



Mega Issue: Future of Ports and Shipping
Key container port industry issues

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My last visit to Busan was 10 years ago

The world was very different.....!

	<u>10 years ago</u>	<u>Today</u>	
Largest container ship (teu)	9,200	19,200	+109%
Global port throughput (million teu)	400	680	+70%
Busan's throughput (million teu)	12	19	+58%

(Much) bigger ships + Bigger alliances + Vessel cascading

The triple whammy!



(Much) bigger ships

The cycle is happening faster, and Maersk has been leapfrogged



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



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

**19,000 teu ships
already in
service**

**21,000 teu ships
now on order...**

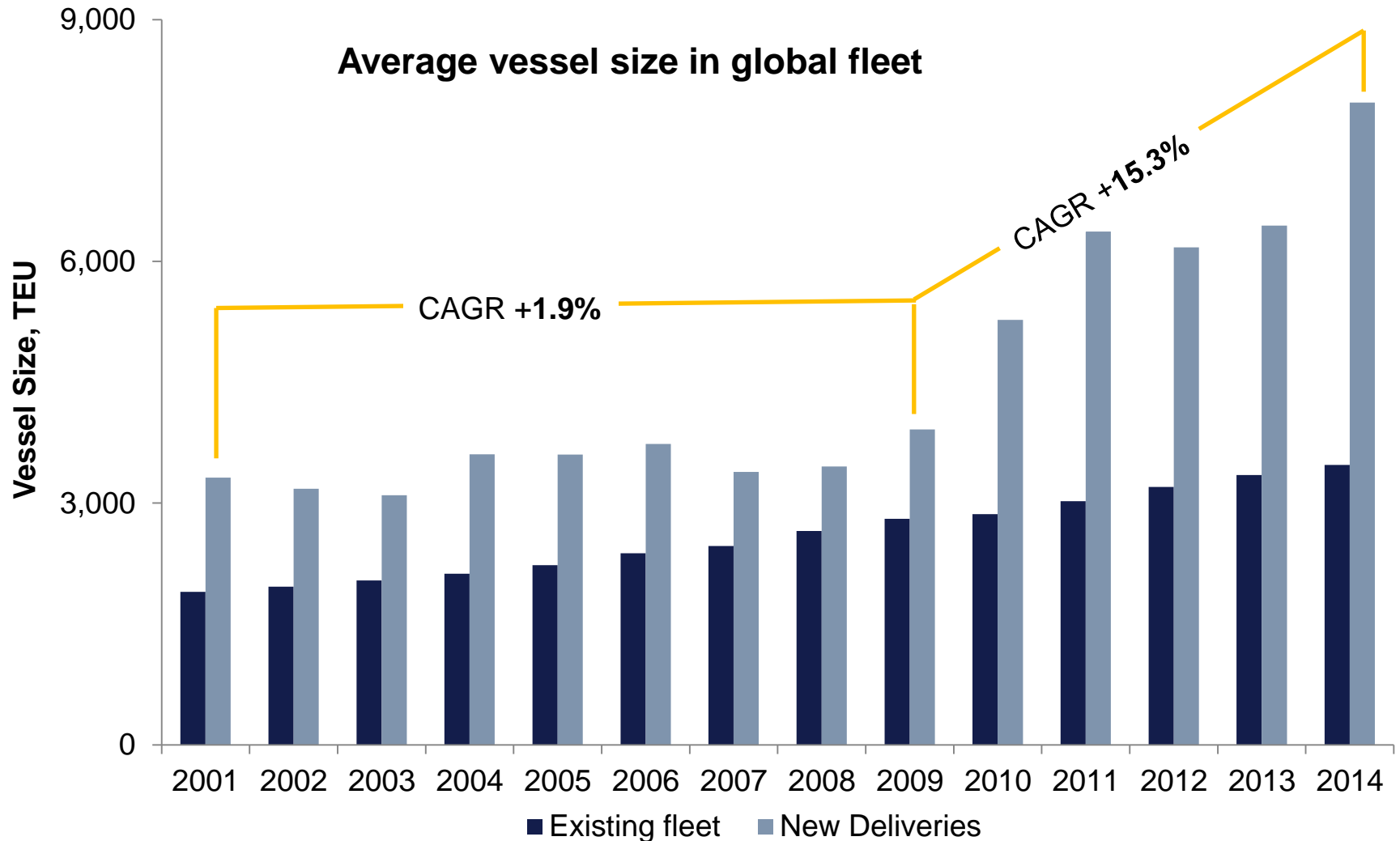


Maersk Triple E 18,000 teu
2013
Other carriers leapfrogged...



25,000 teu vessels?
2020?
Carriers will follow...

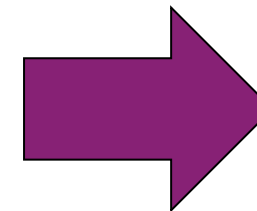
Newbuild vessel size growth is accelerating



Bigger alliances

How long will they stay as they are? Are they stable?

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



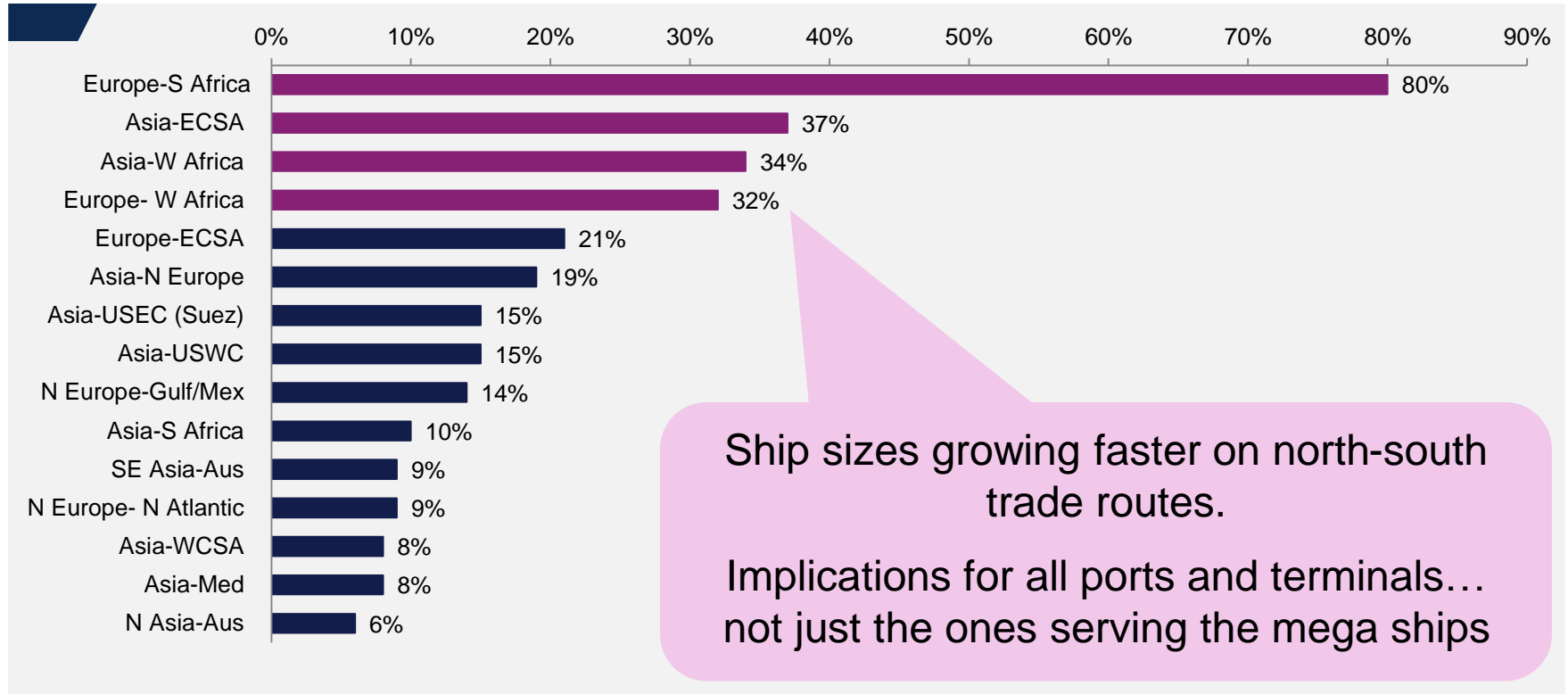
More convergence?

Further changes?

Vessel cascading

Rapid and ongoing increases in largest and average container ship sizes

Increase in average ship size: 1Q 2013 - 1Q 2015



Source: Drewry Maritime Research

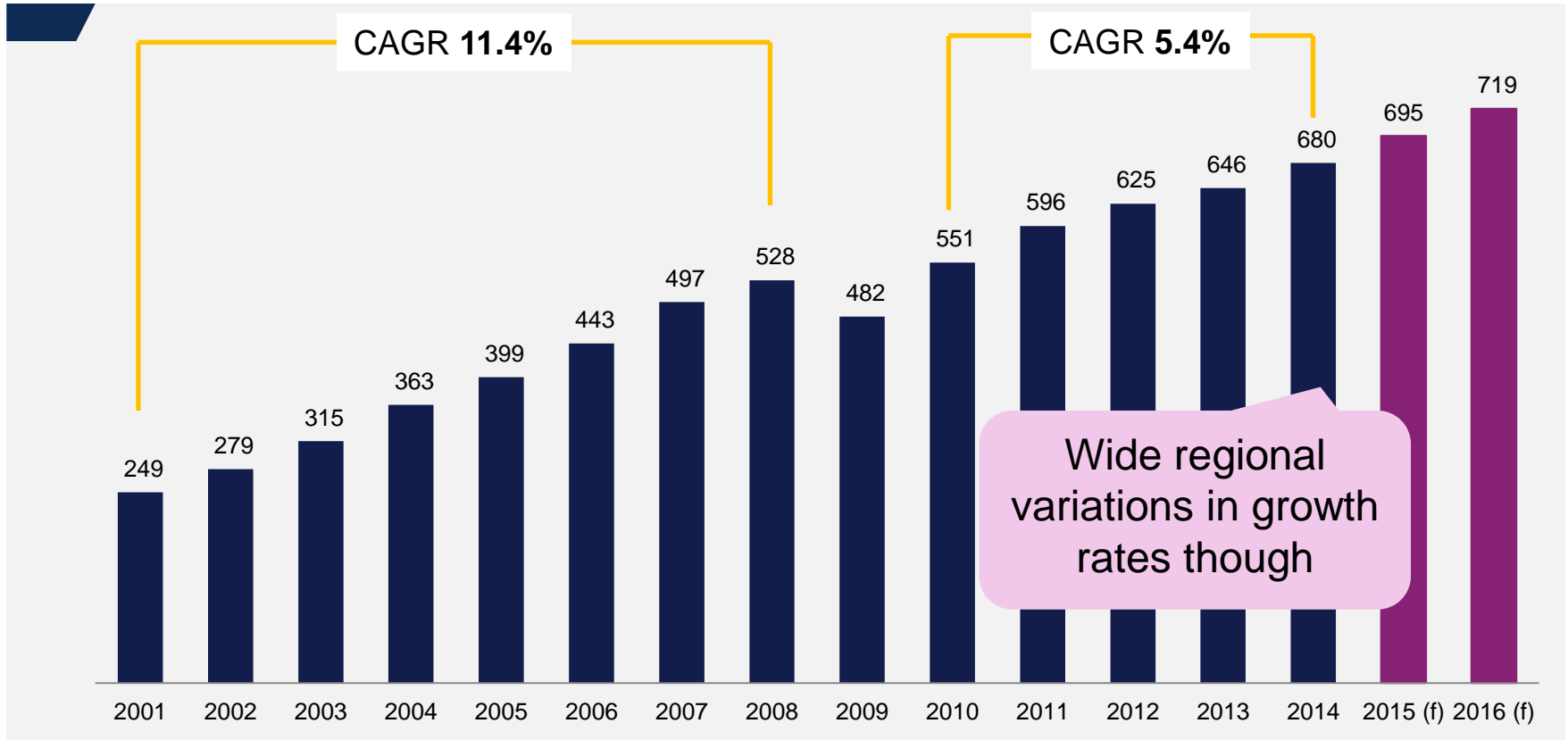
Demand growth



Demand growth

Coping with high growth rates used to be the big challenge. Less so now

Million teu



Source: Drewry Maritime Research

Changing nature of cargo flows

Bigger ships and alliances = more (or less) transshipment?

Need to use hub & spoke transshipment to fill big ships

More opportunity for relay transshipment

Multi-port calling still the norm

Bigger alliances create more direct port pairs

Hub and spoke



Relay / Interlining

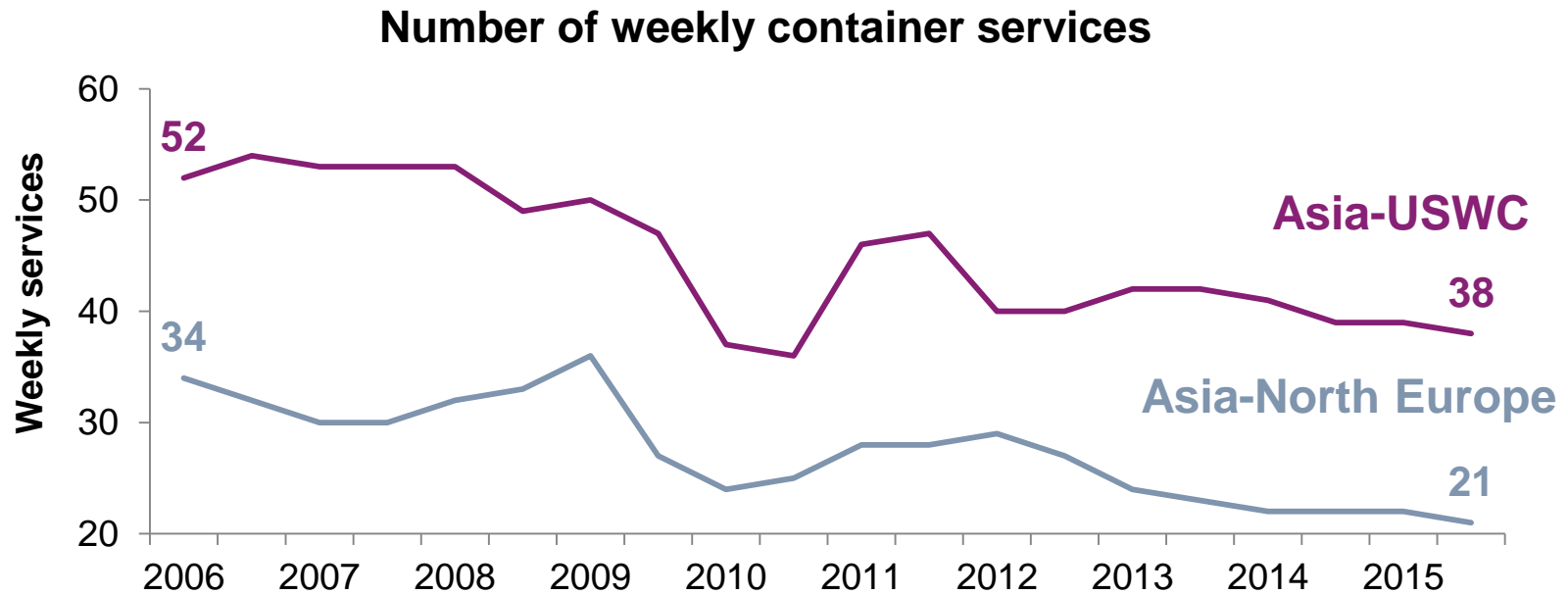


Demand peaks



Reduced service frequency

Increased call sizes and bigger demand peaks



Demand peaks

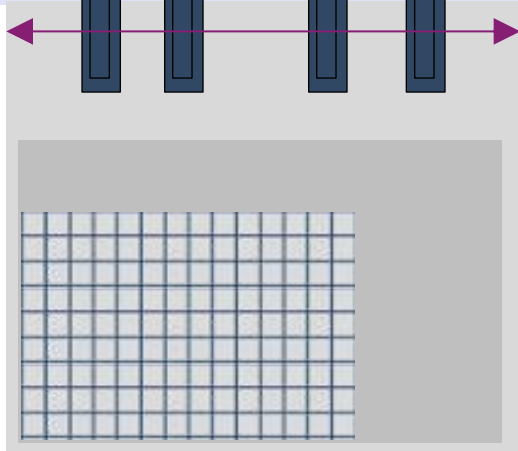
Reduced service frequency and bigger ships = greater peaks

10,000 moves per week
4 x 7,500 TEU vessel calls

2,500 moves
per call

330m quay
14m depth

QC x 4
18 rows
38m high

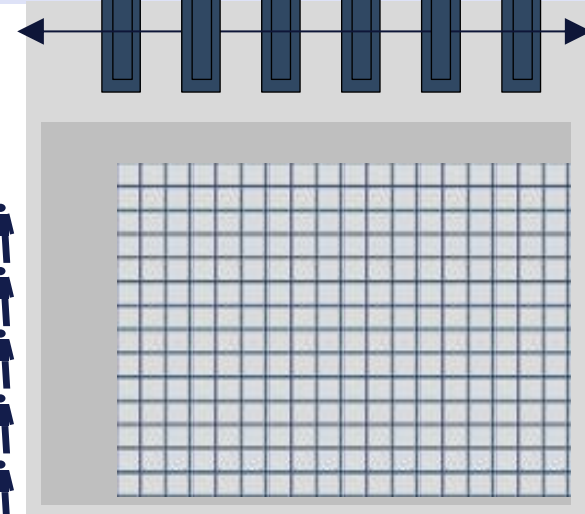


10,000 moves per week
2 x 15,000 TEU vessel calls

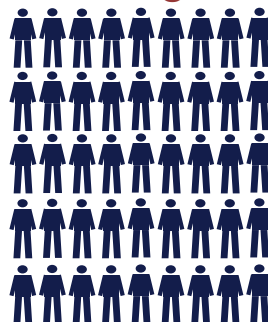
5,000 moves
per call

400m quay
16m depth

QC x 6
22 rows
48m high

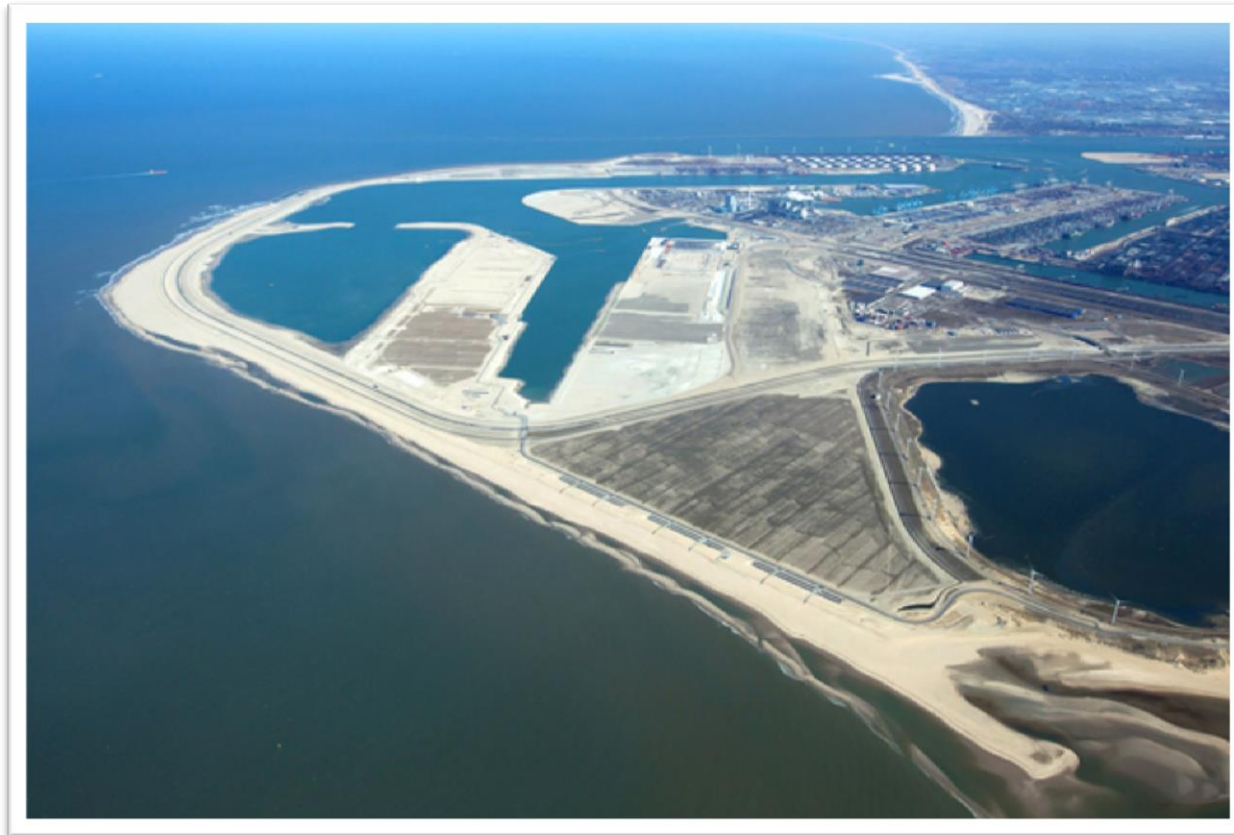


Higher peak
manning



Larger
yard to
handle
peak
loads

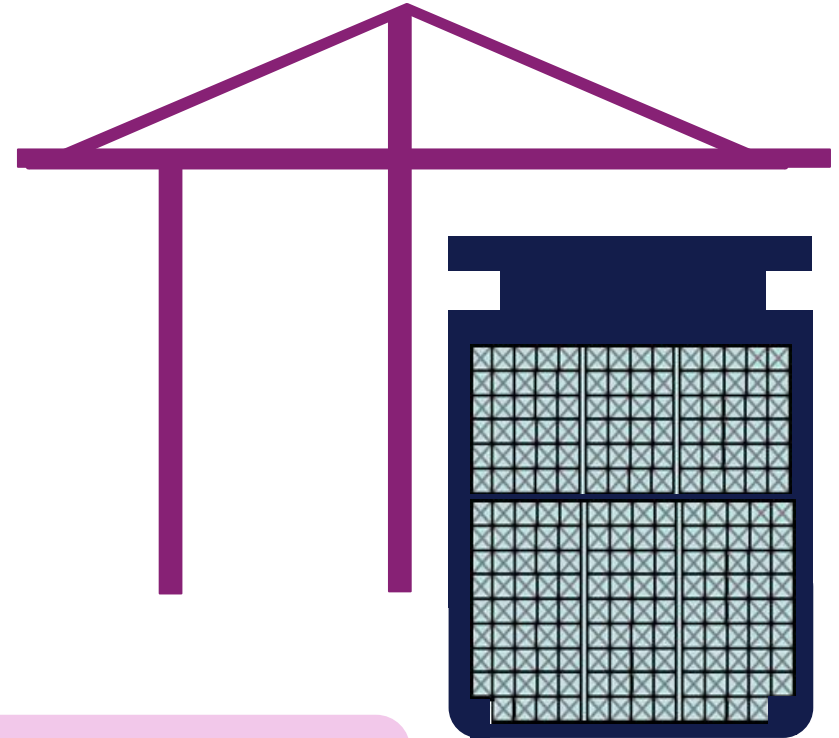
Equipment and infrastructure



Highly significant investment implications for ports

Terminal capex and opex increasing

- Larger (and more) cranes
- Longer and deeper berths
- Deeper approach channels
- Greater air draft
- Higher crane and berth productivity
- **Larger or more densely stacked yard**
-and suitable inland transport links



More rapid obsolescence of existing terminal capacity

Larger vessels are changing terminal demands

Berth wastage

1km berth

Past situation – 8,000 TEU calls



300m



300m



300m

1km berth

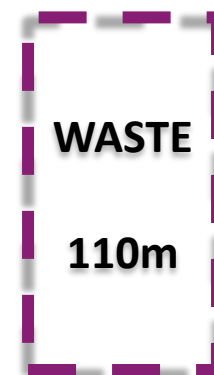
Present situation – 18,000 TEU calls



400m



400m



Traditional ports out of the game?

Ever larger ships are still accessing ports with navigational restrictions

Maersk Line 18,300 teu vessel in Antwerp



MSC 19,200 teu vessels call Antwerp



China Shipping 19,100 teu vessels call Hamburg



Traditional ports out of the game?

Ever larger ships are still accessing ports with navigational restrictions

Large vessels in Itajai, Brazil



Maersk Lavras (300m LOA, 45m beam, 7,450 teu)



MSC Loretta (300m LOA, 40m beam, 6,750 teu)

Hamburg Sud 9,800 teu vessel in draft restricted Buenos Aires....

.....at terminal using mobile harbour cranes



Traditional ports out of the game?

More than 30 ports on secondary trade lanes served by ships of 8-10,000 teu

Don't forget:
It's all about the
cargo!



Latin America

Antofagasta
Buenaventura
Buenos Aires
Callao, Coronel
Iquique
Itajai, Itapoa
Montevideo
Navegantes
Paranagua
Puerto Angamos
Rio Grande
San Antonio
San Vicente
Santos
Sepetiba
Valparaíso

Black Sea

Constanza
Ilychevsk
Odessa

Adriatic

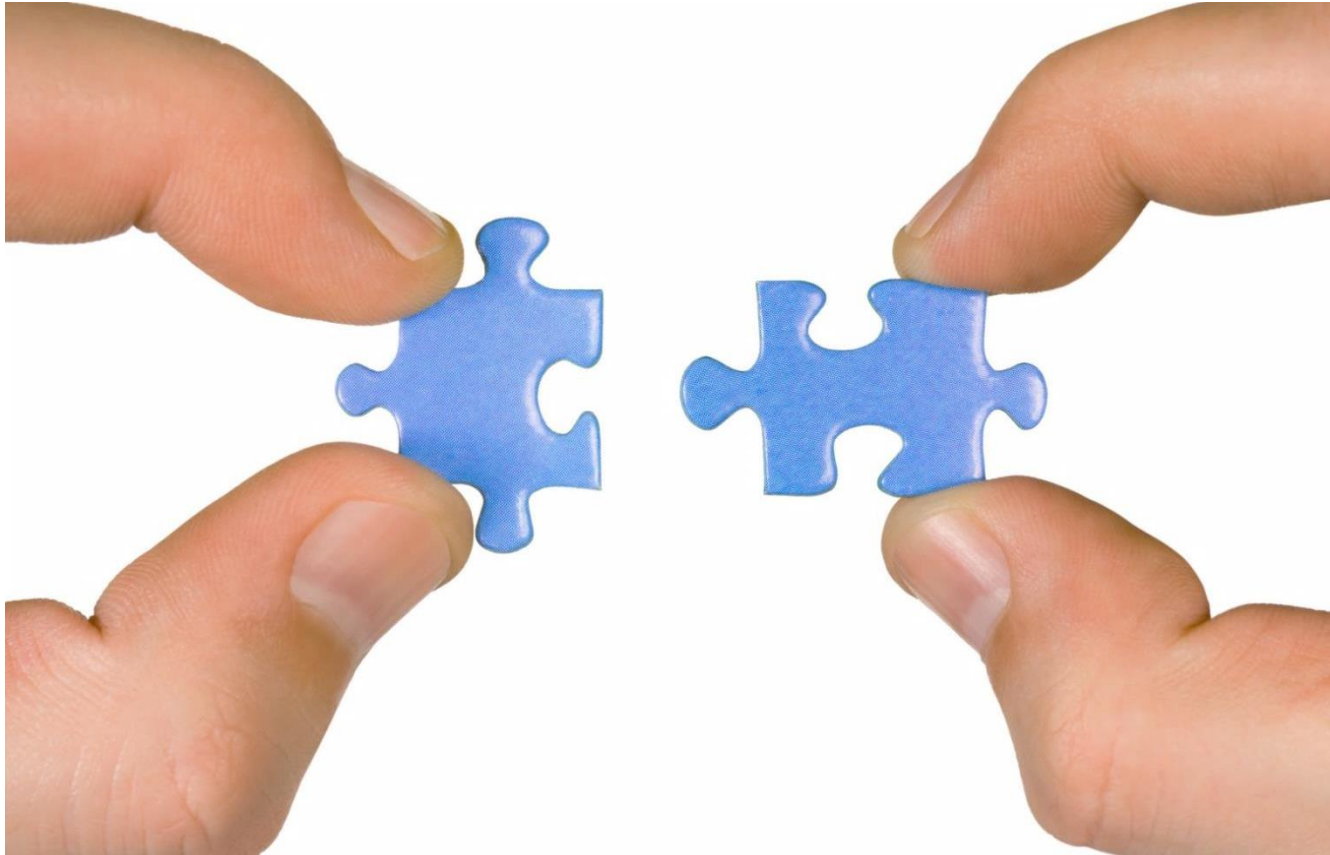
Koper
Rijeka
Trieste

Africa

Coega, Durban
Port Elizabeth
Abidjan, San Pedro
Lome, Lagos
Port Louis

Source: Drewry Route Capacity Database

Fragmented terminal capacity

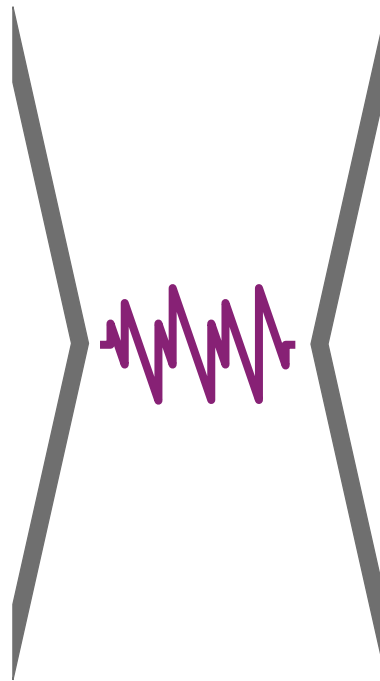
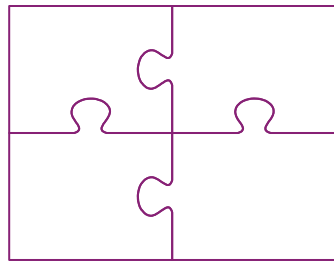
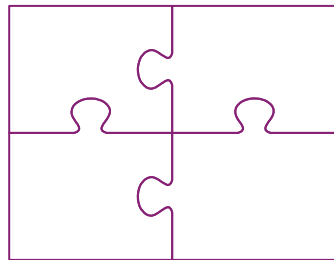


Fragmented terminal capacity

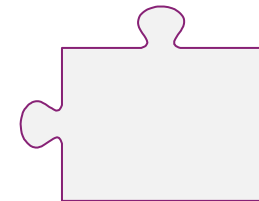
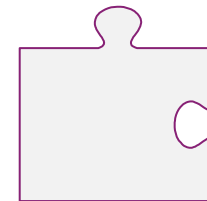
Demand for fewer, larger terminals in each port



Shipping lines/
Alliances

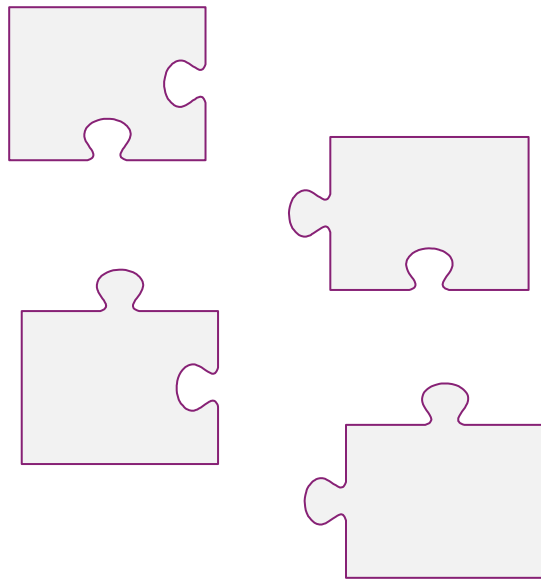


Terminals



Fragmented terminal capacity

Demand for fewer, larger terminals in each port



- Physical fragmentation
- Fragmentation in terms of terminal ownership
- Carrier stakes in terminals complicate matters
- More inter-terminal transfers of boxes required
- Particularly serious issue on the US West Coast

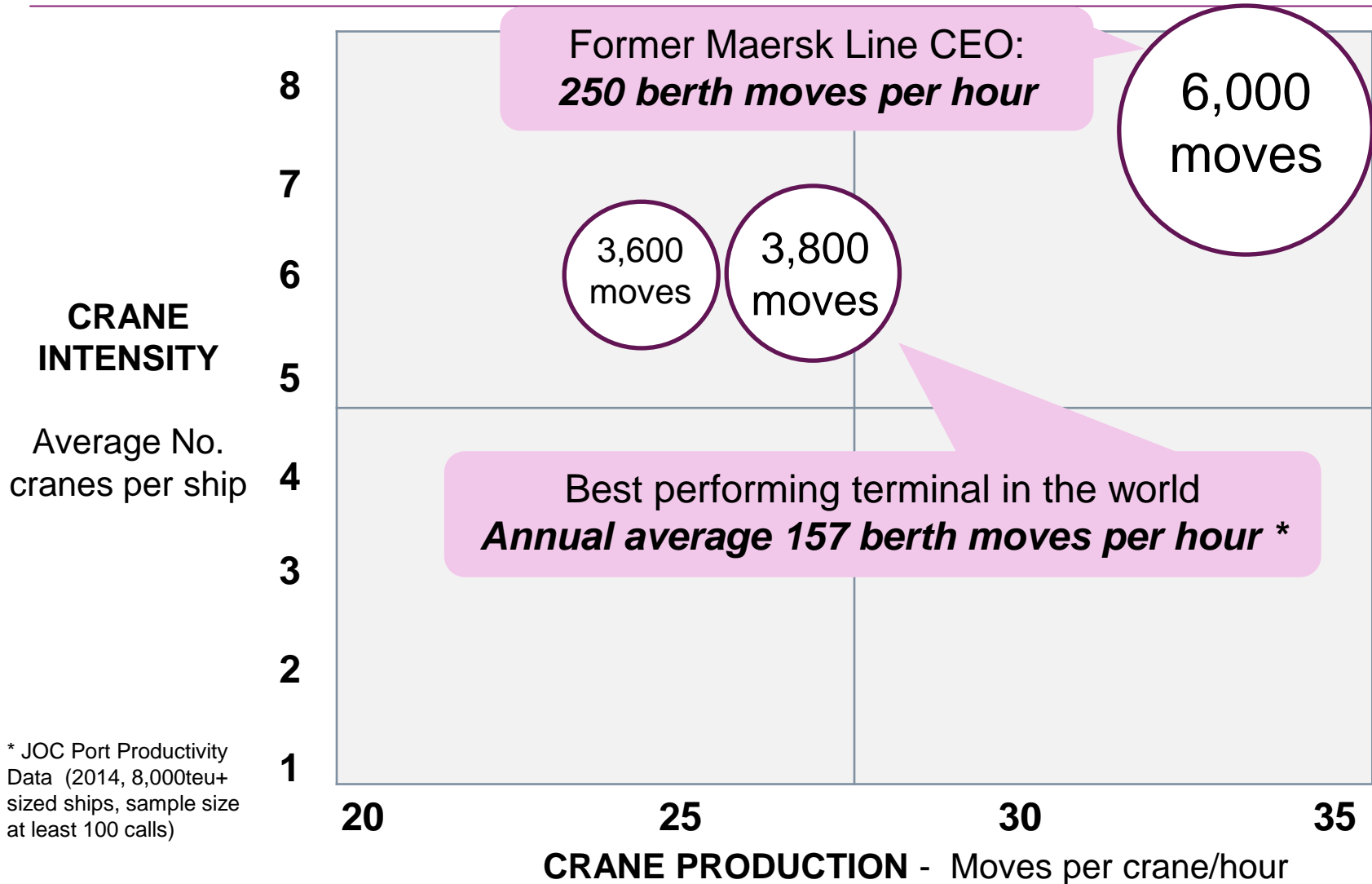
*Los Angeles-Long Beach
G6 traffic is spread across 5
different terminals*

Handling speeds



Handling speeds: Revolution, not evolution needed?

Crane intensity and production: Illustration of number of moves in 24 hours



* JOC Port Productivity Data (2014, 8,000teu+ sized ships, sample size at least 100 calls)

Overall supply chain network costs

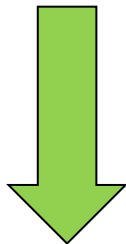
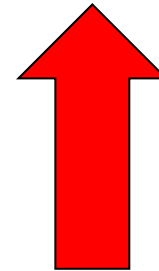


Overall supply chain network costs

Increasing imbalance?

Shipping lines are obtaining sea transport cost savings for themselves (and cargo owners) by deploying bigger ships....

\$



\$

...but they are generating higher costs in other parts of the supply chain

(Much) bigger ships + Bigger alliances + Vessel cascading

What are the potential solutions?

Terminal automation?

Revolution in ship-to-shore handling technology?

Greater collaboration between terminals and carriers

Greater collaboration between terminals e.g. manage port as one “virtual” terminal?

Terminal consolidation (ownership and physically)

Greater port authority cooperation

Higher terminal handling charges?

Structural and organisational changes in landside transportation and logistics

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In the last 5 years we have provided advice on vessel valuations with combined asset value of more than \$180bn

We have advised on container shipping industry investments totalling \$6bn in the last 5 years

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