

Global impacts of ship size development and liner alliances on port planning and productivity



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Agenda



Container ship size growth

Liner alliances and networks

Impacts on ports and terminals

Crystal ball gazing

Follow the leader...

Herd mentality – once one carrier upsizes, all others have to follow



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...

**Lloyd's
Register**

GL
Germanischer Lloyd

OCEAN
SHIPPING
CONSULTANTS

ROYAL HASKONING

stx

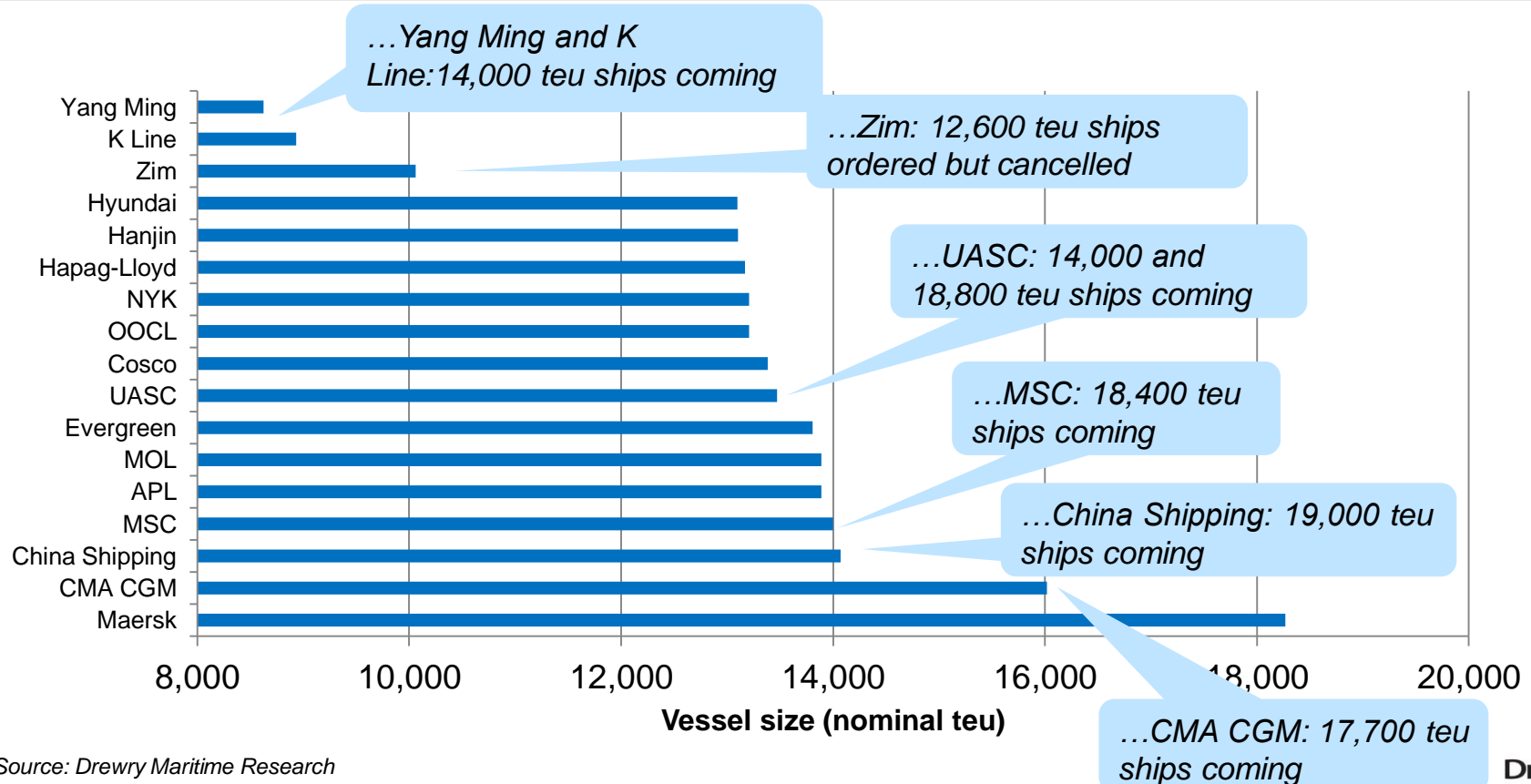
22,000+ teu vessels?
2018?
Carriers will follow...

Largest vessels deployed in Asia-N. Europe trade, Jan 2014

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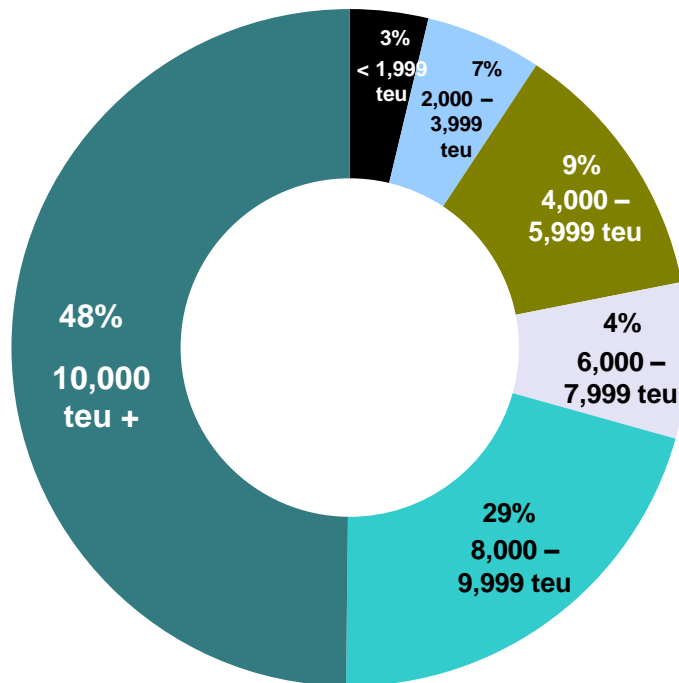
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Herd mentality – once one carrier upsizes, all others have to follow



Orderbook dominated by ULCVs, which are not restricted to Asia-Europe deployment

Total order book by teu size range (% of teu capacity)

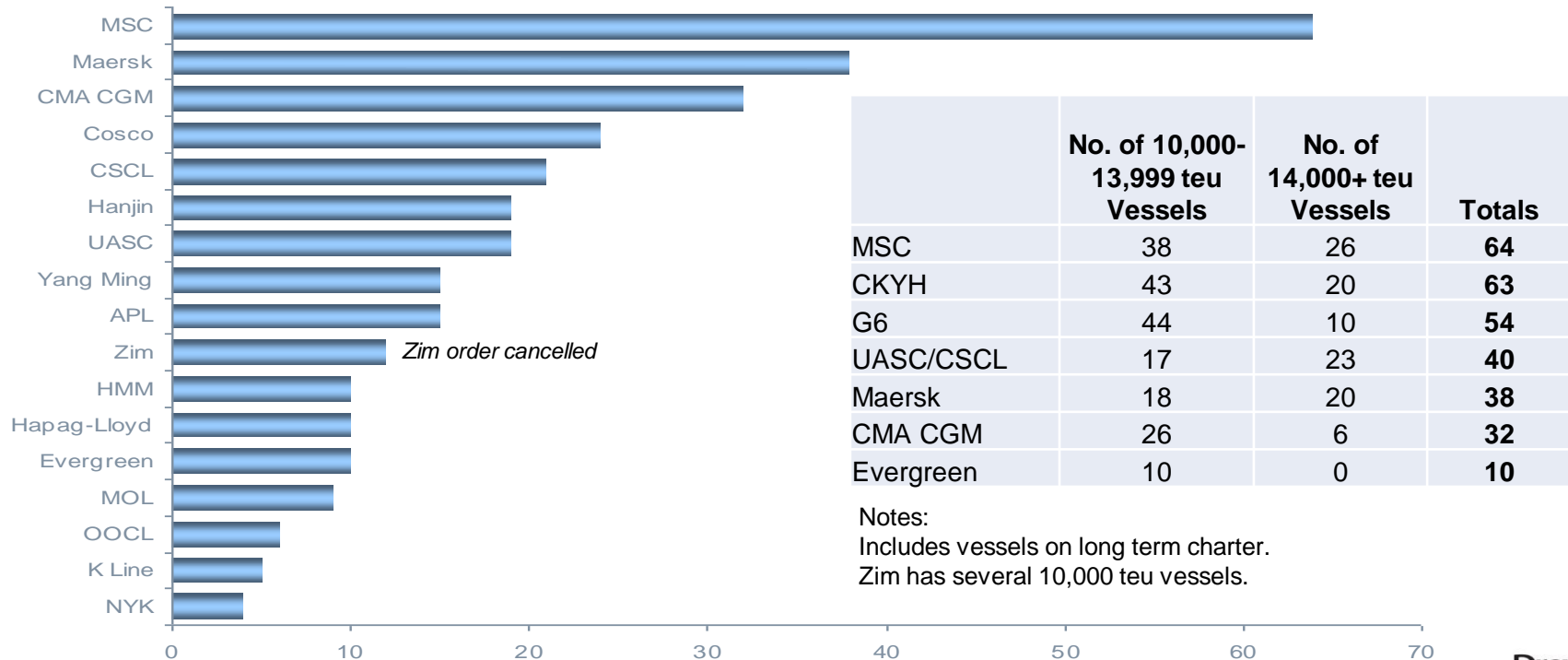


Trade lane deployment of ULCVs - Jan 2014

Asia-North Europe	130
Asia-Mediterranean	36
Asia-USWC	14
Asia-Mid East	9

Number of Ultra Large Container Vessels (ULCVs) per carrier by end-2016

MSC will have the most ULCVs. The smaller lines outside the main alliances will also have a significant number



Vessel cascading

18,000 teu ships have implications for all ports, not just ones on the Asia-Europe route

Asia – Europe route

- Dredging and quay walls most expensive to change – so far the new ships are no longer or deeper than current largest
- Cranes are cheaper and easier to change (relatively speaking) – new ships are wider – so outreach but also crane height are key

Elsewhere

- Rapid vessel upsizing across all dimensions for ports elsewhere
- Not necessarily operating on maximum draft
- Not necessarily the ideal size of ship for the trade route



Ever larger ships are being cascadedglobally

► **Largest deployed vessels, January 2014:**

► Asia - North Europe:	18,270 teu
► Asia - Mediterranean:	14,000 teu
► Asia - US West Coast:	13,800 teu
► Asia - East Coast South America:	9,700 teu
► Europe - East Coast South America:	8,800 teu
► Asia - West Coast South America:	9,200 teu
► Asia - Middle East:	14,000 teu
► Europe - South Africa - Asia:	12,500 teu

Bigger Asia-North Europe ships =
More cascading to other routes =
More alliances on other routes (e.g. G6 Asia-USEC, P3 east-west routes) =
Port/terminal choice shake ups

There are currently 104 vessels of 7,000-10,000 teu deployed on the Asia-N Europe route.

All will need to be cascaded elsewhere by 2016

"India's Mundra Port today handled one of the largest and longest container vessels in the world - MSC Valeria, having a capacity of 14,000 teu" Source: Economic Times, 5 June 2013

Cascading vs. deliberate vessel upsizing

Pursuit of economies of scale in all trade lanes



Maersk Line 18,000 teu vessels on Asia-Europe route

Hamburg Sud purpose built 9,800 teu vessels on Asia- East Coast South America route

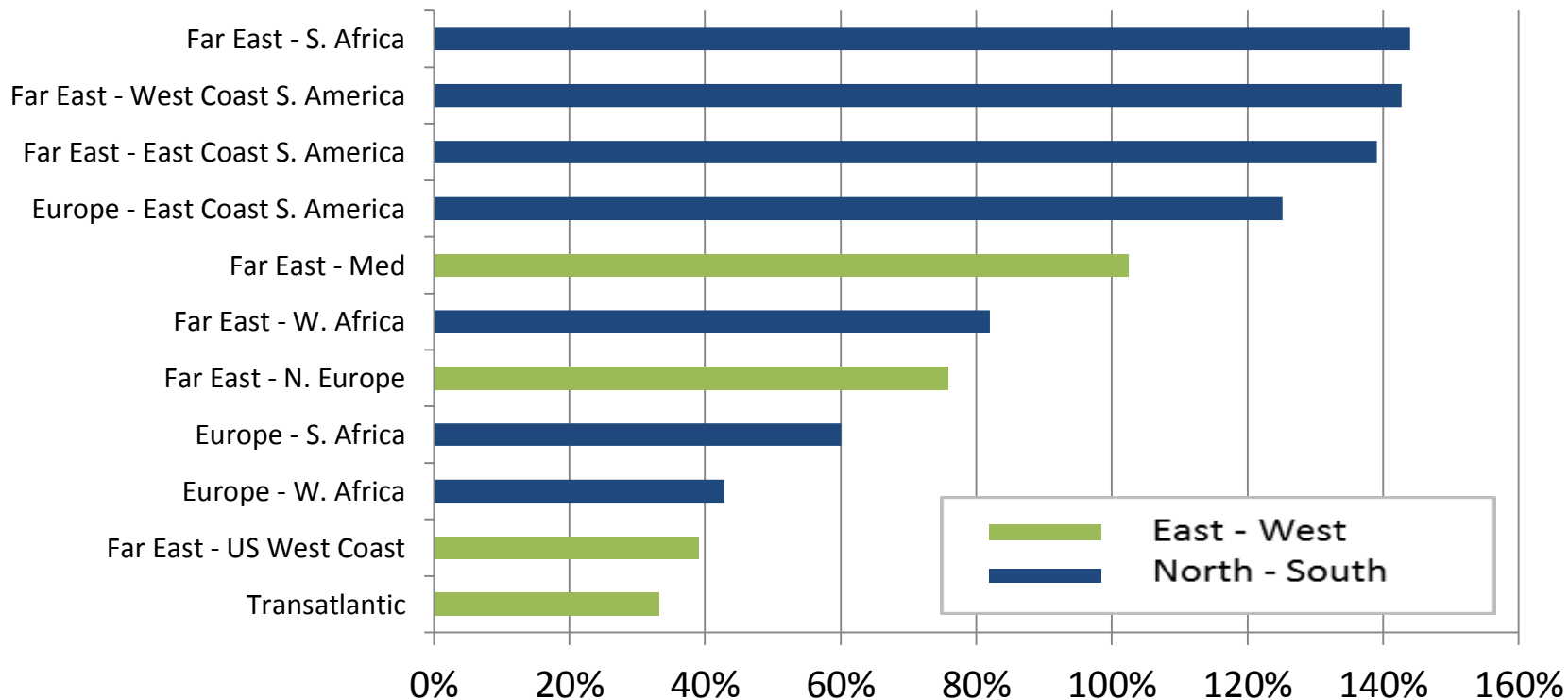


Increase in average container ship size by trade route, 2006-2013

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Massive increases in ship sizes, especially in north-south trades



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Recent developments in alliances

Mega carriers and mega alliances

- Relentless pursuit of economies of scale = ever larger ships

- To fill these ships, carriers have to come together in alliances

- Since 2011, the pressure for alliance **size and geographical scope** has intensified:
 - Maersk, CMA-CGM and MSC in P3
 - Grand and New World Alliances to G6 in Asia-Europe route. G6 expanding to Transpacific and Transatlantic
 - Evergreen joining CKYH

...terminals have to convince and negotiate with 3 (or 5 or 6) lines to call

P3



G6



CKYH



Liner shipping market structure

Concentrated market operationally but not commercially

Many ships
and
shipowners

- Around 400 container shipping companies and 5,100 container ships worldwide

but
concentration

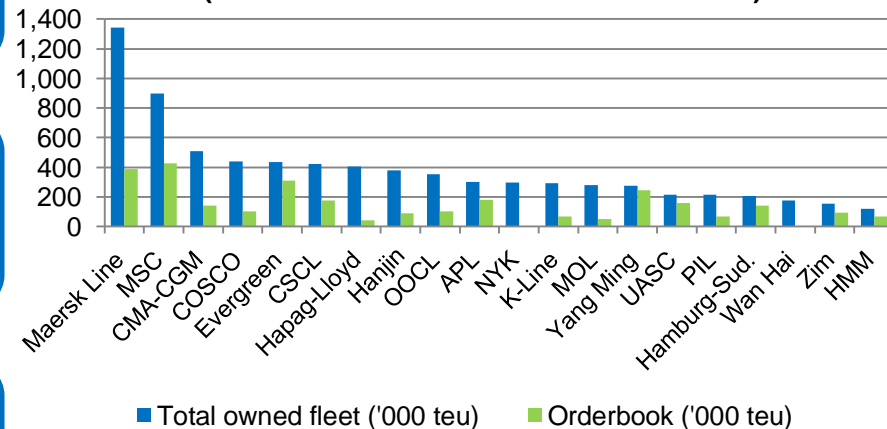
- Top 20 container lines account for over 80% of the market

and
alliances

- Effectively just 3 major global carrier alliances now

...but market still highly competitive as alliances are operational only, not commercial

**Owned fleet size by carrier, July 2013
(excludes leased and chartered vessels)**



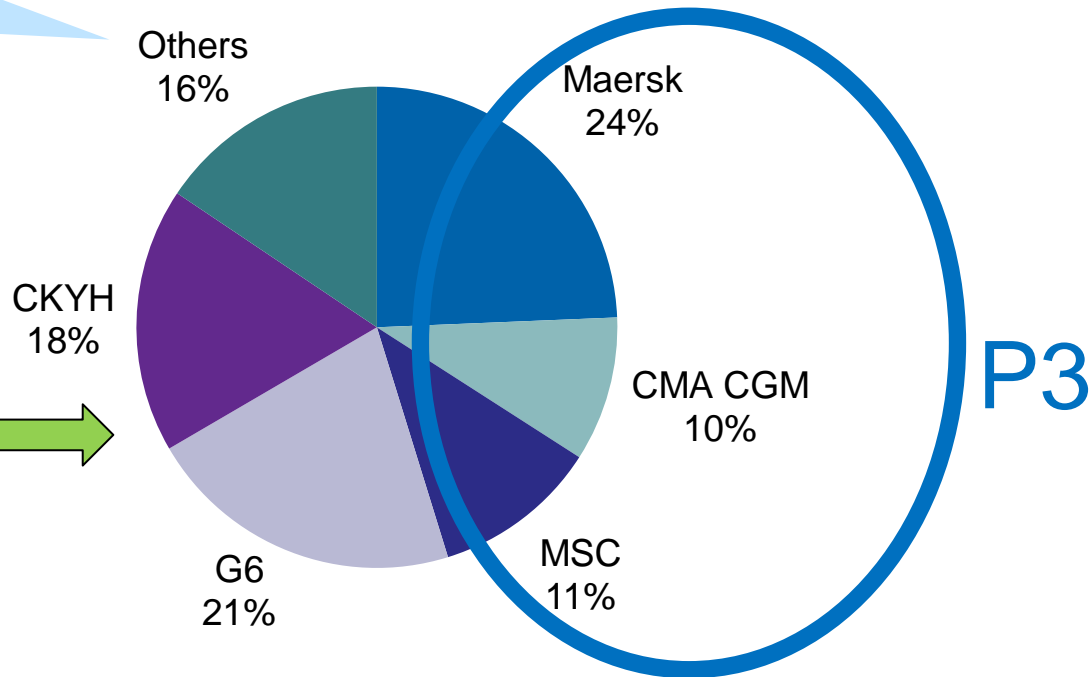
Asia - North Europe capacity shares by carrier/alliance

Essentially just three groupings. The “others” are under pressure to join

“Others” are: Evergreen, China Shipping, UASC and Zim

Evergreen
joining CKYH
alliance

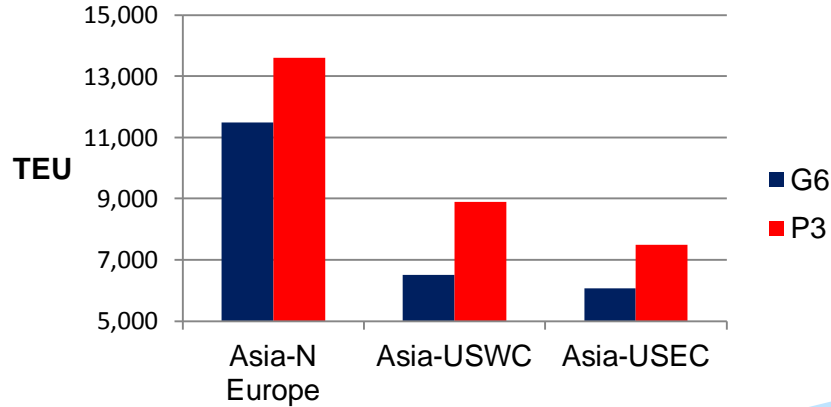
Cosco and China
Shipping co-operation



P3 alliance network – Case study

The P3 will be a powerful force but will still call at numerous ports

Average vessel size



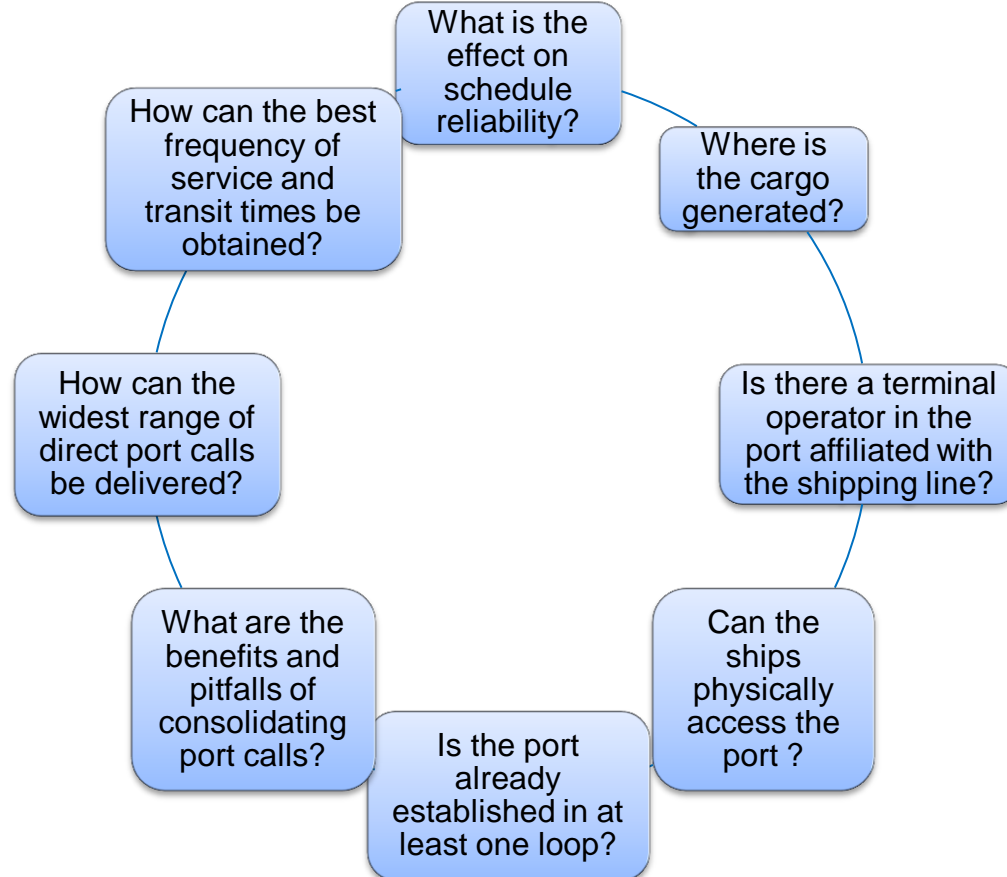
Port rotations will be rationalised (esp. transshipment calls) but each line has too much at stake to completely drop any of their major gateway ports.....



.....plus having the widest range of services and port calls will be a key selling point for P3

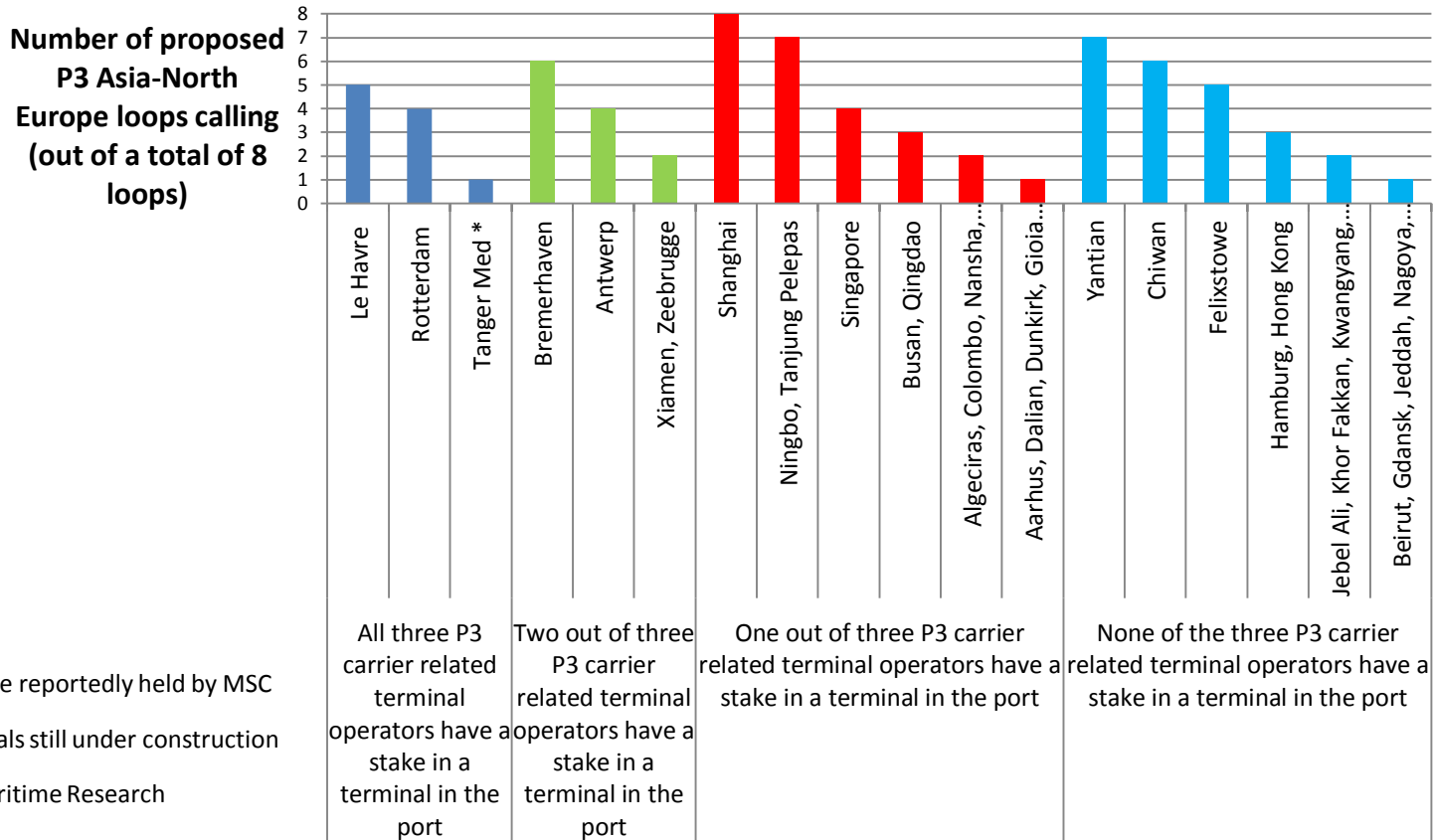
P3 alliance network – Case study

Alliance port and terminal choices involve many trade-offs for each carrier



P3 alliance network – Case study

Terminal ownership appears to be a factor of limited influence in port choice



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Nature of container port demand

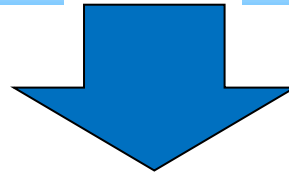
Two dynamic aspects to demand.....both affect terminal capacity needs

Demand growth

- Growth rate %
- Size of market

Change in the nature of demand

- Ship size growth
- Carrier alliances and partnerships



Terminal capacity requirements

Nature of container port demand

Irrespective of demand growth levels, the pressures on terminals are changing

Same volume in significantly
bigger ships =

**Different kind of
capacity needed**

Same volume concentrated in
fewer alliances/players =

Change in the nature of
demand

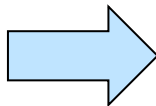
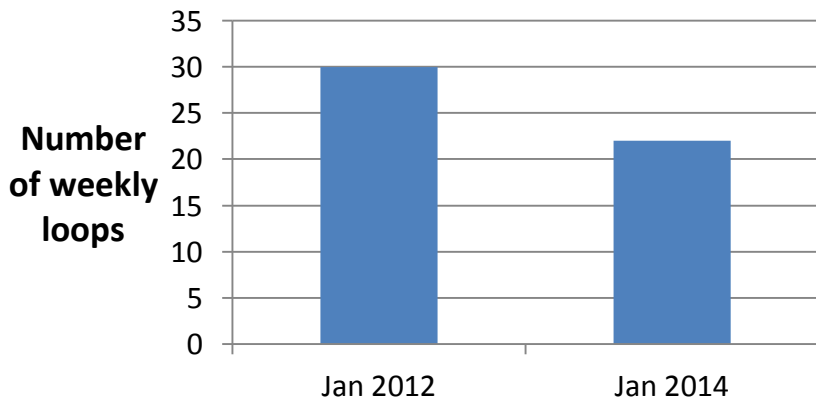
- Ship size growth
- Carrier alliances and partnerships

Bigger ships and bigger alliances

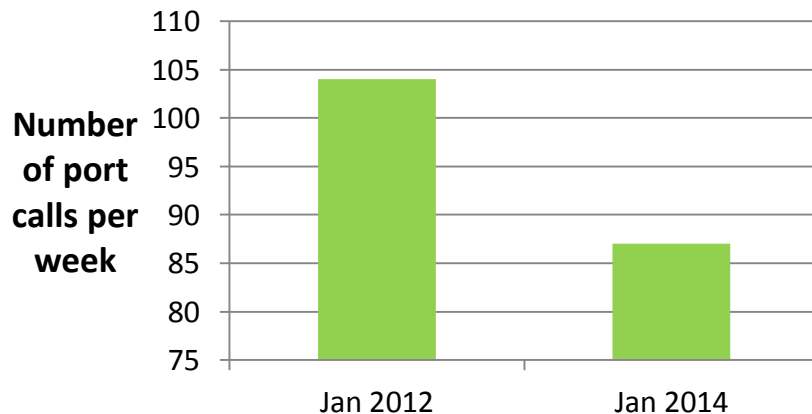
No reduction in the list of ports called at, but greater peaks

- ▶ Typically the same number of ports called at per loop, but less frequently
- ▶ Fewer port calls by bigger ships = greater peaks and troughs at terminals (shipside and landside)

Asia - North Europe trade route



Asia - North Europe trade route



Same list of ~10 North European ports called at

Bigger ships and bigger alliances

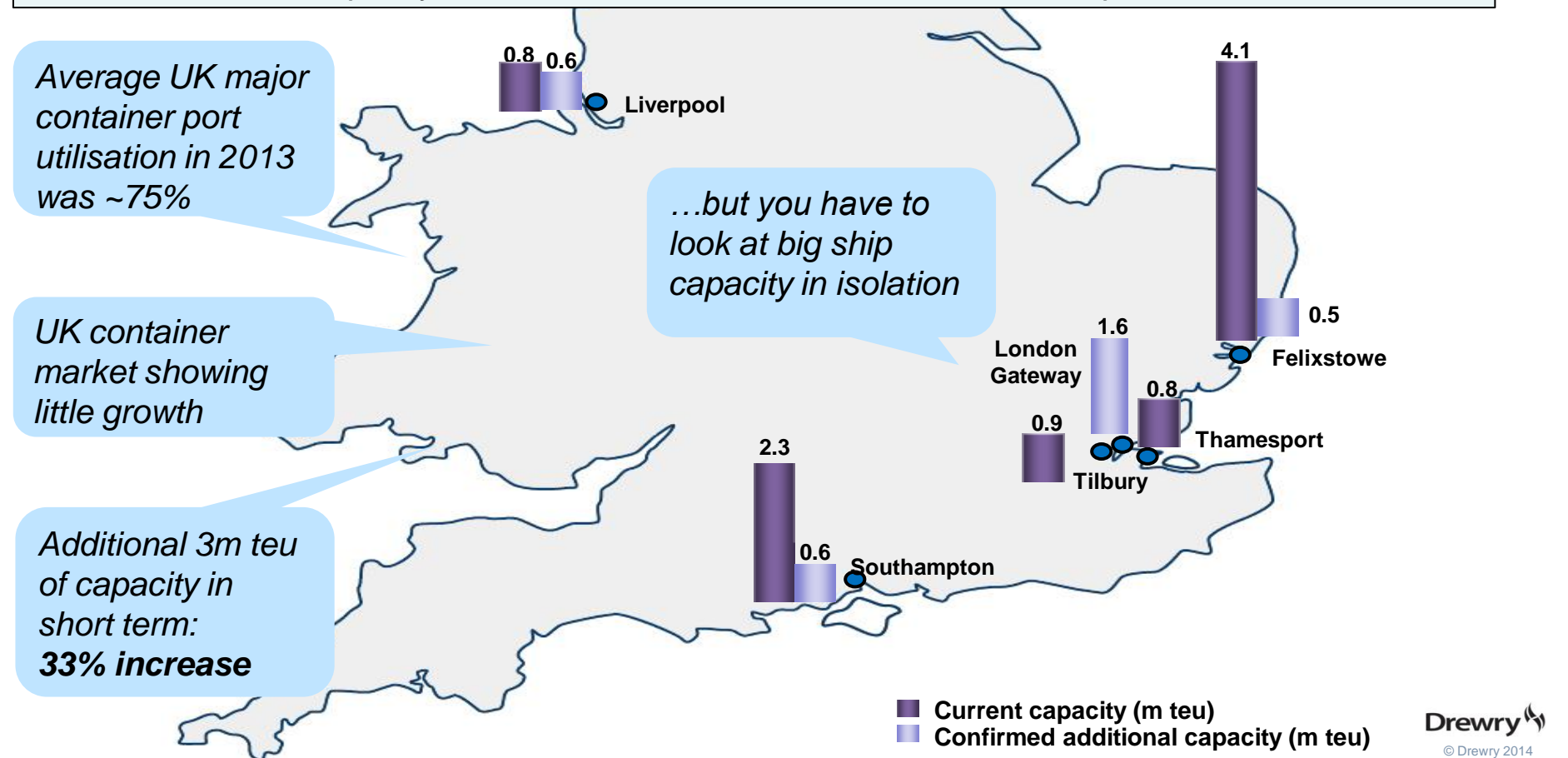
Demand for bigger terminals due to consolidated volumes

- ▶ 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

Port	Seattle	Tacoma
2013 throughput	1.6m teu	1.9m teu
No. of container terminals in the port	4	5
No. of container terminals with carrier stakes	4	4

Case study illustration: UK deep sea container ports

Terminal capacity increase of 30% in face of flat demand – recipe for disaster?



UK ports – Ultra large container vessel (ULCV) capability

The market is actually fairly well balancedfor the very big ships..... at present

Container port demand

- ▶ UK - Asia volumes
~3.5 million teu p.a.
- ▶ Assume ~0.5 million
teu per berth p.a.
- ▶ Need minimum 7
berths in UK able to
handle very large
container ships

Container port capacity

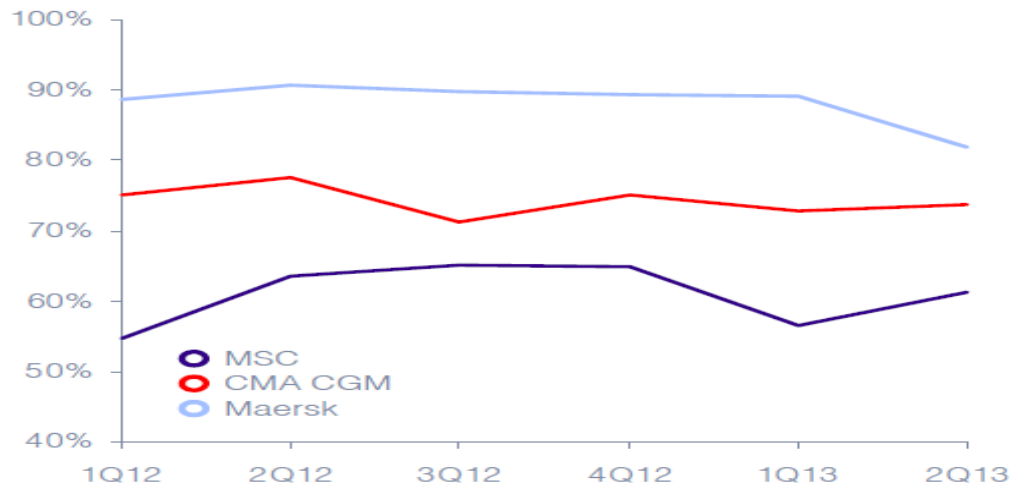
- ▶ Felixstowe = 3 berths
- ▶ Southampton = 3 berths
- ▶ London Gateway = 2 berths by mid 2014
- ▶ 8 berths by end 2014
- ▶ 10 berths by 2017
- ▶ *Potential for at least 14 berths longer term*



***...smaller/shallower berths currently serving
Asia-Europe trade will be under-utilised***

P3 members' widely varying performance will create a challenge for them
but may help ports if reliability becomes more uniform

On-time reliability of P3 carriers



Source: Drewry *Carrier Performance Insight*

Not all carriers are the same

- Wide gaps between most and least reliable carriers
- Alliances are grouping carrier results and lessening differentiation

P3 Network to raise standards

- Maersk expected to enforce high reliability on MSC and CMA CGM who have worse reliability records

Growing importance of transshipment

Transshipment is a central and critical part of liner shipping operations;
bigger ships and alliances increase the need



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

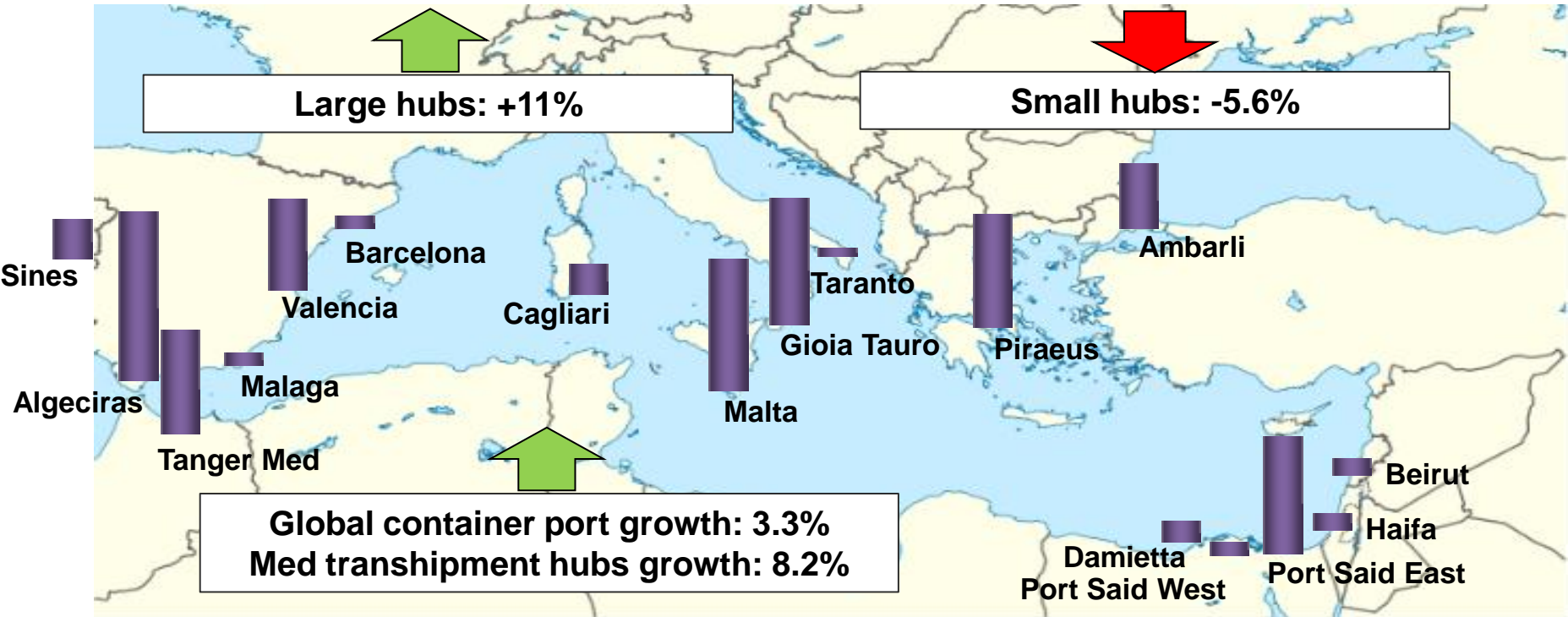
*Bigger mainline vessels
generally mean greater use of
transshipment – to fill the ships*

Transshipment volumes at main Mediterranean hub ports, 2013

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Bigger ships and alliances = more transshipment....for big hubs

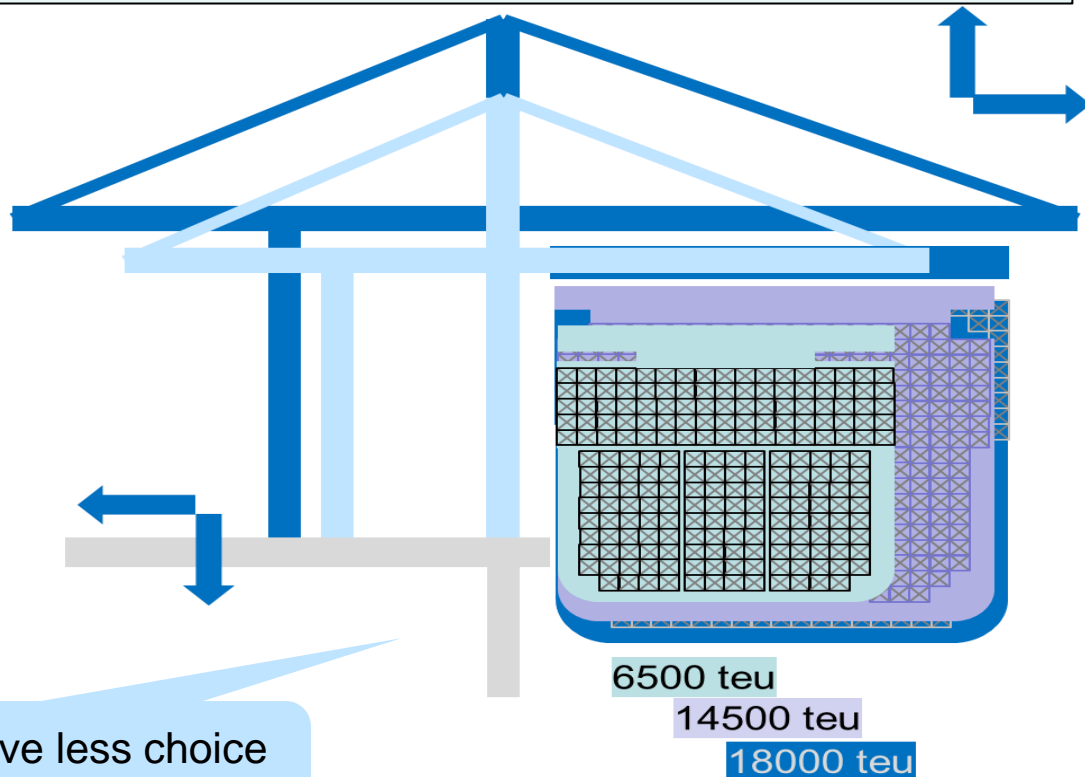


Source: Drewry Maritime Research. Includes some estimates

The challenge of ship size growth for ports

Bigger ships mean investment in equipment, infrastructure.....and systems

- ▶ Mega vessels = mega cranes
- ▶ Berth length and depth
- ▶ Air draft
- ▶ Outreach
- ▶ Intermodal capacity
- ▶ Crane and berth productivity



Bigger ships have less choice
of ports and terminals

Port/terminal infrastructure and equipment requirements

Wide range of requirements in order to both physically accommodate big ships....but also to achieve the required productivity

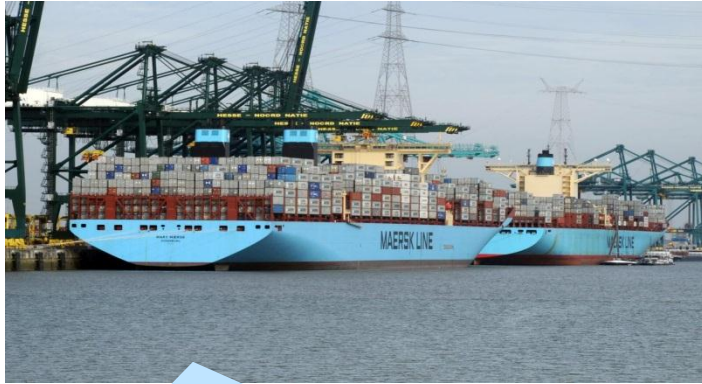
To be able to accommodate the current largest container ships, a port/terminal must have:

- ▶ Large enough cranes (i.e. at least 21-22 boxes across outreach)
- ▶ Sufficient large cranes (at least 3 cranes per vessel and usually at least 5 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 and inland linkscapable of coping.....

Are shipping lines prepared to pay for these enhanced requirements?

Traditional ports out of the game?

Ever larger ships are still accessing ports with navigational restrictions



Maersk Line 18,000 teu vessel in Antwerp

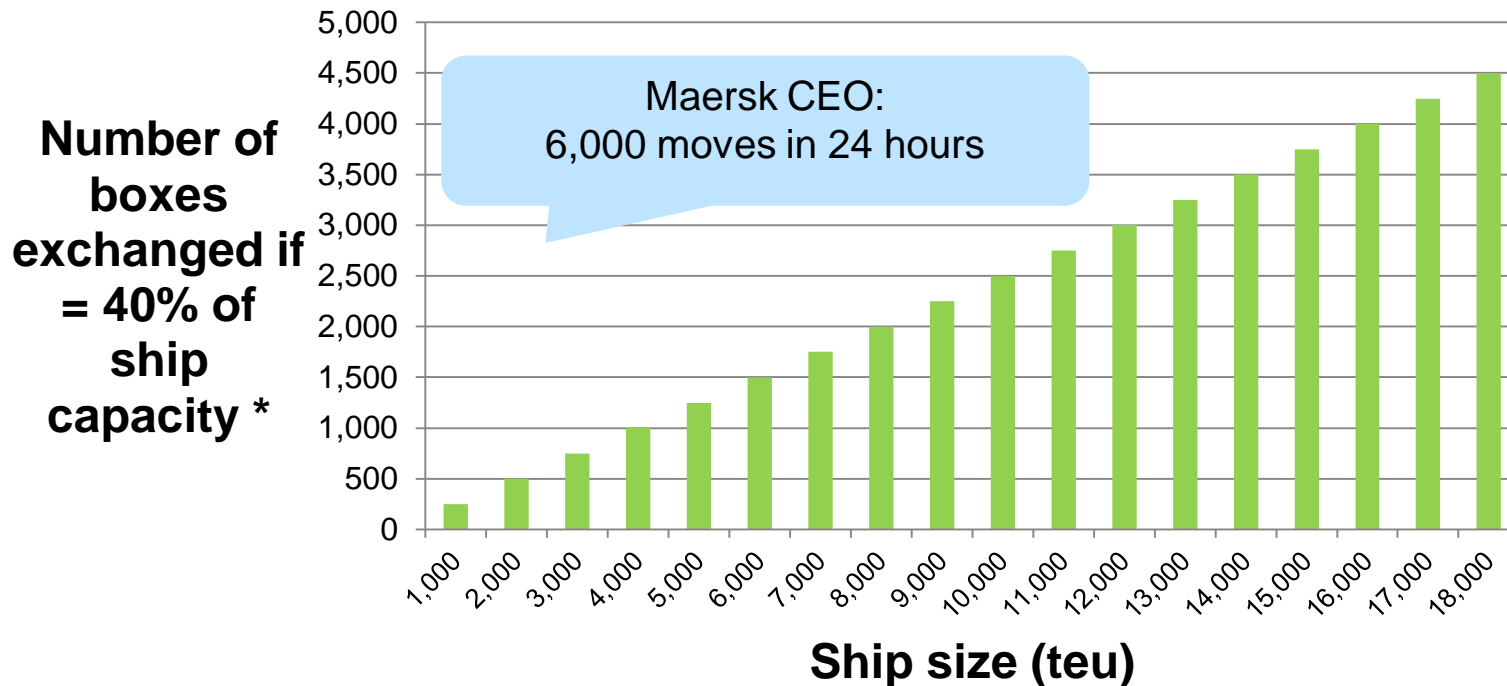
CMA CGM 16,000 teu vessel in Hamburg



Hamburg Sud 9,800 teu vessel in draft restricted Buenos Aires (at terminal using mobile harbour cranes)



Size of exchanges per vessel call get very large very quickly



* i.e. 20% of vessel discharged and 20% loaded per port call

Berth productivity issues

Berth productivity is a combination of crane speed and crane intensity

Ship turnaround time is driven by:

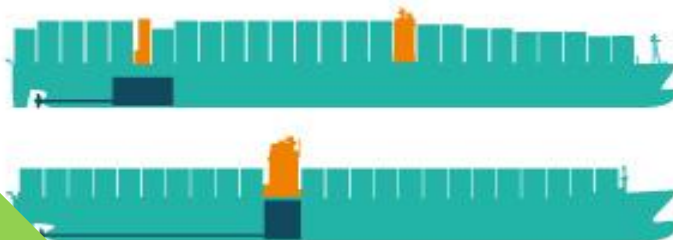
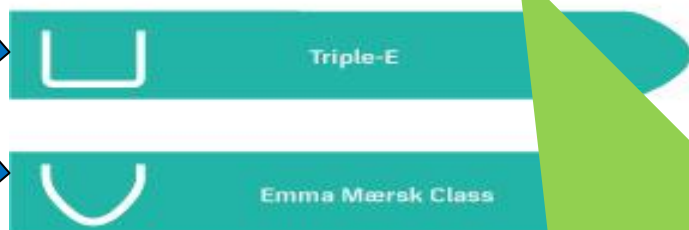
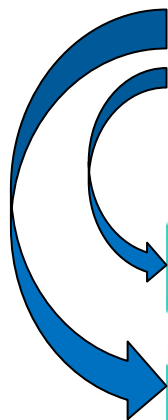
Individual crane cycle speeds

Crane intensity across the ship



It is currently hard to increase the average number of cranes deployed directly in line with ship size because ship lengths are not increasing

Ship size (teu)	Length (m)	Width (m)	Max draft (m)	Boxes wide
12,000	365-380	48-50	15.5	19-20
15,000	400	56	16	22
18,000	400	59	16	23
20-25,000	440-450?	59-61?	16.5?	23-24?



Longer ships can result in lower teu per metre of quay p.a. if box exchange volumes per call are unchanged

Crane intensity and berth productivity

Crane intensity/berth productivity is a commercial as well as an operational issue

Operational factors	Commercial factors
<ul style="list-style-type: none">• How the ship is stowed for the port in question• Size of the container exchange per vessel call	<ul style="list-style-type: none">• Speed of turnaround required or guaranteed• Flexibility, availability and cost of dock labour (and their normal hours of working)

What level of productivity does the shipping line want (they may not want the fastest) and **are they prepared to pay for it?**

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What will the container shipping and port world look like in 5-10 years?



Sheer scale of today's container port industry

The container port industry is now a huge one

For example:

- ▶ Even if Shanghai only performs at the world average growth of 5% p.a.this will add almost 10 million teu to the port's throughput by 2017
- ▶ A figure of 10 million teu is more than the entire container port throughput of the UK, India or Brazil.



What will the container shipping and port world look like in 5-10 years?

No change

	<u>2000</u>	<u>Today</u>	<u>2020</u>
Empties share	~20%	~20%	~20%
Typical EBITDA margins (gateway terminals)	~40%	~40%	~40%
Typical EBITDA margins (transhipment terminals)	~20%	~20%	~20%

What will the container shipping and port world look like in 5-10 years?

Big changes

	<u>2000</u>	<u>Today</u>	<u>2020</u>
Largest container ship (teu)	7,060	18,000	22,000+
Super post-Panamax gantries	20	1,160	2,000+
Market share top 4 terminal operators *	~25%	~41%	?
Number of major liner alliances/players	7	3	2?

* total teu basis

What will the container shipping and port world look like in 5-10 years?

Big changes

	<u>2000</u>	<u>Today</u>	<u>2020</u>
World port teu throughput	235m	623m	~1 billion
Global transshipment teu	58m	175m	~320m
Asian ports' share of world teu	47%	56%	65%+
Chinese ports' share of world teu	16%	30%	40%+

Making Contact

Intelligence creates advantage. A collaboration with Drewry will provide the information to support sound business decision-making.

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