Brief Intro of Mercator International LLC

Who we are:

• Advisors to developers, financiers, operators, and customers of transport and logistics infrastructure, especially related to ports.
• Formed in early 2009 by former executives of Macquarie Capital, Sea Land, Maersk, SSA, and APL.
• Headquartered in suburban Seattle, with associates in multiple countries and continents.

What we do:

• Freight market research
• Microeconomic and cargo forecasting
• Pricing analysis and forecasting
• Transport and port operations reviews
• Transportation asset valuations
• Capital investment analysis
• Transport infrastructure M&A
• Strategic planning
Supporting Port Sector Investment Decisions

A significant portion of our work involves evaluations of port concession acquisitions or sales, as well as major capital investments in port infrastructure improvements.

Some of the major investment projects that we have been involved in recent years include:

### Purchases/Sales of Concessions

<table>
<thead>
<tr>
<th>Company</th>
<th>Country</th>
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</thead>
<tbody>
<tr>
<td>Asciano Ports</td>
<td>Australia</td>
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<tr>
<td>Brisbane Port Corporation</td>
<td>Australia</td>
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<tr>
<td>Terminal de Paranagua</td>
<td>Brazil</td>
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<tr>
<td>Fairview Terminal</td>
<td>Canada</td>
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<tr>
<td>Montreal Gateway Terminals</td>
<td>Canada</td>
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<td>SPR Buenaventura</td>
<td>Colombia</td>
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<td>Tertir Ports</td>
<td>Portugal</td>
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<td>Grup TCB</td>
<td>Spain</td>
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<td>Yilport Holdings</td>
<td>Turkey</td>
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<tr>
<td>Amports</td>
<td>United States</td>
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<tr>
<td>TraPac Terminals</td>
<td>United States</td>
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<tr>
<td>Associated British Ports</td>
<td>United Kingdom</td>
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### Infrastructure Improvement Projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Location</th>
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<tbody>
<tr>
<td>Terminal automation</td>
<td>California</td>
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<tr>
<td>Port-rail terminal development</td>
<td>Florida</td>
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<tr>
<td>Terminal expansion</td>
<td>New York</td>
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<tr>
<td>Greenfield development</td>
<td>North Carolina</td>
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<td>Terminal enhancement</td>
<td>Nova Scotia</td>
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<tr>
<td>On-dock cold storage</td>
<td>Pennsylvania</td>
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<tr>
<td>Terminal renovation</td>
<td>Puget Sound</td>
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<tr>
<td>Terminal expansion</td>
<td>Dominican Republic</td>
</tr>
<tr>
<td>Busan terminal expansion</td>
<td>Korea</td>
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<tr>
<td>Greenfield development</td>
<td>Panama</td>
</tr>
<tr>
<td>Gdansk terminal expansion</td>
<td>Poland</td>
</tr>
<tr>
<td>Greenfield development</td>
<td>United Arab Emirates</td>
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</tbody>
</table>
Evaluating Port Investment Projects – Alternate Perspectives

- Providers of capital for port investment projects tend to have different evaluation metrics, depending on their entity-type

Key metrics

### Financial institutions
- Return on capital
- Risk premium

### Terminal operators
- Return on capital
- Business synergies
- Strategic benefits

### Port authority
- Return on capital
- Risk premium
- Economic development
- Strategic benefits
- Market share

Focal points

### Lenders
- Safety of yield income
- Preservation of capital
- Flexible time horizon

### Private Equity Funds
- Turnaround opportunity
- Quantum income growth capability
- 5-7 year horizon

### Infrastructure Funds
- Stability of earnings
- Bolt-on opportunities
- Expansion options
- 10+ year horizon

- Among private-sector financial institutions, different perspectives on risk and investment horizon also prevail, given the type of institution and the capital being provided
Commercial Drivers for Port infrastructure Improvements

Need/Desire

- Increase in throughput capacity
- Enhanced competitiveness
- New cargo processing opportunity

Core infrastructure components

- Wharves
- Yard/gate
- Handling equipment
- Automation technology
- Rail transfer facility
- Rail track links

Increase in volume

- Market definition
- Market demand drivers
- Market growth outlook
- Port/terminal competitiveness
- Market share
- Port/terminal volume

Revenue

- Current price analysis
- Capacity supply forecast
- Demand/supply forecast
- Rate projection

Rate
Market Definition – The Essential Starting Point

• The structure of the market demand analysis required to commercially justify a port infrastructure project will be driven by type(s) of cargo that the project is designed for:

**Drybulk**
- (grains, minerals, ores)

**Liquid bulk**
- (oil/petroleum, chemicals, LNG)

**RoRo**
- (vehicles, machinery)

**Breakbulk**
- (steel, forestry products)

**Unitized**
- (container, trailers)

• For bulk target cargoes, analyses of specific industries will be more critical, whereas for unitized cargoes, macroeconomic performance will be of greater importance
Market Definition – The Essential Starting Point

• Geographic scope of project demand analysis will be driven by type of cargo opportunity and the location of the port.
Mercator’s demand forecasting methodology for North American container ports follows a top-down approach composed of multiple sequential steps:

1. **Data collection and processing**
   - Historical data:
     - Real GDP
     - Container volumes (TEU)
     - Trade lane volumes

2. **Macro-economic level forecasting**
   - Linear regression model for North America based on:
     - Real GDP
     - Container volumes (TEU)

3. **Estimate coastal volumes per tradelane**
   - Baseline volumes to/from Pacific, Atlantic, and Gulf Coasts per tradelane:

4. **Forecast market share per tradelane**
   - Apply growth rates per tradelane to baseline coastal volumes to develop ‘unadjusted’ forecasts by Coast

5. **Develop ‘adjusted’ coastal forecast per tradelane**
   - Adjustments account for shipping and rail industry developments

6. **Conduct sensitivity/risk analyses**
   - Forecast includes 3 scenarios:
     i. Base case
     ii. High case
     iii. Low case

7. **Produce “adjusted” forecast for port**

An important step in demand forecasting is a manual review of the model results to ensure the results are consistent with rational expectations since mathematical models cannot account for every impact.
Demand Forecast Methodology – Model Accuracy

• To test the reliability of the linear regression model, historical real GDP figures are used to predict historical container throughput, which are then compared to observed volumes.

• Mercator’s model combines real GDP of the U.S. and Canada, and explains 98.1% of the variability of the response data around its mean.

• With the exception of data points associated with major economic disruptions (outliers), our model effectively predicts historical throughput.

• The volume forecasted for 2015 was within 1.0% of the actual.

Combined Real GDP and Container Throughput (1990-2015)

Historical Accuracy of the Linear Regression Model

Demand Forecast Methodology - Tradelane Dimensions

• The composition of coastal zone volume by tradelane can vary greatly by trade lane across North America – especially for container traffic, as can be seen below:

• Similar differences can be observed with other types of cargoes

By indexing historical tradelane volumes to 2000=100, the tradelanes that have gained share can be easily distinguished from those that have lost share (those growing faster than the continental rate will gain share while those growing more slowly will lose share).

The ISC/ME, Oceania and Africa, and (most importantly) Asia tradelanes have all grown at rates that are above the North American rate, and the impact on shares can be seen in the accompanying bar chart.

In terms of annual shifts, Asia’s gained 0.35 percentage points per year (pp/y) was nearly completely offset by the Transatlantic loss of 0.33 pp/y.

Similarly, Latin America’s loss of 0.11 pp/y has been nearly completely offset by the gains of .07 and .02 pp/y in the ISC/ME and Oceania/Africa tradelanes, respectively.
After quantifying project risks, the forecast can be split into different scenarios, the most common of which would be the upside, base, and downside cases (optimistic, most probable and pessimistic).

The pessimistic scenario incorporates the EMV of risks and the optimistic scenario incorporates the EMV of opportunities identified.
Market Share Analysis – Competition Framework

• Depending on the type of the targeted cargo for a port project, and the location of the port, the framework of competition for the project can encompass multiple ports.

• For example, the competition for an expanded container terminal in Southern California includes terminals in BC and PNW ports, as well as East and Gulf Coast ports.
Market Share Analysis – Competition Framework

- As an additional example, in a recent study assessing the demand for a new multi-purpose terminal (to handle break-bulk, dry bulk, and RO-RO cargoes) in a Middle Atlantic port, Mercator defined all of the ports shown map to the right as comprising the competition framework for the proposed facility.

- Given the volumes of import/export cargoes that are destined to (or originate in) inland points well outside port metropolitan areas, the analysis of inland transport cost differentials between competing ports is a critical component of assessing a port’s or terminal’s competitive position.
Market Share Estimating – Cargo Routing Cost Analysis

For projects entailing construction of new, or expansion/renovation of existing terminals, integrated route cost analysis, combining inland cost differential analysis with models of ocean transportation costs, terminal costs, and equipment repositioning costs, is an essential tool for assessing the terminal’s competitive position before and after project implementation.

<table>
<thead>
<tr>
<th>GATEWAY PORT</th>
<th>VESSEL SERVICE DESIGN</th>
<th>ASIA PORT</th>
<th>OCEAN TRANSPORT</th>
<th>NO. AMR. PORT</th>
<th>NO. AMR. INLAND</th>
<th>TOTAL ROUTE COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAN PEDRO BAY</td>
<td>FE - SPB - OAK - FE</td>
<td>245</td>
<td>611</td>
<td>732</td>
<td>1410</td>
<td>2998</td>
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<tr>
<td>TACOMA</td>
<td>FE - TAC - VCR - FE</td>
<td>245</td>
<td>549</td>
<td>472</td>
<td>1490</td>
<td>2756</td>
</tr>
<tr>
<td>SEATTLE</td>
<td>FE - SEA - VCR - FE</td>
<td>245</td>
<td>548</td>
<td>482</td>
<td>1490</td>
<td>2765</td>
</tr>
<tr>
<td>VANCOUVER</td>
<td>FE - TAC - VCR - FE</td>
<td>245</td>
<td>548</td>
<td>394</td>
<td>1475</td>
<td>2662</td>
</tr>
<tr>
<td>PRINCE RUPERT (PNW)</td>
<td>FE - PRP - VCR - TAC - FE</td>
<td>245</td>
<td>741</td>
<td>433</td>
<td>1350</td>
<td>2769</td>
</tr>
<tr>
<td>PRINCE RUPERT (w/ SoCal)</td>
<td>FE - PRP - SPB - OAK - FE</td>
<td>245</td>
<td>818</td>
<td>433</td>
<td>1350</td>
<td>2846</td>
</tr>
</tbody>
</table>
• Although transit time has increasingly become a less important factor in cargo routing decisions than total route cost, service differentials of more than one or two days can still have a bearing on a gateway port’s share of discretionary cargoes.

• Thus, an important element of assessing the expected market share of a port or terminal, post implementation of the project, relates to service competitiveness.
Another essential tool in projecting future market shares of ports and terminals is the analysis of differentials in infrastructure parameters and capabilities.

The optimal parameters to utilize in such comparative analyses will vary, depending on the type(s) of cargo targeted for the project, but in general should include:

- Total berth length and maximum contiguous (linear) berth length
- Maximum ship displacement on berth
- Water depth alongside berth
- Crane outreach/maximum ship beam
- Overall maximum ship dimensions
- Total external cargo marshalling area
- Annual thru-put capacity
Price Forecasting – Demand/Supply Analysis

• In projecting the directions and quantums of changes in unit revenues for a port infrastructure development, it is important to first forecast the balance between aggregate cargo demand and terminal capacity supply over the relevant time period – whether for a given port or range of ports (depending on the competition framework).

![Port of Oakland - Estimated Capacity Utilization](image)

• Additional analysis of the number of carriers serving the market versus the number of terminal operators, and the relative strength of each group is also a key element of price forecasting.
Summary Points

• Commercial justification of a port infrastructure improvement project, that can help secure financing for the project, entails quantitatively addressing several key questions:

  • What is the expected growth of the cargo market(s) underpinning the project’s *forecasted* volume?
    • *What macroeconomic and/or microeconomic factors cause that expected growth to be sustainable over the forecast period?*
  
  • What share of the market will the terminal/port be expected to capture from implementing the project?
    • *What competitive advantages will support the project’s planned incremental volumes?*
  
  • In the near term, what pricing actions can be expected from competitors that could impact planned unit revenues for the project?
  
  • What is the expected outlook for terminal capacity demand versus supply during the forecast period, to support or impede long-term pricing increases?
  
  • What threats and risks could emerge during the forecast period that could significantly impact projected volumes and revenues?