CIMC Events

Colombo International Logistics Conference

1st – 2nd August, 2019, Galadari Hotel Colombo

Ports & shipping sector perspectives beyond 2020

Ports, Logistics & Technology Infusion

EU – Sri Lanka Trade-Related Assistance Project, implemented by the International Trade Centre (ITC)

Dr Jonathan Beard, Partner, EY

International Trade Centre

European Union

UNIDO

EY Building a better working world

Key drivers of competition & change – old and new

- Demand disruption / trade uncertainty
- Bigger vessels
- Bigger variety of vessel sizes, especially for major hub ports
- Larger and fewer customers – both M&A and Alliance structures
- More complex calls
- Downward pressure on tariffs
- Demands for higher *port* productivity
- **Digital….and digital disruption** – BIM, IoT, Machine Learning, AI, CAVs, Blockchain, AI, etc.
- Climate change, higher environmental standards, new fuel requirements

Ports and **port ecosystems** must address these in a sustainable fashion, but 'future proofing' is far from easy - *Do the Same a Bit Better, or reach for a Paradigm Shift?*

> ***"We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run."***
> (Roy Amara, The Institute for the Future)

International Trade Centre

European Union

UNIDO

EY Building a better working world

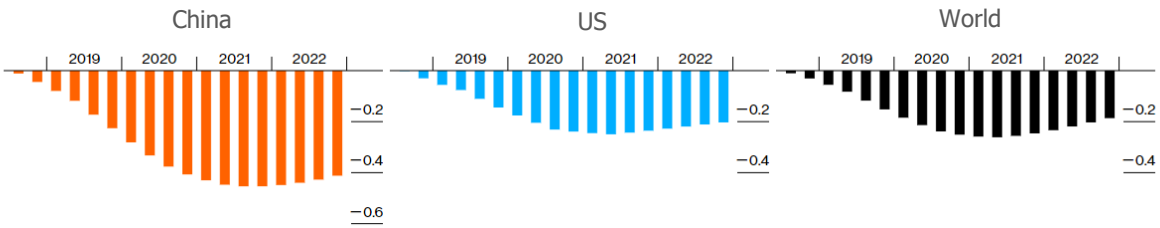
Demand disruption / trade uncertainty

Trade has remained subdued: US-China trade 'war' introduces further threats…and opportunities

EY Trade Survey, Jan 2019
(500 US C-level executives, +$1bil revenues)

- 28% of companies expect tariffs to remain in effect indefinitely.
- 72% will consider M&A to offset increased production costs due to tariffs.
- 72% will pass increased production costs to consumers in the form of higher prices due to tariffs.

Current Tariff Levels
Forecast percent impact on quarterly GDP

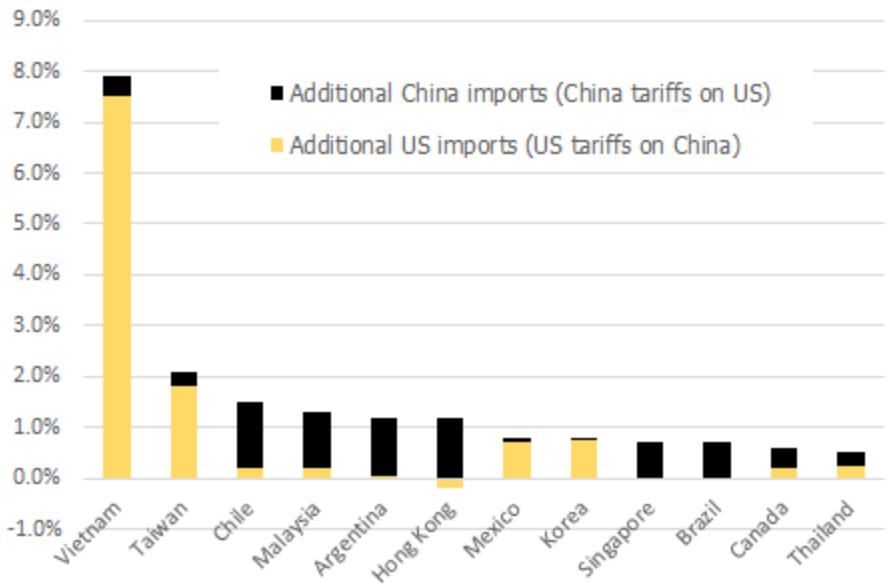


Source: EY; Bloomberg; The Edge; Reuters; Financial Times / Ingram Pinn

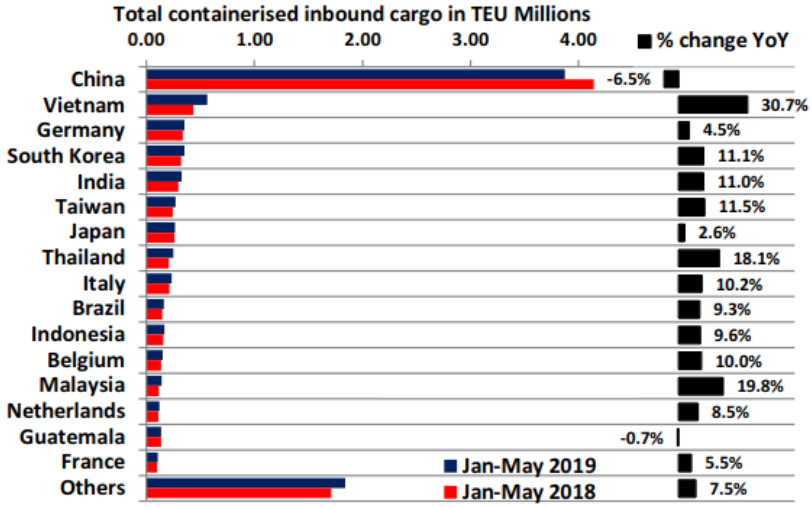
Demand disruption / trade uncertainty

'Winners and Losers?

Estimates of trade diversion beneficiaries by country (percent of country 2019 GDP)



US Containerised Imports: Jan-May 2018 vs Jan-May 2019



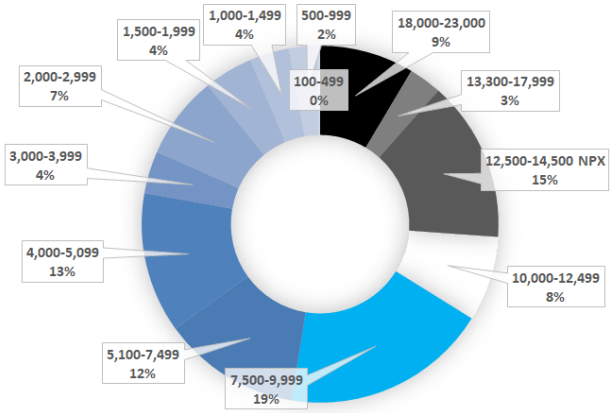
Source: Alphaliner

Notes: based on 12 months data to Q1 2019

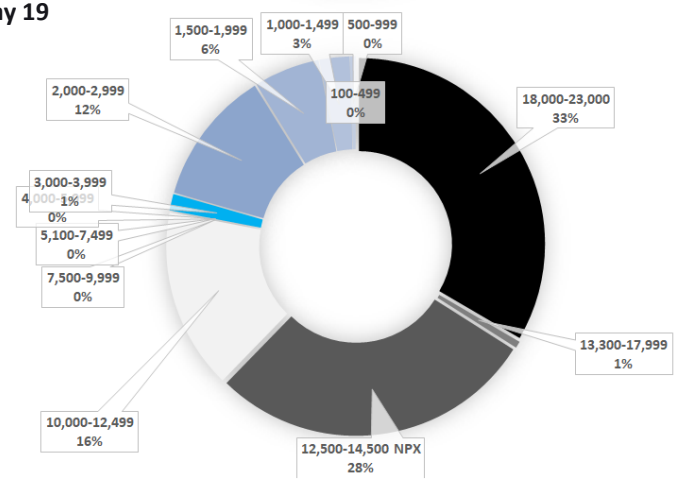
Source: US Census Bureau; China General Administration of Customs; Nomura

Bigger vessels; Bigger variety of vessel sizes, especially for major hub ports; Larger and fewer customers – Alliances…

Current Fleet at May 19

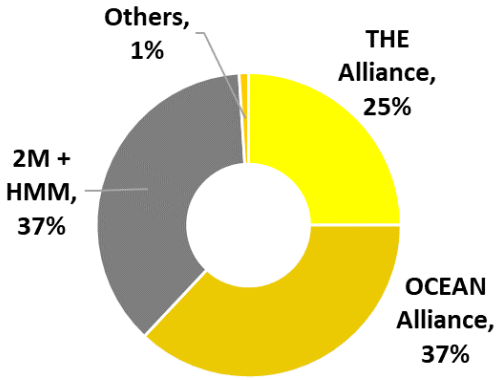


Order Book at May 19

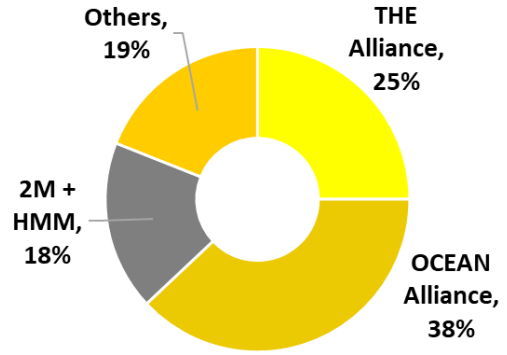


Alliance Capacity Shares at May 19

FE-Europe



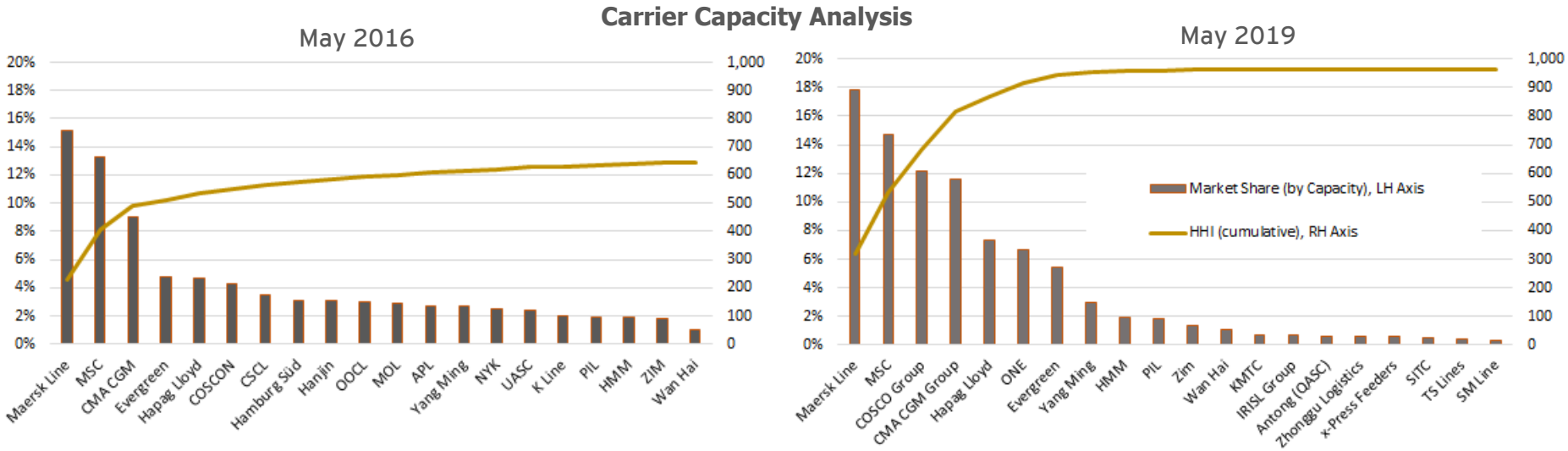
FE-N America



Source: Alphaliner; EY

…and M&A

Traditionally fragmented industry has consolidated – will power shift to lines?



Source: EY; Alphaliner

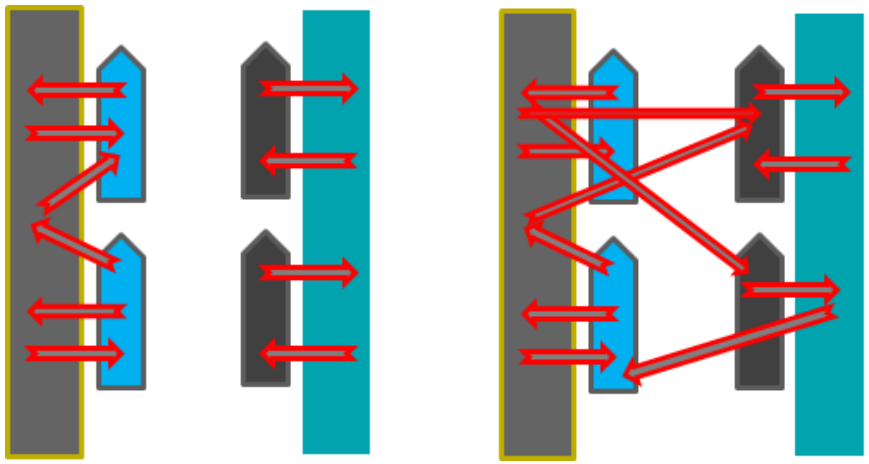
- One simple measure of global capacity, Herfindahl-Hirschman index (HHI) is 965 (up from 643) – close to 'trigger point' of 1,000
- Much higher for certain routes, where cabotage restrictions limit competition
- Regulators will be increasingly wary

Notes: HHI measure for market concentration widely used by EU Directorate General for Competition, US Federal Maritime Commission (FMC) and US Department of Justice. Calculated by squaring market share of each firm competing in a market, and then summing the resulting numbers.
US DoJ considers a market with HHI <1,000 to be a competitive; 1,000-1,800 to be a moderately concentrated marketplace; and > 1,800 to be a highly concentrated marketplace. Mergers that increase the HHI by more than 100 points in concentrated markets generally raise antitrust concerns

Port Competition & Planning for Mega-vessels & Alliances – "Size Matters"

- Major hubs and gateways, require considerable scale to meet customer needs
- In an era of mega-vessels and alliances, single operator, integrated transhipment hubs (e.g. Singapore) have a considerable advantage
- Versus split and / or multi-operator ports such as Busan, Kaoshiung and Hong Kong Port (HKP)
- E.g. Hong Kong Port (HKP) – Inter-Terminal Transfers (ITTs) rose 15% over last year to 674,000 TEUs – 1,800 TEUs/day. Handling these seamlessly is a competitive advantage

Box Moves Get More Complicated with Alliances and Larger Vessels



Source: ICF; EY

- Main HKP terminal operators – MTL and HPH - developed a 'work-around'; the **Hong Kong Seaport Alliance (HKSPA)**. A joint operating agreement across 23 berths at HKP – planning and operations conducted using common terminal operating system by an Operations Co-ordination Team: "terminal neutral" model.

Running Fragmented Facilities and Operations as One

HKSPA should improve competitiveness and in situ capacity

Hong Kong Container Port Terminal Configuration and Ownership

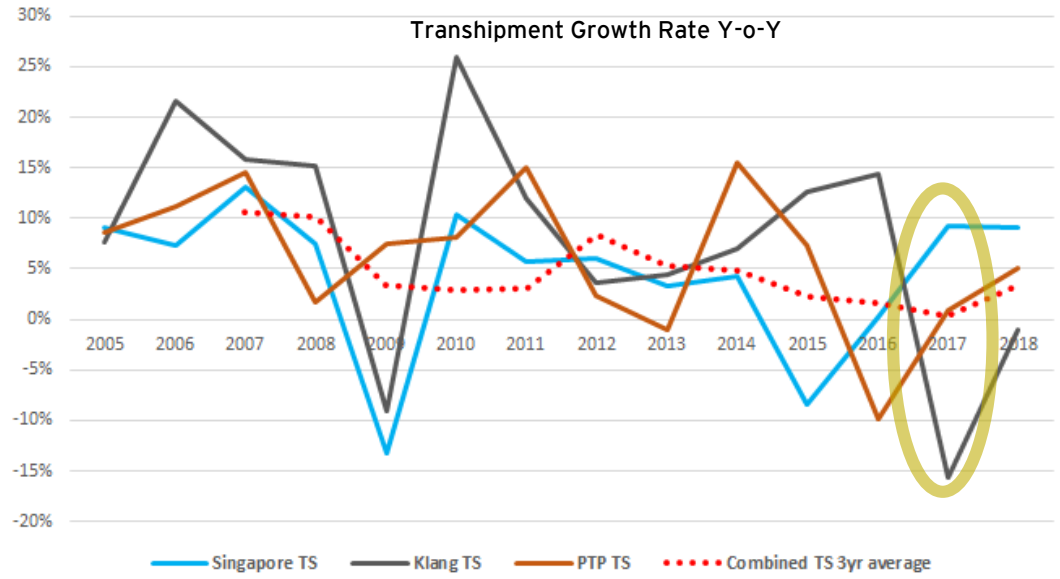
Notes: DPW (Terminal 3) is not part of the HKSPA
Source: Hang Seng Management College; EY

- HKSPA began operations at start of Q2 2019
- Intention is to enhance overall competitiveness of HKP, by operating as a larger whole, but Ownership positions of concessionaires are unaffected
- Vessels go to the most appropriate berth at time of call, regardless of terminal services agreement (TSAs)
- This arrangement should also increase the effective capacity of the combined terminals.
- Early days, but already delivered reductions in ITTs / Internal Truck moves and increases in "one stop barges"

How to lock-in key customers, especially in highly competitive Asia transhipment markets?

A *compelling* port development strategy is a competitive advantage

SE Asia Transhipment Market is Increasingly Focused on Three "Mega-Hubs" – lock-in cargo via equity stakes / JVs?

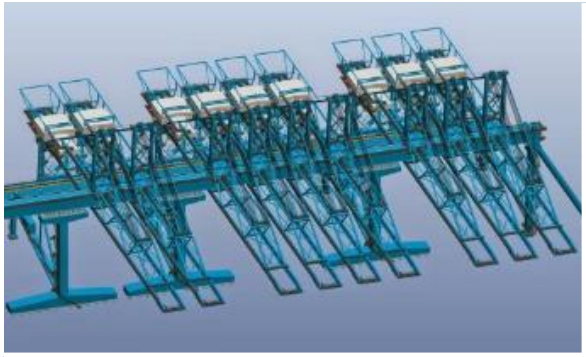


Source: EY; Port Authorities

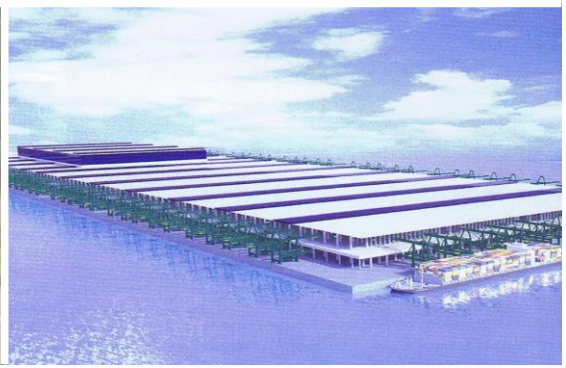
- To attract an alliance requires new capacity at scale to **accommodate all alliance partners**, at substantial specifications (i.e. largest vessels) **and *ahead* of demand.**
- Moving an alliance from an established hub port to another is complex and expensive
- Traditionally "footloose" transhipment market, may be becoming more fixed or "locked-in", to the advantage of incumbent ports.
- **Will alliances remain or break-up and re-form**, providing scope for transhipment volumes to shift?
- Lock-in key customers via equity stakes as per Singapore (and previously PTP)?
- Further M&A complicates the picture. E.g. 2016 acquisition by CMA CGM of Singapore's NOL
  - Singapore enjoyed significant growth, reversing some market share loss to Klang (and PTP). 2017-2018 throughput rose 3.4 mil TEU (10.2%), secured its position as THE Alliance's main hub in SE Asia and signed JV with the new line ONE at expense of Klang.
- ~65mil TEUs of capacity at Singapore's Tuas **sends a clear message to customers and potential competitors.**

Future Competition – What Price Productivity?

Doing the Same a Bit Better, or Paradigm Shift?



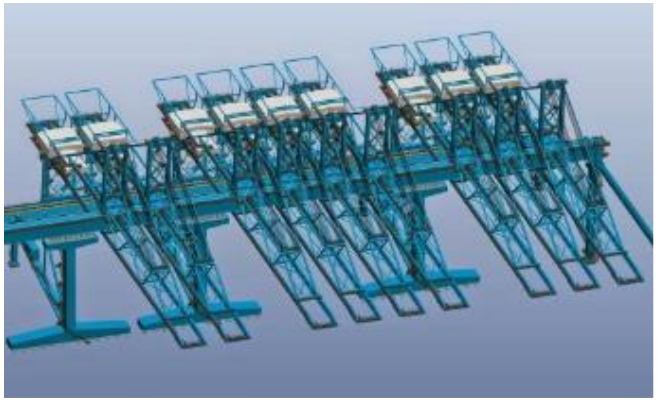
- More of the same but a bit better (e.g. VICT, Melbourne; Maasvlakte 2, Rotterdam)…
- …or a step change in design & operations?
- Who wants to be first mover?
- What is the **return on investment** and how much are **customers willing to pay** for superior productivity? What impact in attracting cargo volumes?
- What will digital disruption 'outside the gate' (e.g. CAV, EVs, etc.) mean for operations inside the gate?



Source: APMT; GRID Logistics Inc; Uber; EY; Conservation

Paradigm Shift - What is the Return on Investment (ROI)?

Relatively little data available so far



- **FastNet** conceptualized by APMT & Liftech to enable STS gantry cranes to work adjacent container bays (instead of alternate).
- Estimated to deliver **450 moves per hour quay-face productivity**
- However, the ROI is uncertain and APMT have yet to introduce the technology at its new terminals

Source: APMT; Liftech

Out of the Box Thinking can lead to Expensive Mistakes

E.g. Ceres Paragon terminal (ACT) at Amsterdam

THELOADSTAR

MAKING SENSE OF THE SUPPLY CHAIN

Content Mode Verticals People & Training Events Shop

Amsterdam's 'White Elephant' is put out of its misery

By Benedict Young 03/09/2012

News that Amsterdam Container Terminals (ACT) is shutting down operations may not come as a great surprise to those who have watched its decade-long struggle to establish a foothold in Europe's box handling sector – as this reporter has.

It is a sad end to a facility that promised great innovation and a step change in vessel handling productivity, but soon came to be viewed by many as a 'White Elephant'.

Formerly known as Ceres Paragon Terminal, it broke the rules of container terminal design. Built at the turn of the millennium by US-based terminal operator Ceres Group, it is the world's only container terminal to feature an indented berth that allowed cranes to service boxships from both sides.

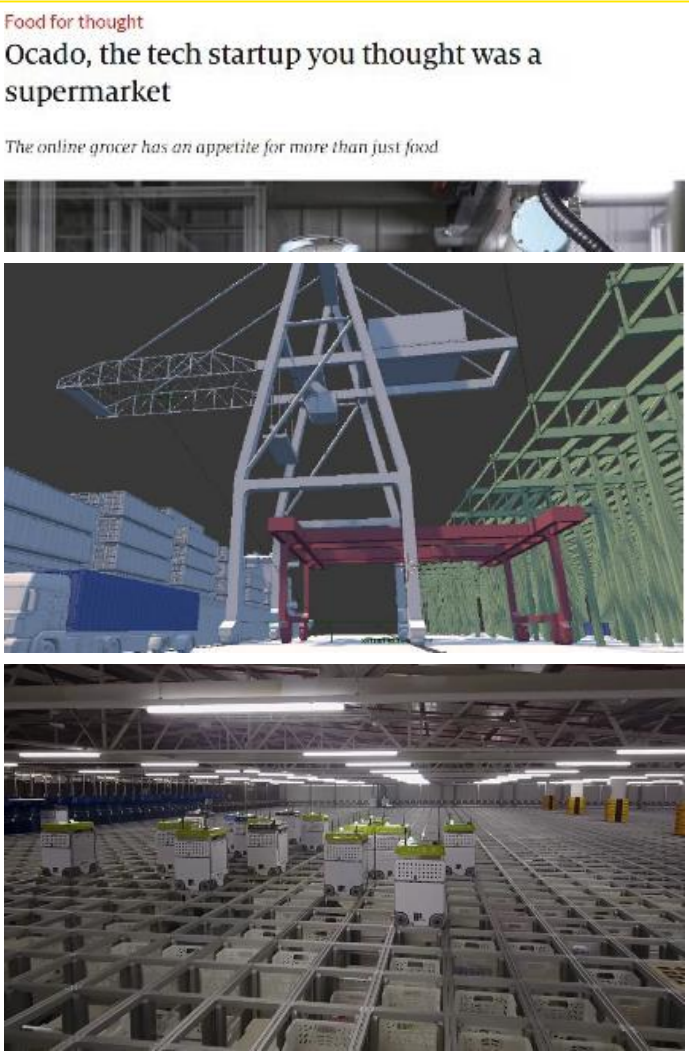
International Trade Centre

European Union

UNIDO

EY Building a better working world

Improved Container Yard Productivity and Feed to Quay-face


Food for thought

Ocado, the tech startup you thought was a supermarket

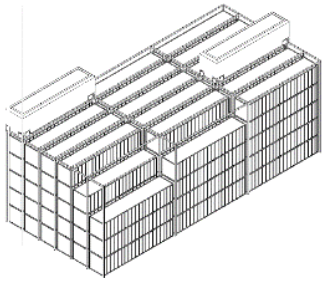
The online grocer has an appetite for more than just food

E.g. **Ocado** have proposed upgrading its grocery picking technology application & warehousing system for containers

Targeting:

- >350 containers per hr over 8 cranes
- Up to 1,200 TEUs/acre (3,000 TEUs/hectare)
- Sorting and sequencing up to 500 containers/hr/hectare of yard space (200/acre)
- Railhead productivity >200 containers/hr & reduced land take at terminal (e.g. versus traditional on-dock rail yard)
- **Can be phased** - upgrade existing ports in small increments

See also Jebel Ali's 'BOXBAY' terminal – due to open 2020



Source: Ocado

Gateway Ports - New Ways of Connecting the Hinterland
E.g. Hyperloop

- Moves cargo (or pax) speeds > 1,100 km/hr
- Fully enclosed tube: system isolated from weather and crossings
- Low pressure environment reduces resistance
- Electric propulsion enables emissions free transport (if generation is "green")
- Levitated pod reduces friction, compressor reduces resistance
- Can move one container at a time – no need to 'build a train'
- Reduced land take at terminal (e.g. versus on-dock rail yard)
- Requires 'truck move at other end' (for now)
- Does maritime cargo need >1,100 km/hr for landside moves?
- Operational details and costs to be determined
- Best suited to certain gateway terminals & hinterlands, but not others?

> "DP World Invests in Hyperloop"
>
> "Hyperloop One…have announced a further US$50 million in funding, provided by DP World, taking the total seed money raised to $160 million…."
>
> - [Port Technology Oct 14, 2016]

Source: Hyperloop One; Port Technology; EY

New Ways of Connecting the Hinterland - Connected Autonomous Vehicles (CAVs)?

Paradigm shift outside gate.....but also within terminals & marine side?

Autonomous - operational functions of a traditional vehicle without a human operator

Connected - technology enabling it to connect to devices within the vehicle, as well as external networks such as the internet

Self-driving truck

- Longer & more reliable operating hours
- Increased efficiency with platooning
- Fatal accidents can be avoided or reduced
- Improved interface with container terminal

Source: Mercedes-Benz; Arcadis; EY

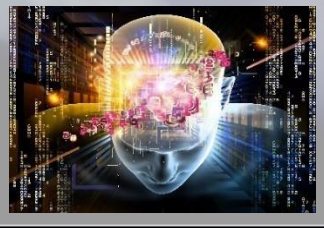
Supply Chain Enhancement & Restructuring

Digital innovations are already impacting across various dimensions

- Use of AI to improve forecasting & predictability – from assessing social-media trends & shifts in demand to inventory turnover & vendor behaviour: fine-tune supply chains in real time
  - Morrisons (British grocery chain) replaced manual stock planning with Ai enhanced system for demand forecasting & replenishment: reduced incidence of out-of-stock items on shelves by 30% and cut inventory needs by several days.
  - ORSAY (German fashion retailer) used self-learning algorithm to make +110,000 autonomous pricing decisions. Helped firm to reduce volume of stock that needed discounts of +30% to sell

  Significant portion of procurement tasks (vendor management, order placement and invoice processing) can be automated using available technology…even more so in near future
- IoT facilitates better monitoring of shipments: e.g. sensors can track location of goods, but also the orientation of crates and factors such as temperature and humidity.
- **'Smart infrastructure'** – better design & delivery (e.g. BIM) and better asset management via sensors / IoT

Source: EY; The Economist; Frauscher

Internet of Things (IoT)	Big Data and Analytics	Artificial Intelligence	Mobile and Social Media
			

Enhanced trade facilitation and data exchange

The promise of Blockchain

- Current supply chains are complex and lack transparency; trade is largely facilitated / impeded by numerous paper based transactions
- Digital innovation offers considerable scope for streamlining, especially if regulations are updated accordingly. Great interest in how blockchains (distributed ledgers) might transform the supply chain and logistics industry – reduce paperwork, free up working capital, increase transparency, etc.
- A number of initiatives and platforms:
  - E.g. Maersk and IBM's "**TradeLens**" - distributed ledger technology platform for supply chains
  - E.g. **Global Shipping Business Network** – several terminal operators & lines, including HPH, COSCO, PSA, DPW
  - E.g. "**Insurwave**™" – first marine insurance blockhain platform in commercial use: developed by EY and Guardtime, in collaboration with Maersk, Willis Towers Watson, MS Amlin and AXA XL Catlin (**www.youtube.com/watch?v=w2HHhopoRTs**)
    - Links shippers, brokers through to insurers and reinsures via distributed ledger and enables sharing of trusted data and transactions
- Still in their infancy

Bringing it all together – 'Smart Port Ecosystems'

A range of stakeholders / competitors, need to come together… even more so in the digital age

Source: EY adapted from ICF 2003; also republished in Mark Millar, "Global Supply Chain Ecosystems - Strategies for Competitive Advantage in a Complex World", 2014

International Trade Centre

European Union

UNIDO

EY Building a better working world

Wrap: What's over the horizon? How will 'ports & logistics ecosystems of the future' compete & collaborate?

- Digital innovations offer considerable scope for enhanced use of assets, better co-ordination, more efficient port ecosystems and supply chains, and new sources of competition
  - But technology solutions should be driven by customer need, rather than a 'solution' looking for a problem
- CAVs will be widespread within 10 years – impact will not simply be 'outside the gate'
- **Ports remain lumpy investments** – a critical issue in large, dynamic markets is to preserve options / flexibility where possible, ensure adequate capacity is available in a timely fashion, but avoid expensive over-build.
- Should ports / terminal operators aim for paradigm shift in performance, or go for "more of the same but a bit better", or "mixed" strategy? "More of the same" may seem less risky operationally and financially, but may lock in long-term obsolescence & irrelevance
- Will lines shift bargaining power towards themselves & improve finances? History suggests unlikely
- How to lock-in key customers - equity stakes / JVs, scale economies?
- Pressure on margins and demand uncertainty may play against major changes. Quay-face (and port) productivity is important to lines….but only to a certain point. Terminal operators will continue to focus on *their* productivity metrics – maximise asset utilisation whilst maintaining customer service levels

International Trade Centre

European Union

UNIDO

EY Building a better working world

Thank You

Dr Jonathan Beard
Partner | Infrastructure Advisory

Ernst & Young Transaction Ltd
21/F, Citic Tower, 1 Tim Mei Road, Central, Hong Kong

Office: +852 2675 2991
Mobile: +852 9661 6058 / +852 6095 8434

jonathan.beard@hk.ey.com
ey.com

EY
Building a better working world