Industry Trends: Challenges and Opportunities
Tina Liu, Drewry Shipping Consultant
This presentation is based on following Drewry reports

✓ Published annually for the last 12 years
✓ Refined and enhanced scope and analysis each year
✓ “One stop shop” industry reference
✓ Comprehensive and independent assessment
✓ Analysis of global/international terminal operators….
✓ …. but also selected other owners/operators….
✓ ….. and the wider industry context
Key trend

- Ship size
- Carrier alliance
- Shipping lines financial issues
- Active Asia investors
- Portfolio management
- Emerging market focus
- Growth Drivers
- Cascading
- Terminal valuation on the rise
- Higher productivity required
- Terminal automation
- Supply demand balance

Growth Drivers:
- Cascading
- Terminal valuation on the rise
- Higher productivity required
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- Supply demand balance
Industry Background

**Market players**
- Around 700 specialised container terminals worldwide + around 600 multi-purpose and RoRo facilities handling containers.
- 24 companies are considered as Global/international terminal operators by Drewry. (They control 60% of world container handling capacity)

**Market structure**
- Typical institutional structure is the “public port authority-private terminal operators” model, also known as the landlord port authority.
- Up to 90% of ports worldwide use the landlord port authority model, although this only accounts for around 65% of throughput

**Market size**
Estimated 2013 container terminal industry:
- Volume: 640 million teu
- Revenue: US$ 48 billion
- EBITDA: US$ 11 billion (~22%)
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Container port market outlook

2013
- Volume: 642 Million TEU
- Capacity: 953 Million TEU
- Supply growth: 3.3%

2018
- Volume: 842 Million TEU
- Capacity: 1.1 Billion TEU
- Demand growth: 5.6%
Prior to 2009 the industry's worst year was +4.6% growth

US recession

Asian financial crisis

China outsourcing

New global norm

Global financial crisis

Historical market trends
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Driver of container port traffic

**Organic growth: GDP**

- General cargo trade (million tonnes) vs World GDP (billion USD)

**Imbalance of trade: empty containers**

- Empty container (%) over years

**Replacement: Dry cargo containerization**

- Container penetration (%) over years

**Transshipment: result of vessel upsizing**

- Transshipment (%) over years
Latest GDP

Thousands of international $
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<table>
<thead>
<tr>
<th>Region</th>
<th>Throughput</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>6.4%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Asia</td>
<td>6.4%</td>
<td>3.3%</td>
</tr>
<tr>
<td>ME &amp; ISC</td>
<td>6.8%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Global Total</td>
<td>5.6%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Latin America</td>
<td>5.4%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Europe</td>
<td>3.8%</td>
<td>2.4%</td>
</tr>
<tr>
<td>North America</td>
<td>3.2%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Oceania</td>
<td>3.2%</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Throughput and Capacity percentages for different regions globally.
Key trend

Ship size
Carrier alliance
Shipping lines financial issues
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Growth Drivers
Cascading
Terminal valuation on the rise
Higher productivity required
Terminal automation
Supply demand balance
Vessel size development

Regina Maersk 7,400 teu
Mid 1990s
Other carriers followed…

Emma Maersk 15,500 teu Mid 2000s
Other carriers followed…

Maersk Triple E 18,000 teu 2013
Other carriers following…

24,000+ teu vessels?
2020?
Carriers will follow…
• Larger (and more) cranes
• Longer berths
• Deeper berths
• Deeper approach channels
• Greater air draft
• Higher crane and berth productivity
• And a yard/landsisde operation ……
  and inland links …..capable of coping…….
Hamburg Sud 9,800 teu vessel in draft restricted in Buenos Aires (at terminal using mobile harbour cranes)

CMA CGM 16,000 teu vessel in Hamburg

Maersk Line 18,000 teu vessel in Antwerp
Global containership size development

Orderbook stands at 3.4 million teu
- 55% is for vessels of over 10,000 teu capacity
- 68% is for delivery by end 2015
- Orderbook is 20% of existing fleet capacity

- 104 x 8-10,000 teu vessels
- 139 x 14,000+ teu vessels
What trade routes will the 8-10,000 teu vessels most likely end up on?

- Most into ECSA and WCSA trades
- Some into Asia-Middle East and Asia-USEC (via Suez)
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Largest vessels deployed in Asia-North Europe route, 2014

Source: Drewry Maritime Research
Increase in average container ship size, 2006-2013

- Far East - S. Africa
- Far East - West Coast S. America
- Far East - East Coast S. America
- Europe - East Coast S. America
- Far East - Med
- Far East - W. Africa
- Far East - N. Europe
- Europe - S. Africa
- Europe - W. Africa
- Far East - US West Coast
- Transatlantic

Legend:
- **East - West**
- **North - South**
Increase in average container ship size, 2011-2014

- Increase in average container ship size, 2011-2014:
  - Asia-N Europe: +27%
  - Asia-Med: +36%
  - Asia-USWC: +21%
  - Asia-ECSA: +59%
  - Europe-ECSA: +75%
  - Asia-WCSA: +47%
  - Asia-Middle East: +47%

Average vessel size (teu)
### Growth of alliances

<table>
<thead>
<tr>
<th>Shipping line</th>
<th>Alliances/vessel sharing agreements (VSAs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maersk</td>
<td>P3 (denied)</td>
</tr>
<tr>
<td>MSC</td>
<td></td>
</tr>
<tr>
<td>CMA CGM</td>
<td></td>
</tr>
<tr>
<td>China Shipping</td>
<td>China Shipping/UASC</td>
</tr>
<tr>
<td>UASC</td>
<td></td>
</tr>
<tr>
<td>NYK</td>
<td>Grand Alliance</td>
</tr>
<tr>
<td>OOCL</td>
<td></td>
</tr>
<tr>
<td>Hapag-Lloyd</td>
<td></td>
</tr>
<tr>
<td>APL</td>
<td>New World Alliance</td>
</tr>
<tr>
<td>MOL</td>
<td></td>
</tr>
<tr>
<td>Hyundai</td>
<td></td>
</tr>
<tr>
<td>Cosco</td>
<td>CKYH Alliance</td>
</tr>
<tr>
<td>K Line</td>
<td></td>
</tr>
<tr>
<td>Yang Ming</td>
<td></td>
</tr>
<tr>
<td>Hanjin</td>
<td></td>
</tr>
<tr>
<td>Evergreen</td>
<td>Independent</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
<tr>
<td><strong>16</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>Maersk</strong></td>
<td><strong>2M</strong></td>
</tr>
<tr>
<td><strong>Ocean Three</strong></td>
<td><strong>G6 Alliance</strong></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td></td>
</tr>
</tbody>
</table>

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**Note:** The table shows the alliances and vessel-sharing agreements (VSAs) among different shipping lines. The numbers indicate the total number of shipping lines and alliances, respectively.

“CKYHE Alliance files agreement and reports to related regulators for expansion of cooperation scope to US trades”
Big alliances = big ships
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Port/terminal infrastructure equipment requirements

- To be able to accommodate the current largest container ships, a port/terminal must have:
  - Large enough cranes (i.e. at least 21-22 boxes across outreach)
  - Sufficient large cranes (at least 3 cranes per vessel and usually 5 or more is desirable)
  - Long enough berths (i.e. at least 400 metres)
  - Deep enough water alongside the berth (i.e. at least 14.5 metres and up to 17 metres)
  - Deep enough water in the approach channel (i.e. up to 17 metres)
  - And a yard/landside operation capable of coping......

Are shipping lines prepared to pay for these enhanced requirements?
Vessel call volumes and handling speeds

JOC Port Productivity Data
Best performing terminal in the world (2013):
*179 berth moves per hour*

Maersk CEO:
6,000 moves in 24 hours =
*250 berth moves per hour*

Number of boxes exchanged if = 40% of ship capacity *

Ship size (teu)
# Vessel call volumes and handling speeds

<table>
<thead>
<tr>
<th>Ship size (teu)</th>
<th>Length (m)</th>
<th>Width (m)</th>
<th>Max draft (m)</th>
<th>Boxes wide</th>
</tr>
</thead>
<tbody>
<tr>
<td>12,000</td>
<td>365-380</td>
<td>48-50</td>
<td>15.5</td>
<td>19-20</td>
</tr>
<tr>
<td>15,000</td>
<td>400</td>
<td>56</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>18,000</td>
<td>400</td>
<td>59</td>
<td>16</td>
<td>23</td>
</tr>
</tbody>
</table>
## Vessel call volumes and handling speeds

<table>
<thead>
<tr>
<th>Operational factors</th>
<th>Commercial factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>How the ship is stowed for the port in question</td>
<td>Speed of turnaround required or guaranteed</td>
</tr>
<tr>
<td>Size of the container exchange per vessel call</td>
<td>Flexibility, availability and cost of dock labour (and their normal hours of working)</td>
</tr>
</tbody>
</table>

What level of productivity does the shipping line want (they may not want the fastest) and are they prepared to pay for it?
What will be the largest container ship in the world by 2020?
- 20,000 TEU
- 22,000 TEU
- 25,000 TEU
- 28,000 TEU

VOTE NOW
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Fragmented terminal capacity

- Annual volumes per “customer” are increasing - need for bigger terminals in each port and/or bigger ports
- Fragmented terminal capacity – **both physically and in terms of ownership** - is a challenge for many ports e.g. US west coast

<table>
<thead>
<tr>
<th></th>
<th>Seattle</th>
<th>Tacoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013 throughput</td>
<td>1.6m teu</td>
<td>1.9m teu</td>
</tr>
<tr>
<td>Number of container terminals in the port</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Number of container terminals with shipping line ownership</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

*Los Angeles-Long Beach* G6 vessels use five different terminals
Fragmented terminal capacity

The old days

Cargo volumes

The new world

Terminal capacity
Changing nature of demand

Asia - North Europe trade route

Number of weekly loops

<table>
<thead>
<tr>
<th></th>
<th>Jan 2012</th>
<th>Jan 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Asia - North Europe trade route

Number of port calls per week

<table>
<thead>
<tr>
<th></th>
<th>Jan 2012</th>
<th>Jan 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ECT website: 28 October 2014

“Last weekend, the Thalassa Pistis of Evergreen Line called at the ECT Delta Terminal where the ship set a new record for ECT and for the Port of Rotterdam: during its visit to the terminal, 10,557 containers were handled”

“On the vessel a berth productivity of more than 150 container moves per hour was achieved”

Even with this very good handling speed, the vessel was still in port for nearly 3 days
Example:

- Terminal handling one million teu p.a.
- Change from 7 ship calls per week to 5 ship calls per week
To peak or not to peak?

Before

3,000 boxes

3,000 boxes

After

6,000 boxes

MONDAY
<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before</strong></td>
<td>3,000 boxes</td>
<td>3,000 boxes</td>
</tr>
<tr>
<td><strong>After</strong></td>
<td>6,000 boxes</td>
<td></td>
</tr>
</tbody>
</table>

And what if the ships are off-schedule too?
Example:

- Terminal handling one million teu p.a.
- Change from 7 ship calls per week to 5 ship calls per week

- Many more boxes hitting the yard per hour
- But peaks cause labour issues
- Wasted resource

- Moves per crane per hour
- Number of cranes per ship
- Berth moves per hour
- Vessel turnaround time
- Required gang hours p.a.
- Berth occupancy
Hub and spoke
- Connecting mainline and feeder vessels
- Used to serve smaller spoke ports from main hubs

Relay
- Mainline to mainline vessel connection
- Used to link together deep sea services at key nodes

*Bigger mainline vessels generally mean greater use of transhipment – to fill the ships*
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Growth Drivers
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Terminal valuation on the rise
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Active Asia investors
- Portfolio management
- Emerging market focus

Portfolio management
- Emerging market focus
- Growth Drivers

Growth Drivers
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- Supply demand balance

Terminal valuation on the rise
- Higher productivity required
- Terminal automation

Terminal automation
- Supply demand balance

Supply demand balance
- Terminal automation
- Terminal valuation on the rise
“Automation” of container terminals is a broad term and in practice means different things to different people.
- Robotic operation of yard equipment is the highest profile aspect of terminal automation.
- Terminal automation (robotisation) to date has focused on the quay to stack horizontal transfer and the yard stacking system.

<table>
<thead>
<tr>
<th>Fully automated</th>
<th>Semi-automated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defined as automated horizontal transfer and automated yard stacking</td>
<td>Defined as automated yard stacking only</td>
</tr>
</tbody>
</table>
How many terminals today are fully or semi-automated?

- 16
- 26
- 39

VOTE NOW
Terminal automation: The story so far

Less than 5% of terminals globally are fully or semi-automated, but the proportion is growing

<table>
<thead>
<tr>
<th>Number of terminals</th>
<th>Fully automated (existing)</th>
<th>Fully automated (planned)</th>
<th>Semi-automated (existing)</th>
<th>Semi-automated (planned)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>8</td>
<td>21</td>
<td>5</td>
</tr>
</tbody>
</table>
Terminal automation: The story so far

What percentage of the world's terminals will be fully or semi-automated by 2025?

- 5%
- 10%
- 15%
- More!

VOTE NOW
### Terminal automation: The story so far

<table>
<thead>
<tr>
<th>10 years ago</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australia</td>
</tr>
<tr>
<td>Germany</td>
<td>Belgium</td>
</tr>
<tr>
<td>Netherlands</td>
<td>China</td>
</tr>
<tr>
<td>Singapore</td>
<td>Germany</td>
</tr>
<tr>
<td>UK</td>
<td>Japan</td>
</tr>
<tr>
<td></td>
<td>Netherlands</td>
</tr>
<tr>
<td></td>
<td>Singapore</td>
</tr>
<tr>
<td></td>
<td>South Korea</td>
</tr>
<tr>
<td></td>
<td>Spain</td>
</tr>
<tr>
<td></td>
<td>Taiwan</td>
</tr>
<tr>
<td></td>
<td>UAE</td>
</tr>
<tr>
<td></td>
<td>UK</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
</tbody>
</table>

*Low wage economy*

*Picking up pace*
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Main stevedore and hybrid global/international terminal operators (GTOs/ITOs) remain active, mainly in terms of greenfield and brownfield expansion, but also because of a degree of acquisitions and divestments.

APMT, ICTSI, HPH and DP World have the most projects in the pipeline; PSA, TIL, CMA CGM and Bollore also have significant plans.

Most of the shipping line GTOs/ITOs have unchanged portfolios and no expansion plans, and several have been selling (usually minority) stakes in selected terminals.
In 2013, GTOs/ITOs delivered another year of **good profits** and EBITDA margins.

Typical EBITDA margins range from 20-45%, with the variation a reflection of the level of risk of each operators’ portfolio.

After grinding to a halt in the global financial crisis of 2009, **M&A activity** in the port sector has intensified again; financial investors are particularly active.
CMHI and Bollore are new entrants this year to the GTO/ITO category; both have aggressive expansion intentions.

Several players not currently categorised as GTOs/ITOs are growing fast and have a strong appetite for international expansion, including Gulftainer and Yilport. They are likely to soon be contending for GTO/ITO status.

Others such as GPI, SAAM Ports, Ultramar and Ports America and are also making selected expansions or seeking to acquire.
Drewry was founded in 1970 as a provider of independent information and advice to the global maritime industry. Since then we have worked with over 4,000 clients in more than 100 countries.

We are privately owned with research and advisory teams in London, Delhi, Singapore and Shanghai.

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Section Break
Subtitle
5 Years on, Ports outperform Operators

Source: Bloomberg, Drewry Maritime Equity Research