Trends and Challenges for Container Ports

Eva Pérez

Valencia, 11 May 2016
CHALLENGES FOR CONTAINER PORTS

- Changes in global trade patterns
- Vertical integration
- Horizontal concentration of ocean carriers
- Alliances
- Increasing vessel size
- Port overcapacity
Change in global trade patterns
Change in trade patterns

Global Economic Focus and Sea Trade Moves East

TOP 25 COUNTRIES ACCORDING TO CONTAINER HANDLING VOLUMES IN 2011

- 2011 TEU
- 2007 TEU
- CAGR 2007-2011

Based on total reported container volumes by country including transshipment and empty container handling volumes.

Source: Alphaliner, October 2012
Table 1

Containerisation International's latest survey of the globe's top 30 ports reveals that in 2014, a total of approximately 366m teu was handled, equivalent to about 58% of world container-handling activity, and an increase of 5.6% on 2013's results.
Vertical integration

### RANKING OF CONTAINER TERMINAL OPERATORS

**Challenges: Vertical Integration**

#### RANKING DE TERMINALISTAS MUNDIALES DEL NEGOCIO DEL CONTENEDOR

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<td>+5,1%</td>
<td>+19,3%</td>
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<td>57.090.000</td>
<td>60.280.000</td>
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<td>APL-NOL</td>
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<td>4.800.000</td>
<td>4.700.000</td>
<td>4.600.000</td>
<td>4.300.000</td>
<td>4.929.800</td>
<td>+2,1%</td>
<td>-2,6%</td>
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<td>OOCL</td>
<td>0,9%</td>
<td>4.200.000</td>
<td>4.100.000</td>
<td>4.000.000</td>
<td>3.500.000</td>
<td>3.500.000</td>
<td>+2,4%</td>
<td>+20,0%</td>
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<td>0,7%</td>
<td>3.600.000</td>
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<td>3.100.000</td>
<td>2.700.000</td>
<td>3.300.000</td>
<td>+9,1%</td>
<td>+9,1%</td>
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<tr>
<td>19</td>
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<td>0,7%</td>
<td>3.593.292</td>
<td>3.306.862</td>
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<td>3.317.416</td>
<td>+8,7%</td>
<td>+8,3%</td>
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<td>20</td>
<td>Global Port Investments</td>
<td>0,3%</td>
<td>1.449.000</td>
<td>1.344.000</td>
<td>1.095.000</td>
<td>604.000</td>
<td>1.326.000</td>
<td>+7,8%</td>
<td>+9,3%</td>
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<tr>
<td><strong>TOP 20 Grupos</strong></td>
<td><strong>100,0%</strong></td>
<td><strong>486.419.982</strong></td>
<td><strong>469.046.608</strong></td>
<td><strong>451.939.017</strong></td>
<td><strong>400.843.156</strong></td>
<td><strong>432.479.180</strong></td>
<td>+3,7%</td>
<td>+12,5%</td>
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</table>

**Top 6 global/international terminal operators, 2014 (total teu basis)**

<table>
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<tr>
<th>Rnk</th>
<th>Operator</th>
<th>Million teu</th>
<th>2014 % Volume Growth</th>
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<tr>
<td>1</td>
<td>Hutchison Port Holdings</td>
<td>82.9</td>
<td>6.0%</td>
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<td>2</td>
<td>China Merchants Holdings International</td>
<td>80.6</td>
<td>13.1%</td>
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<tr>
<td>3</td>
<td>APM Terminals</td>
<td>79.1</td>
<td>5.5%</td>
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<tr>
<td>4</td>
<td>Cosco Pacific</td>
<td>67.3</td>
<td>9.9%</td>
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<tr>
<td>5</td>
<td>PSA International</td>
<td>65.4</td>
<td>5.8%</td>
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<tr>
<td>6</td>
<td>DP World</td>
<td>60.0</td>
<td>8.9%</td>
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</table>

Fuente: TRANSPORTE XXI en base a datos publicados por las compañías. Los datos de Evergreen, SSA Marine, CMA CGM y APL-NOL han sido estimados. Datos en TEUs. Las cifras incluyen las operaciones en las terminales de uso común.
Increasing market concentration
MERGERS AND ACQUISITIONS

1993
1. APL
2. Cosco
3. DSR-Senator
4. Evergreen
5. Hanjin
6. Hapag-Lloyd
7. Hyundai
8. K Line
9. Maersk
10. MOL
11. MSC
12. Nedlloyd
13. NOL
14. NYK
15. OOCL
16. P&O
17. Sealand
18. UASC
19. Yang Ming
20. Zim

1998
1. APL
2. Cosco
3. DSR-Senator
4. Evergreen
5. Hanjin
6. Hapag-Lloyd
7. Hyundai
8. K Line
9. Maersk
10. MOL
11. MSC
12. Nedlloyd
13. NOL
14. NYK
15. OOCL
16. P&O
17. Sealand
18. UASC
19. Yang Ming
20. Zim

2000
1. APL
2. Cosco
3. Evergreen
4. Hanjin/DSR-Senator
5. Hapag Lloyd
6. Hyundai
7. Maersk
8. MOL
9. MSC
10. NYK
11. OOCL
12. P&O Nedlloyd
13. Sealand
14. UASC
15. Yang Ming
16. Zim

2009
1. Maersk/Sealand
2. Grand Alliance (P&O, NYK, HL, OOCL)
3. New World Alliance (APL/NOL, MOL, Hyundai)
4. Cosco/Yang Ming/K Line/Hanjin/DRS-Senator
5. Evergreen
6. MSC
7. Zim

Fuente: Ricardo Sánchez, CEPAL
MERGERS AND ACQUISITIONS

Top 20 Carriers: Impact of CMA CGM-APL merger

ALPHALINER

Fuente: Alphaliner 2016
Challenges

MERGERS AND ACQUISITIONS

Top 19 carriers: Capacity operated as at 22 April 2016

Source: Alphaliner, 2016
Challenge: Alliances
## Challenge: Alliances

### Far East-North Europe Services Matrix (as at May 2016)

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<tr>
<th>Alliance</th>
<th>Service Name</th>
<th>Carriers</th>
<th>Maersk</th>
<th>MSC</th>
<th>K Line</th>
<th>Yang Ming</th>
<th>Hanjin</th>
<th>Evergreen</th>
<th>COSCO (CKYHE+O3)</th>
<th>CMA CGM</th>
<th>UASC</th>
<th>APL</th>
<th>Hapag-Lloyd</th>
<th>HMM</th>
<th>MOL</th>
<th>NYK</th>
<th>OOCL</th>
<th>PIL</th>
<th>Hamburg Sud</th>
<th>Ave. weekly TEU</th>
<th>Capacity by Alliance in TEU</th>
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<td></td>
<td></td>
<td>18,800</td>
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| Total no. of weekly sailings | 5 | 5 | 7 | 7 | 7 | 8 | 8 | 8 | 5 | 4 | 4 | 4 | 4 | 4 | 1 | 2 |

*Fuente: Alphaliner 2016*
Challenge: Alliances

Estimated Far East-Europe capacity share by Alliance

SHARE OF TOTAL CAPACITY BY ALLIANCE

Estimated Far East-North America capacity share by Alliance

Source: Alphaliner 2016
THE 2M ALLIANCE

193 vessels
- = 10 vessels

2.4 million teu

77 ports

22 strings

Duration of agreement

Begins early
2015

Duration of the 2m agreement is 10 years

Expires
2025

Lloyd's List Graphic  •  Source: Companies
**Challenge: Alliances**

**Ocean Alliance**
Total capacity operated by Ocean Alliance partners, including services outside of alliances:
5.40 Mteu

Planned capacity in Ocean Alliance services:
2.78 Mteu

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**2M**
Total capacity operated by Maersk and MSC, including non-2M services:
5.72 Mteu

Capacity operated in 2M services:
2.15 Mteu
### EVOLUTION IN ALLIANCES OPERATING BETWEEN ASIA AND EUROPE

#### Development of Carrier Alliances on the Far East-North Europe trade: 1996-2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Alliances</th>
</tr>
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<tbody>
<tr>
<td>1996</td>
<td>Maersk Sea-Land, HMM, MSC, Norsania, CMA</td>
</tr>
<tr>
<td>1997</td>
<td>Maersk Sea-Land, HMM, MSC, Norsania, CMA</td>
</tr>
<tr>
<td>1998</td>
<td>Maersk Sea-Land, HMM, MSC, Norsania, CMA</td>
</tr>
<tr>
<td>1999-2000</td>
<td>Maersk-SeaLand, Maersk-Sealand, P&amp;O Nedloyd, MSC</td>
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<td>2001</td>
<td>Maersk-Seeland, P&amp;O Nedloyd, MSC</td>
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<td>2002-2004</td>
<td>Maersk-Seeland, P&amp;O Nedloyd, MSC</td>
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<td>2005</td>
<td>Maersk, MSC, CMA CGM, Zim, UASC</td>
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<td>2006-2009</td>
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<td>Maersk, MSC, CMA CGM, Zim, UASC</td>
</tr>
<tr>
<td>2011</td>
<td>Maersk, MSC, CMA CGM, Zim, UASC</td>
</tr>
<tr>
<td>2012-2013</td>
<td>Maersk, MSC, CMA CGM, Zim, UASC</td>
</tr>
<tr>
<td>2014</td>
<td>Maersk, MSC, CMA CGM, Zim, UASC</td>
</tr>
</tbody>
</table>

- **COSCO**
- **K Line**
- **Xiamen**
- **DSR Senator**
- **Hanjin**
- **Evergreen**
- **Lloyd Triestino**
- **CSAV**
- **Norsania**
- **Alphaliner**

Fuente: Alphaliner 2014
# Evolution of Containership Size

<table>
<thead>
<tr>
<th>Generation</th>
<th>Ship Type</th>
<th>Length</th>
<th>Draft</th>
<th>TEU</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Generation (1956-1970)</strong></td>
<td>Converted Cargo Vessel</td>
<td>135m – 200m</td>
<td>&lt; 9 metres</td>
<td>500 – 800 TEU</td>
</tr>
<tr>
<td></td>
<td>Converted Tanker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second Generation (1970-1980)</strong></td>
<td>Cellular Containership</td>
<td>215 metres</td>
<td>10 metres</td>
<td>1,000 – 2,500 TEU</td>
</tr>
<tr>
<td><strong>Third Generation (1980-1988)</strong></td>
<td>Panamax Class</td>
<td>250 – 290 metres</td>
<td>11 - 12 metres</td>
<td>3,000 – 4,000 TEU</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fifth Generation (2000-2005)</strong></td>
<td>Post Panamax Plus</td>
<td>352 metres</td>
<td>14 - 15 metres</td>
<td>6,000 – 9,000 TEU</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td>400 metres</td>
<td>16.5 metres</td>
<td>18,000 TEUs</td>
</tr>
</tbody>
</table>
MOL’s latest orders bring the order-book for containerships of over 18,000 TEU to 66 units.

In addition to this, the Hong-Kong based carrier OOCL is expected to announce orders for next-generation jumbos in the coming weeks, further adding to the pipeline for ships of this size class.

Maersk Line has also indicated that it was seeking new ships of this size. These would add to the 20 ‘EEE’ class ships, which the Danish carrier ordered in 2011.

> 18,000 TEU units ordered by carrier

<table>
<thead>
<tr>
<th>Carrier</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maersk</td>
<td>20</td>
</tr>
<tr>
<td>MSC</td>
<td>18</td>
</tr>
<tr>
<td>Evergreen</td>
<td>11</td>
</tr>
<tr>
<td>UASC</td>
<td>6</td>
</tr>
<tr>
<td>MOL</td>
<td>6</td>
</tr>
<tr>
<td>CSCL</td>
<td>5</td>
</tr>
</tbody>
</table>
Challenge: Change in Routes

Source: Alphaliner, 2016
Port competition and overcapacity
Port competition and overcapacity

Challenges

% port-to-port connections including transhipment

40% overcapacity

How many hub ports are needed?
A shortcut across the top of the world

Northeast Passage
8,452 MILES

Southerly route
12,694 MILES

INTTRA SOLUTIONS FOR CARRIERS
CARRIER LINK

INTTRA’s Carrier-Link is a comprehensive service that provides global, standardized electronic connectivity of an ocean container carrier to thousands of individual shipping entities (both direct shippers and logistics providers).

One EDI connection with INTTRA for each of INTTRA’s carrier services provides the carrier with instant connectivity between all active and future INTTRA users.

<table>
<thead>
<tr>
<th>From user to carrier</th>
<th>From carrier to user</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booking Requests (new or amended)</td>
<td>Booking Response or confirmation</td>
</tr>
<tr>
<td>Shipping Instructions (new or amended)</td>
<td>Bill of Lading (image, data, or both)</td>
</tr>
<tr>
<td></td>
<td>Sailing Schedules</td>
</tr>
<tr>
<td></td>
<td>Status Events</td>
</tr>
</tbody>
</table>

For data flowing in both directions:
- INTTRA provides carrier-friendly industry leadership via EDI implementation Guides with widespread global multi-carrier adoption.
- INTTRA coordinates all aspects of user-facing project and technical management including installation, configuration, training and on-going support.
- INTTRA performs all aspects of data management including syntax conversion (to/from EDIFACT or ANSI or X12 or flat-file), mode conversion (to/from Web or desktop), and code conversion (to/from different coding standards for coded data).
So many challenges!
Problem: Find $x$

Solution: Here it is
Valenciaport 2020:
Market led initiatives
Efficiency
Financial sustainability
Social and environmental sustainability

STRATEGIES:
Integration of the Port Cluster and Innovation
Our reply to challenges related to changes in global trade patterns

Market intelligence:

Market analysis and traffic forecasting
Integration of Customs and ports statistics
Exploitation of statistics generated by the port community system
Big data projects at container terminals
Internet of things (es. SOLAS gross verified mass of containers)
Our reply to increasing vessel size

- **Semi-automation / Automation**

- **Increasing size of cranes**
Our reply to increasing vessel size

Noatum invierte 24 millones para recibir buques de más de 18.000 contenedores

La concesionaria de la mayor terminal del puerto de Valencia instalará grúas nuevas de hasta 48 metros y adaptará otras seis a partir de marzo

Noatum Container Terminal ha acelerado la ampliación de sus muelles para mejor su capacidad

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Trade facilitation, less paperwork, more efficiency:

Let’s cut the red tape
Solutions to Improve Port Services Efficiency:
39.8 million Euros of net savings in Spain acc. to Customs
Automation as the only way to grow

First tests:

Further work:

In collaboration with
Intermodality and Rail Corridors

Rail corridors:
- Madrid – Centro – Portugal
- Mediterráneo - Atlántico
- Mediterráneo

58 trains per week
First RTMS in Spain developed by Continental Rail: 2.6 million Euros of net profits for MOS4MOS partners
Energy efficiency
GREENCRANES is a pilot action involving three Member States: **Spain, Italy and Slovenia**, including public administrations, strategic ports, port industrial partners and innovation centres.

**Project Consortium**

- Fundación ValenciaPort
- Aena
- Broekland
- Termanz
- لوكا كيپر
- Konecranes
- ABB
- Rina
- Autoridade Portuária da Madeira
- Global Service Srl
- Scuola Superiore Sant'Anna

**External Companies**

- Terberg
- Benschop
- Alfeldand
- Westport
- Gas Natural Fenosa
- HAM
- Kalmar
- Ecomotive Solutions
- HVM

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Green Technologies and Eco-efficient Alternatives for Cranes and Operations at Port Container Terminals
ECO-RTG RETROFITTING

Green

Cranes

Co-financed by the European Union

Trans-European Transport Network (TEN-T)
Old Generation RTG Consumption (l/h)

Current Situation

Pilot I

Pilot II

45% Decrease

Fuel Cost €

Emissions

Co-financed by the European Union
Trans-European Transport Network (TEN-T)
THE FIRST EUROPEAN LNG TERMINAL TRACTOR

https://www.youtube.com/watch?v=oudKsHQSasA

Co-financed by the European Union
Trans-European Transport Network (TEN-T)
Quick Deployment of GREENCRANES Products in the Port Sector

LNG tractors for new Turkish terminal

08 Jul 2014

Netherlands-based Terberg Benschop is to supply 40 LNG tractors for Asyaport's new container terminal, being built in Turkey on the Marmara Sea.

The YT222 tractors with 170kW Mercedes engines are powerful enough to handle two trailers carrying 20 inch containers.

Asyaport says it chose LNG as a fuel for its environmental properties and the fact that it's considerably cheaper in Turkey than diesel. There is also an LNG filling station near the terminal, so maintenance is easy.

Terberg's Turkish distributor Portunus, based in Istanbul, will provide service and support. Delivery will begin in January 2015.

Asyaport's new deep-water container terminal is strategically located as a transhipment hub for containers destined for the Black Sea via the Bosphorus. It will handle vessels carrying up to 18,000 tsu and will have an annual capacity of around two million tsu.

Investors in the terminal include Terminal Investment Ltd SA (TIL), the terminal operating subsidiary of Mediterranean Shipping Company (MSC), and the Soyuer Group in Turkey.

Following this order, Terberg will also supply 20 tractors to TIL's terminal at Lomé in Togo, West Africa.
SEA TERMINALS

Smart, Energy Efficient and Adaptive Port Terminals

https://www.youtube.com/user/FValenciaport/featured
DYNAMIC LIGHTING: 80% SAVINGS
Environmental Sustainability

Safety First

Port City Integration

& many other initiatives
A port is what you can see, and that other 90% makes it strong and stable ....

Innovation is the key to make the port foundations solid enough for the port to face current challenges
THANKS FOR YOUR ATTENTION!

Eva Pérez García
Director of Transport Economics
eperez@fundacion.valenciaport.com

http://www.fundacion.valenciaport.com/fundacion/