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Haldia Port</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Bad</td>
<td>Good &amp; Can be Improved</td>
<td>Bad</td>
<td>Haldia Port</td>
<td></td>
</tr>
<tr>
<td>Not Bad</td>
<td>Good &amp; Can be Improved</td>
<td>Poor</td>
<td>Paradip Port</td>
<td></td>
</tr>
<tr>
<td>Very Bad</td>
<td>Good</td>
<td>Excellent</td>
<td>Gopalpur</td>
<td></td>
</tr>
</tbody>
</table>
What is the Solution

**Implied Task:**

1. Minimizing transport distance - avoiding unnecessary journeys.
2. Good hinterland connectivity - upgrading more transport arteries and hubs.
4. Cross state border transport initiatives shifting more traffic to railways and inland waterways;

**Main Task:**

1. Define common performance measures.
   - KPI's
   - Turn Around Time of trucks, trains.
   - Documentation processing speed.
2. Custom & clearance speed.
3. Share common planning platform.
4. Identify bottlenecks with predictable speed.
5. Transparent in planning logistic movements with supply chain partners.
   - Address common challenges
7. Integration of supply chains.
   - With data connectivity & transparency
• Undertakes research & consultancy on the Indian Maritime Sector
• Undertakes economic advisory on the following maritime segments
  ✓ Offshore Drilling & Logistics Sector
  ✓ Shipbuilding
  ✓ Shipping
  ✓ Ports & Logistics
• Following are key services provided by Mantrana Team
  ✓ Market Study
  ✓ Project Feasibility Study
  ✓ Business Plan
  ✓ Bid Advisory
  ✓ Due Diligence for investment
Thank you for your Attention