Big Data versus Small Data: Container Port Traffic and Maritime Connectivity

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‘Big Data’ versus ‘Small Data’

Big Data
- Massive quantities.
- Usually collected automatically by sensors.
- Collected in real time.
- Happens ‘by accident’ as a by-product of a digital footprint.
- Ex-post usefulness.

Small Data
- Limited quantities.
- Collected semi-automatically (often human input).
- Collection delayed by reporting systems (daily, monthly, quarterly, annually).
- Purposefully collected (regulation, reporting, decision making).
- Ex-ante usefulness.
1. Container Port Traffic Data
Frustration about container port traffic data
- One of the world’s most simple and indicative data is not comprehensively available.
- Port authority web sites are a mess:
  - Often difficult to find traffic data; often out of date.
  - Data published in a variety of inconvenient formats (GIF, PDF).
- Wide variations in the consistency and level of detail.
- No standards.
- Data collection/compilation is usually a manual process.
- Several regional trade groups collect and maintain data from their constituents:
  - AAPA, ECLAC, ESPO.
- No international agency has ‘claimed the ownership’ of the data.
Global Container Ports Database

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORT</td>
<td>Port name</td>
</tr>
<tr>
<td>STATUS</td>
<td>Active, Merged, Part, Inactive</td>
</tr>
<tr>
<td>CITY</td>
<td>The metropolitan area in which the port is located (or is mainly serving)</td>
</tr>
<tr>
<td>COUNTRY</td>
<td>Country</td>
</tr>
<tr>
<td>RANGE</td>
<td>Maritime range</td>
</tr>
<tr>
<td>LONG; LAT</td>
<td>Longitude and latitude</td>
</tr>
<tr>
<td>ALIAS</td>
<td>Alternate port name (if more than one usual name)</td>
</tr>
<tr>
<td>Port Authority</td>
<td>Name of the port authority</td>
</tr>
<tr>
<td>Source</td>
<td>Link to online data source</td>
</tr>
<tr>
<td>DEPTH_X</td>
<td>Max alongside depth of container terminals; MLW</td>
</tr>
<tr>
<td>CHANNEL</td>
<td>MLW Port Channel Depth</td>
</tr>
<tr>
<td>REEFER</td>
<td>Number of reefer slots at the terminal</td>
</tr>
<tr>
<td>Y_XXXX</td>
<td>Annual traffic in TEU for year XXXX</td>
</tr>
</tbody>
</table>

550 active ports totaling 645 M TEU of volume in 2015
Container Ports and Main Maritime Ranges of the Americas, 2015

Map showing container ports and main maritime ranges in the Americas with TEU (Twenty-foot Equivalent Unit) data for 2015. The map includes regions such as North American East Coast, Gulf Coast, Caribbean, and South American East Coast. The TEU data is color-coded and ranges from 2.0 to 4.0 M, 0.5 to 1.0 M, 1.0 to 2.0 M, and Less than 0.5 M.

- South American East Coast
- South American West Coast
- Caribbean
- Gulf Coast
- North American East Coast
- North American West Coast

Cargo Handled by the Top 5 North American Container Ports, 1985-2015 (in TEUs)
Proposal: A Data Template for Automated Data Harvesting

Metadata

Facilities

- Channel
- Depth
- Berths
- Cranes
- RTGs
- Yard
- Capacity

Terminal

Container Traffic

- Calls
- Total
- Full
- Empty
- Inbound
- Outbound
- Transshipment
- 40
- 40HC
- 20
- Reefer
- Other

CY, FY, Monthly

XML

Filter/Query
2. Developing a Global Connectivity Index
The Components of Connectivity: The ‘Bowtie Approach’

- Gateway or hub ('connector')
  - Foreland Connectivity
    - Global air and maritime shipping networks
  - Hinterland Connectivity
    - Regional corridors (rail, road, fluvial)

$LSCI$
Functional Variations in Connectivity

Hinterland Connectivity

Regional Hub

Regional Center

Global Gateway

Global Hub

Foreland Connectivity
Connectivity Pattern of the World’s Major Maritime Bottlenecks

The connectivity of intermediacy

- **Panama**
  - TEU (2015): 22.2 M TEU
  - TI: 35%

- **Oresund**
  - TEU (2015): 11.7 M TEU
  - TI: 75%

- **Gibraltar**
  - TEU (2015): 17.1 M TEU
  - TI: 80%

- **Suez**
  - TEU (2015): 15.6 M TEU
  - TI: 60%

- **Hormuz**
  - TEU (2015): 30.2 M TEU
  - TI: 75%

- **Malacca**
  - TEU (2015): 59.4 M TEU
  - TI: 80%
Container Traffic at Main Ports around the Panama Canal

Map showing the locations of ports in the area:
- Atlantic Ocean
- Colon
- Balboa
- Cartagena
- Puerto Limon
- Buenaventura
- Costa Rica
- Panama
- Colombia

Graph showing TEU (Twenty-Foot Equivalent Units) from 1995 to 2015:
- Balboa
- Colon
- Cartagena
- Buenaventura
- Puerto Limon

Key:
- Less than 500,000
- 500,000 to 1.5 M
- 1.5 to 3 M
- More than 3 M

Total: 11.7 M TEU
Transshipment Incidence: 75%
Container Traffic Handled at the Main Ports Around the Suez Canal

- Mediterranean Ocean
- Egypt
- Jordan
- Syria
- Iraq
- Saudi Arabia

Map showing ports:
- Port Said
- Alexandria-El Dekheila
- Damietta
- Sokhna
- Aqaba
- Jeddah

Graph showing TEU (2015) traffic:
- Port Said
- Alexandria-El Dekheila
- Jeddah
- Damietta
- Ashdod

Total: 15.6 M TEU
Transshipment Incidence: 60%
Container Traffic at Main Ports around the Strait of Malacca

[Map showing the locations of Pulau Pinang, Port Klang, Singapore, Tanjung Pelepas, and Tanjung Priok with a line chart indicating the TEU (2015) data. The chart shows the total TEU from 1985 to 2015, with Singapore having the highest TEU, followed by Tanjung Pelepas and Port Klang. The total TEU is 59.4 M TEU, and the transshipment incidence is 80%.]

Total: 59.4 M TEU  Transshipment Incidence: 80%
Container Traffic Handled at the Main Ports Around the Strait of Hormuz

TEU (2015)
- Less than 2 M
- 2 to 6 M
- 6 to 12 M
- More than 12 M

Total: 30.2 M TEU  Transshipment Incidence: 75%
Container Traffic Handled at the Main Ports Around the Strait of Gibraltar
Container Traffic Handled at the Main Ports Around the Strait of Oresund

[Map showing container traffic at main ports around the Strait of Oresund, with TEU (Twenty-foot Equivalent Unit) data for 2015. The map highlights ports like Hamburg, Gdansk, Gothenburg, St. Petersburg, and Hamina. A graph on the right side shows the trend of container traffic from 1985 to 2015, with Hamburg and Gdansk having the highest traffic. The total container traffic for 2015 is 22.2 million TEU, with a transshipment incidence of 35%.]
Conclusion: Big Data = More Inertia?

I'm too nimble and sexy for you