

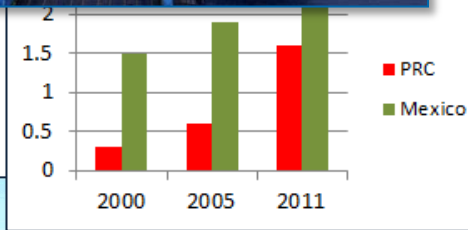
14th TPM Annual Conference

Hyatt Regency, Long Beach
2-5 March 2014

North American Port Productivity – Lessons from Asia & Europe? _{v3}

Dr Jonathan Beard, Jolke Helbing, Geoff Dobilas





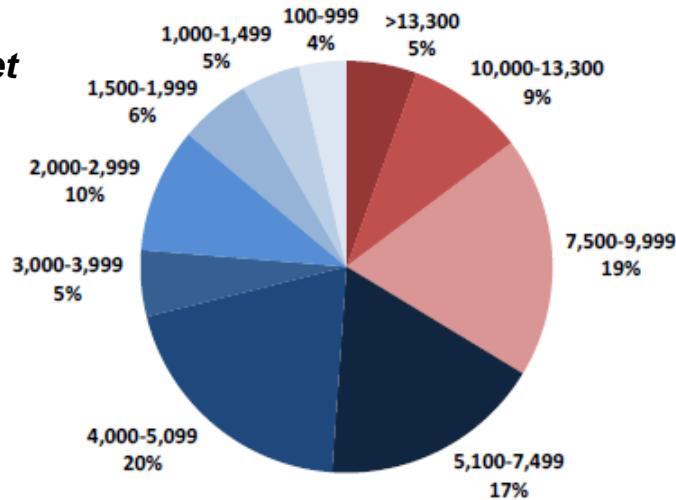
Context

- Changes in vessel technology & deployment
- Impacts for capex , productivity, capacity and profits - who gets the costs savings?
- Bigger vessels and bigger alliances – benefits & headaches for terminal operators
- Outside the gate – connecting the hinterland

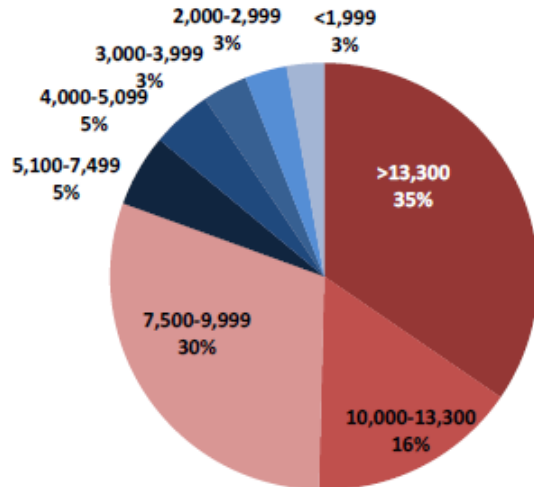
Demand – What are Customer Requirements?

Container vessels are getting ever larger: Maersk EEE 18,000TEU, CSCL 19,000 TEU

Current Fleet



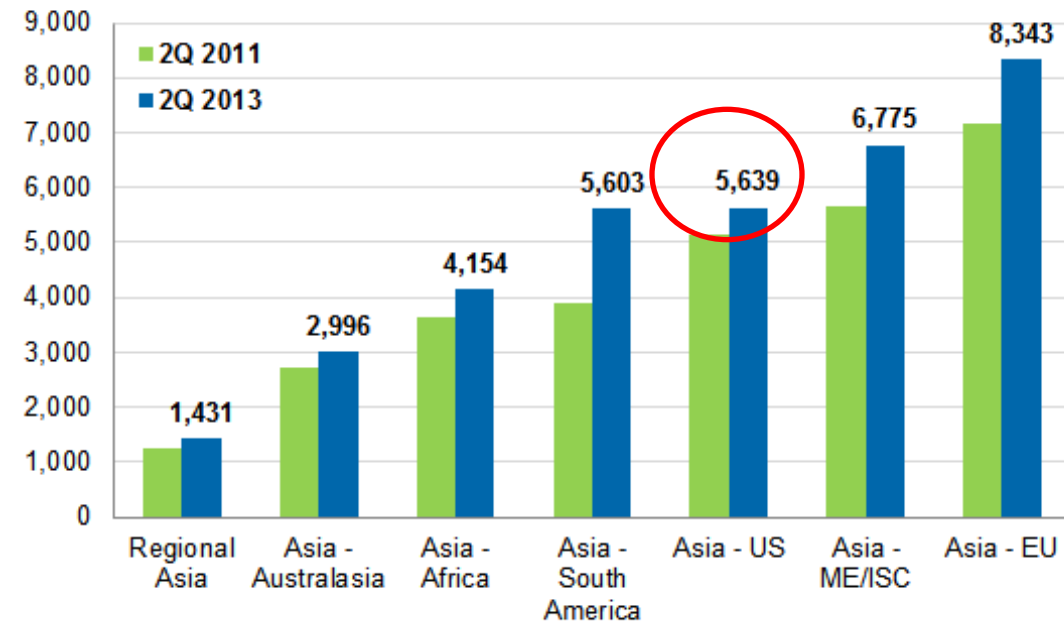
Orderbook



- FE-N EU average vessels sizes Feb 14
 - P3* 11,600 TEU
 - G6 11,300 TEU
 - CKYHE 10,300 TEU
- FE-N Am 14x 10-19,000 TEU (5.4% of total capacity)
- FE- EU 173x 10-19,000 TEU (58.2% of total capacity)

Avg Size of Vsl (TEU)

Asia Trades



Note: Data as of Jan 2014

Source: Alphaliner and Lloyd's List

Note: data as of Aug 2010 and Feb 2013. *P3 yet to be approved / begin operations

Source: ICF GHK based on CI online; Alphaliner

Planning & Performance Parameters

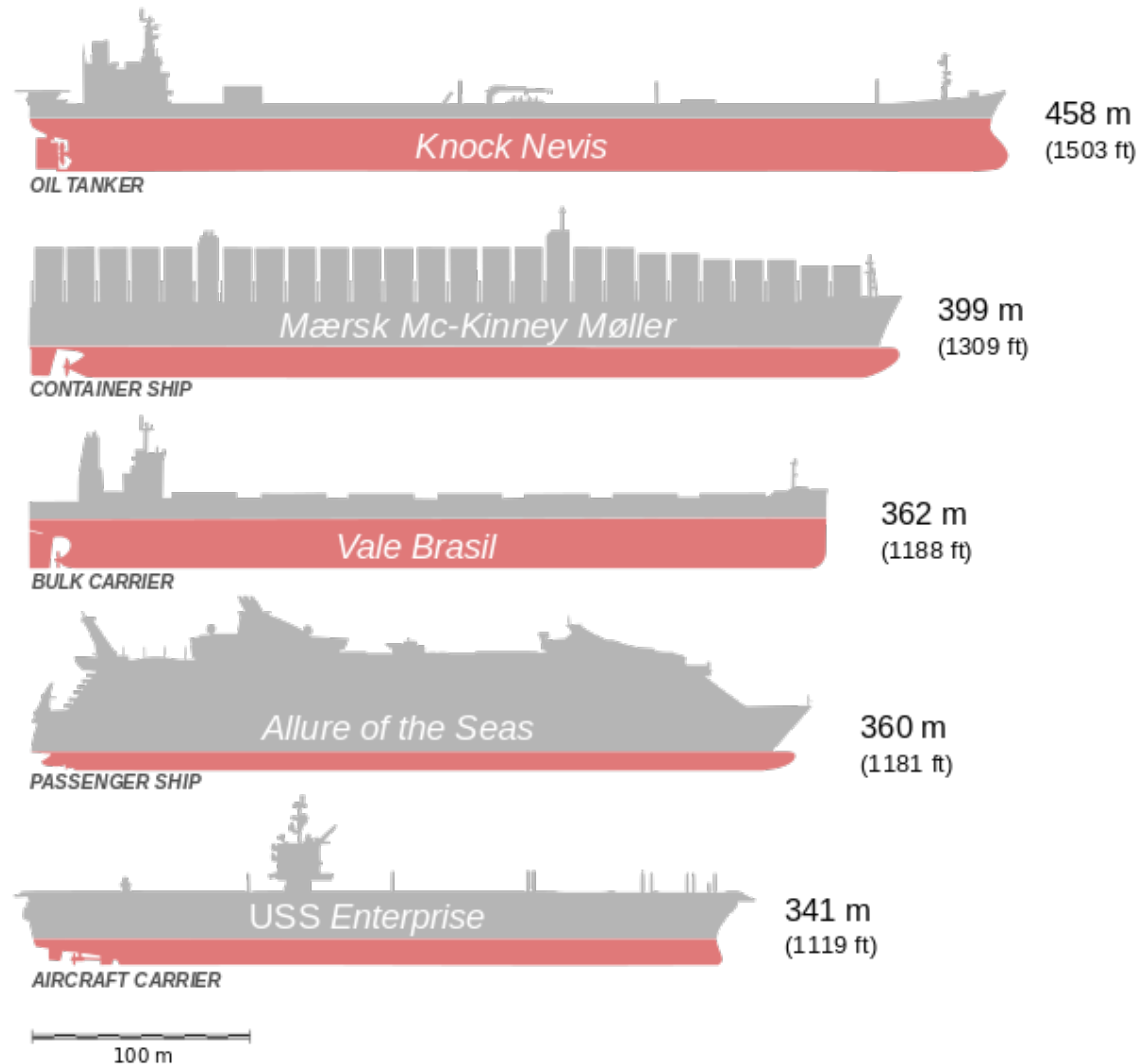
Shipping Lines Looking for Economies of Scale

■ Triple-E Maersk Class:

- LOA: 396m of Macro Polo (CMA CGM), 400m of EEEs
- Draft: -16m of Macro Polo, -15.5m of Emma, and only -14.5m of EEEs
- Beam: 53.6m of Macro Polo and 59m of EEEs
- Box across: **23 rows** of EEEs (vs Panamax of 13 rows and New Panamax of 17 rows)
- Height: 44-47m above quay for EEEs (vs 42-44m above quay for New Panamax)

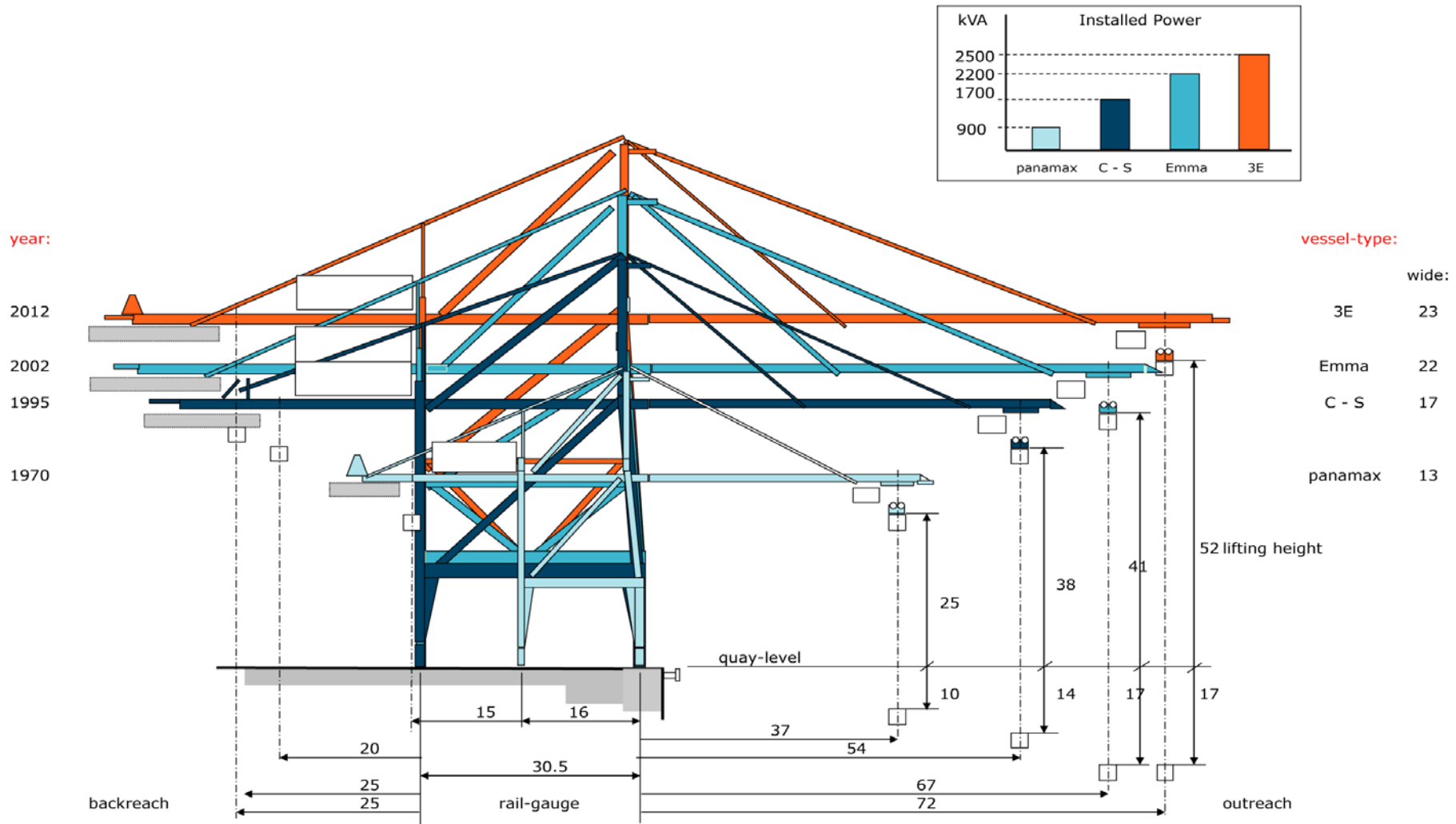
■ Bulk ports – ‘Valemax’

- 400,000 dwt ‘banned’ from PRC ports....safety concerns (CSA) or protectionism?



Source: ICF GHK, DPW

Increased Equipment Demands



Notes: *A volt-ampere (VA) = voltage times the current feeding an *electrical* load. KVA = kilovolt-ampere
Source: APM terminals – Christiaan Laursen PFI

Increased Air Draft Requirements for Vessels....and Equipment



Source: HIT

Capex & Performance Parameters

Invest to play the game or be relegated to second division?

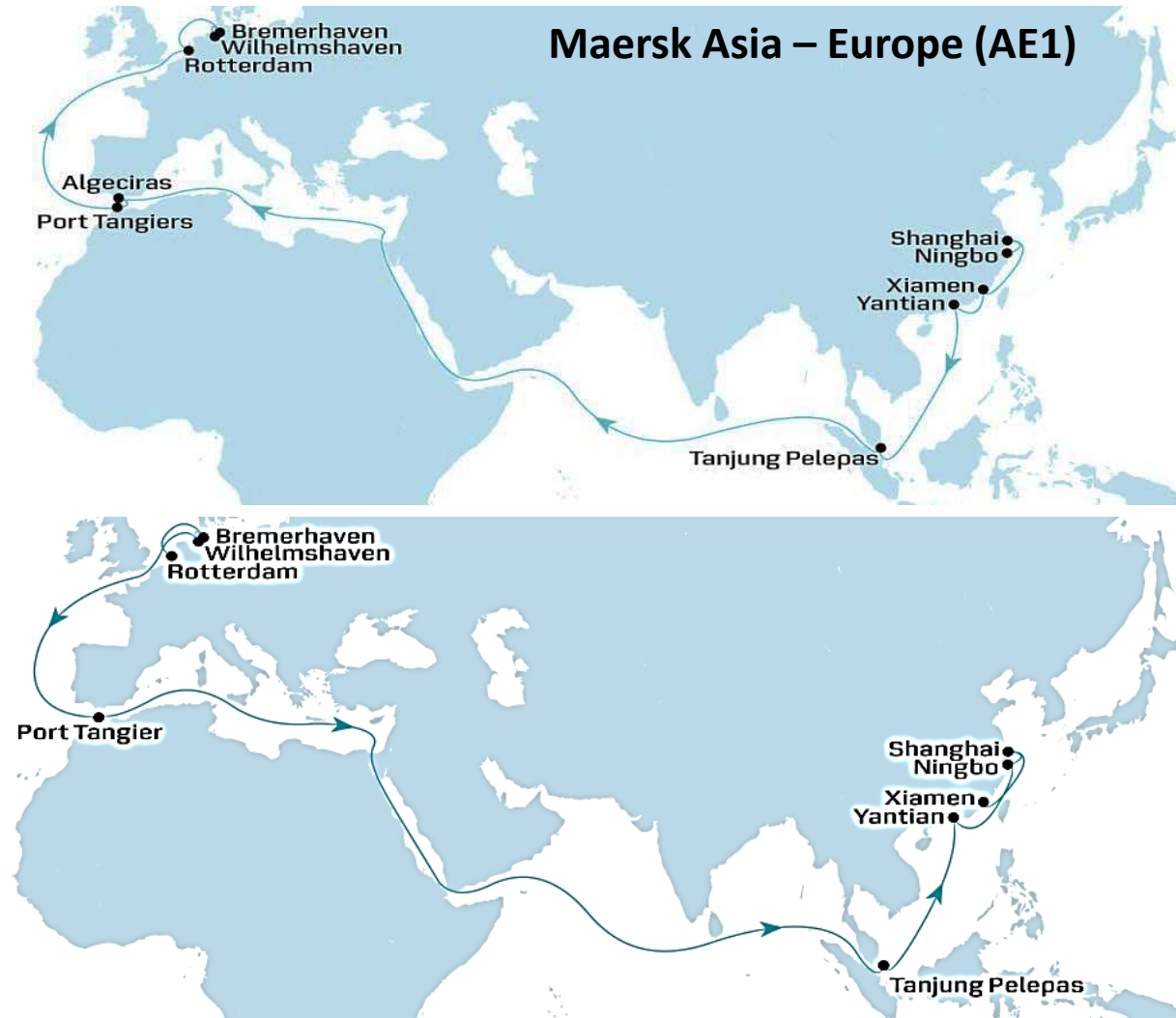
- CAPEX for mega-vessels
 - 17m water depth
 - long straight quays (1,000m or longer): maximum flexibility
 - outreach for 23-24 across
 - land (25ha/400m berth)
 - inland connectivity (for gateway ports)
- Major shipping lines demand performance
 - > 35 moves per crane hour, 230-250 moves/ship hr @ berth for *larger* vessels
 - Reliable berth windows and turnaround time
- **Cargo:** Maersk EEE seeking **6,000 moves???**, <24hrs from CTs, but can the carriers deliver on their part of the 'deal'?
- Major hub (& some gateway) ports must efficiently accommodate variety of vessels sizes (e.g. from feeder / barges to mother vessels) - flexibility in design



Build it...but will they come?

“The EEE: not coming to a US port near you soon”

- Largest vessels are being **deployed on Asia-EU trade**
- Few ports in North or South America able to take the ULCS...and productivity concerns in any case
- New Panama canal locks designed for the last generation of container ships (~12,500 TEU). Nicaragua?
- ~10,000 TEU size to become vessel of choice for Asia/USEC trade lane*
- Transpacific USWC trade lane will move to >8,000 TEUs*
- Scenario: **Winners “lock in” volume** and establish a virtuous circle, become mega transshipment (& gateway) hubs; losers see captive/direct volume routed via a third port, increasing cost of import/export????
- Port institutional model – beware **state backed players** chasing volume growth at any cost



Source: Maersk (subject to P3 approval); *Rickmers

Key challenge is to meet customer service requirements at *minimum* cost

Port TRANSHIPMENT	Berth Productivity*	TEUs /m of quay / per annum	TEUs / QC / per annum	Port VESSELS < 8,000 TEUs	Berth Productivity*
Qingdao	96			Qingdao	80
Shanghai	86			Shanghai	79
Jebel Ali	81	1,420	137,0009	Nhava Sheva (JN)	79
Busan	80			Ningbo	77
Khor al Fakkan	74			Busan	77
Salalah	72	2,940	330,000	Jebel Ali	77
Hong Kong^	68	2,360	192,000	Taipei	73
Westport (Klang)	66	1,500	154,000	Tainjin	70
Tanjung Pelepas	63	2,610	322,000	Salalah	70
Rotterdam	63			Elizabeth (US)	69

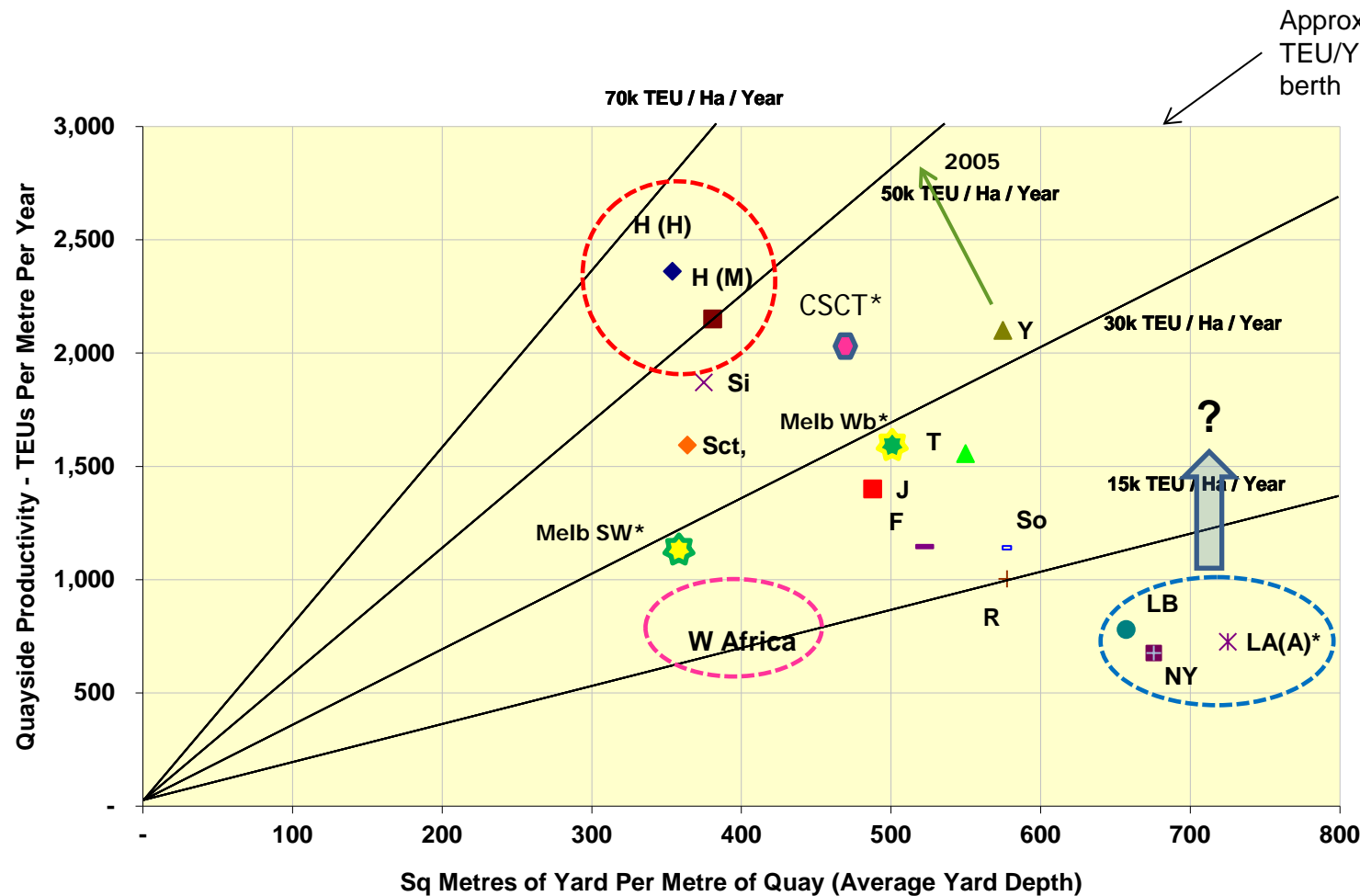
- Deliver customer productivity KPIs (e.g. Berth Productivity) whilst also maintaining high utilisation (e.g. TEUs/m of quay/per annum; TEUs/Quay Crane/per annum; TEUs/hectare of yard/per annum, etc.)

Notes: * Number of total container moves (on-load, off-load, and re-positioning) divided by the number of hours during which the vessel is at berth, 2012. Data on TEUs /m of berth and TEUs per QC 2012, ^HIT 2011

Source: JOC Port Productivity Research; ICF GHK

Increased Terminal Productivity → Increased Capacity

Sweet spot for operators / investors...but external factors also shape productivity



LA(A)* = LA Pier 400 at capacity
 NY = New York (2012)
 LB = Long Beach (2012)
 H(H) = Hong Kong HIT
 H(M) = Hong Kong MTL
 Si = Singapore
 Sct = Shanghai SCT (2008)
 J = Jakarta (JICt)
 T = Tanjung Pelepas
 R = Rotterdam ECT
 F = Felixstowe
 Y = Yantian (TICT)
 So = Southampton
 CSCT* (CICT) = Colombo South CT at design capacity (i.e. theoretical rather than achieved productivity)
 Melb SW = Melbourne Swanson West
 Melb Wb = Melbourne Webb at full capacity

Source: ICF GHK; data are for 2011 throughput unless otherwise stated

Trade & Vessel Mix are Key Port Performance Drivers



Capacity – Impact of Market Factors

E.g. Hong Kong: potential 5-7m TEU of additional capacity dependent on TEUs per call

Within a given infrastructure footprint, capacity can vary

- Operational productivity;
- Ratio of 20ft to 40ft containers;
- Ratio of transhipped to direct (land or inland waterway) containers;
- Requirement for terminal space for river and inland waterway barges;
- Throughput variation during the year;
- Effects of working close to capacity on customer service and satisfaction;
- Vessel size mix; and
- Average number of container moves (containers unloaded and loaded) per vessel

Capacity Scenarios for Hong Kong Kwai Tsing Terminals

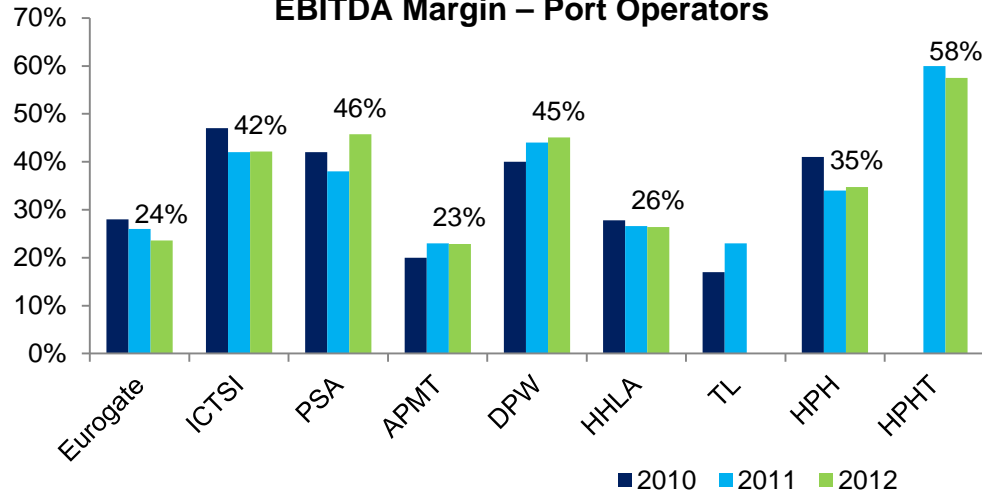
Total TEUs moved per Vessel Call	Port Ocean Vessel Capacity M TEUs p.a.	Average TEUs per move	Quay Crane moves per hour	TEUs per metre of quay face p.a.
1,200	17.7	1.64	33	2,300
1,700	22.6	1.70	35	2,930
2,125	24.5	1.70	35	3,190

Source: ICF GHK

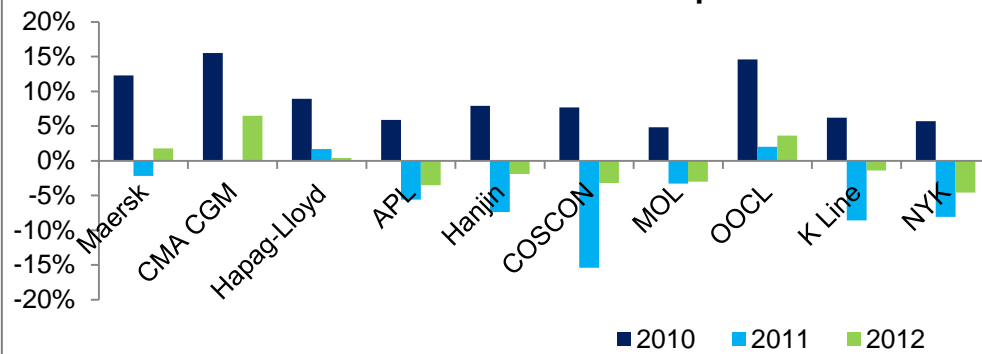
Profitability: Port Operators vs Liners vs Cargo Owners

Further downward pressure on tariffs - will CT operators retain their position, will BCOs / shippers get anything?

EBITDA Margin – Port Operators



EBITDA MARGIN – Liner Companies



Capex and opex requirements increasing, revenue per TEU decreasing (especially if targeting transshipment) – even with improved productivity, what impact on returns?

Port Operators

- Relatively stable EBITDA
- Very market / region dependent
- Inland networks mostly at lower profitability but part of strategy
- 2013 1H similar

Liner Companies

- Less successful
- 5 out of top 20 with positive operating margin 1H2013
- Still very diverse although consolidation ongoing
- With such low & unstable margins **will carriers pass on mega vessel cost savings to customers?**

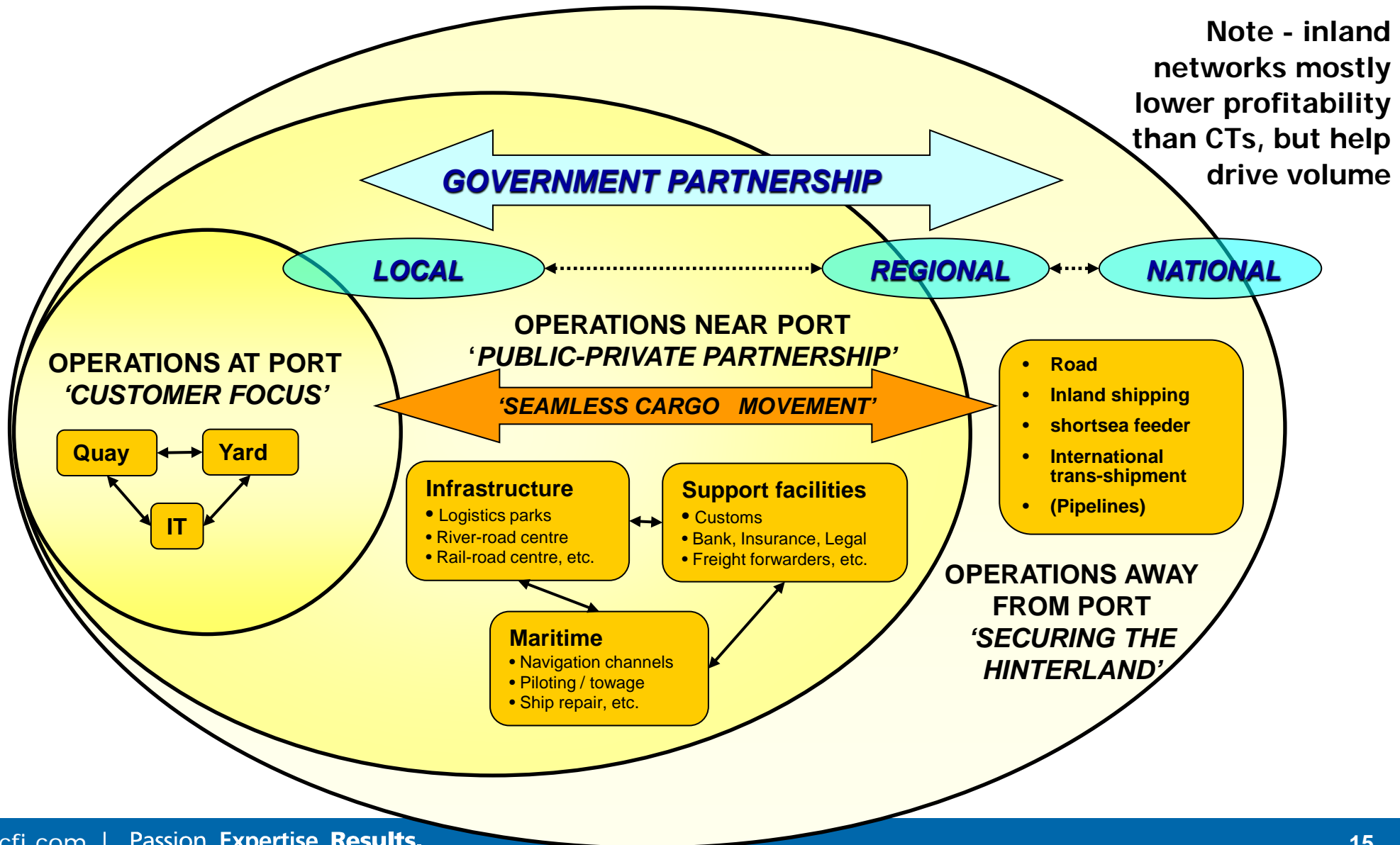
Economies of Scale via Larger Vessels & Alliances

Impacts for competition, operators and investors

- New alliances to defray risk of introducing larger vessels in subdued demand conditions...
- ...and secure enough numbers of vessels that are of same size / same magnitude of size to offer fixed or weekly schedule
- Start operations in Q2 2014 but only *if* approvals from competition authorities secured
- Likely effects include
 - More efficient deployment and utilization
 - Pricing power and pressure on port tariffs, especially where over capacity in the market
 - Changes in port rotations & re-arrangement of terminal choices (to the extent own/related port operators can accommodate volumes)
 - Optimization of feeder connections...decline of common feeders?
- Reaction from competing alliances (G6 & CKYH)? E.g. Evergreen joins CKYH alliance in Asia-Europe trades from Mar '14.
- Implications for regional port competition, especially in **transshipment markets & contested import / export (IE) hinterlands?**
 - E.g. SE Asia transshipment market: Westports, Singapore, PTP – look at equity interests. What are the carrier commitments, **any long-term 'lock-in'?**
 - Can US model of '*dedicated single* carrier terminals' continue?

What about outside the gate? You're only as good as the weakest link

Increasing need to get containers through the terminal due to larger vessels.....but terminal operators / ports only control a small portion of the supply chain links



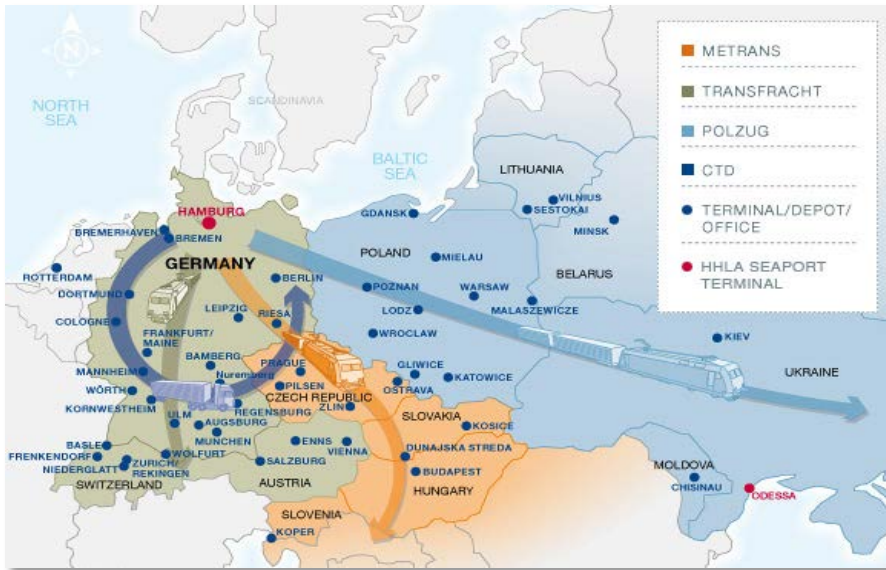
SIPG's Yangtze River Development Strategy

Capture contested hinterland through long term capital investment in river ports...impacts on competition?



Moving Beyond the Gate – Securing the Hinterland

Connectivity = Improved Efficiency = Increased Throughput



Hamburg - HHLA

- direct involvement in rail services to large part of the hinterland
- own trucking services
- network of inland depots

Rotterdam – ECT

- large inland depot network (focus on barges and rail connectivity)
- Cargo acceptance at the depots
- Direct investments
- Operational involvement
- no rail investments (but service agreements)



India gateway ports – dedicated freight corridors

Summary & Implications

Intense competition in Asia incl. capex upgrades - N America moderated by captive Imp/Exp hinterlands, productivity and infrastructure impediments, but change is inevitable

- Mega vessels and mega alliances driving investment and competition for Asian ports exposed to contested markets especially at transshipment pinch points
- State backed players with deep pockets pose a further threat to commercial operators
- N America competition – some moderation from uncontested Imp/Exp hinterlands, productivity & infrastructure impediments
- Common-user operators continue to dominate vs carriers get serious about *long-term* commitment to terminal operations?
- Mega vessel economies of scale? For terminals, the jury is still out.
- Given low and unstable margins, will carriers pass on mega vessel cost savings to customers?
- Full automation? Rotterdam (Maasvlakte II) leading the way, others (e.g. London Gateway) ‘wait and see’. Asia less pressure due to lower labour costs / higher flexibility
- ‘Outside the gate’ - increasing need to get containers through the terminal due to larger vessels
- Asian and EU operators looking to control the hinterland...but not cede control to other supply chain stakeholders (e.g. railroad companies)
- ..and playing catch up on environmental issues (e.g. air quality) and intermodal
- Capex and opex requirements increasing, revenue per TEU decreasing (especially if targeting transshipment) – even with improved productivity, what impact on returns?
- US model of ‘*dedicated single carrier terminals*’ unlikely to continue, likewise the chassis system?

Thank You – Any Questions?



ICF GHK - Selected Clients





an ICF International Company

Ports, Logistics & Transport Services

Regional Contacts

Jonathan Beard, Hong Kong

+852.2868.6980

jonathan.beard@icfi.com

Anil Gubrele, Mumbai

+91.98.19918055

anil.gubrele@icfi.com

Jolke Helbing, Amsterdam

+31.35.8872.181

jolke.helbing@icfi.com

David Hathaway, Beijing

+86.10.6562.8300

david.hathaway@icfi.com

Geoff Dobilas, Toronto

+1.416.341.0990

geoffrey.dobilas@icfi.com

Augusto Mello, Rio de Janeiro

+55.2121.172550

augusto.mello@icfi.com