

Session 14

**Future plans and port
development in Singapore**



PORT DEVELOPMENT AND COMPETITIVENESS

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Future plans and port development in Singapore

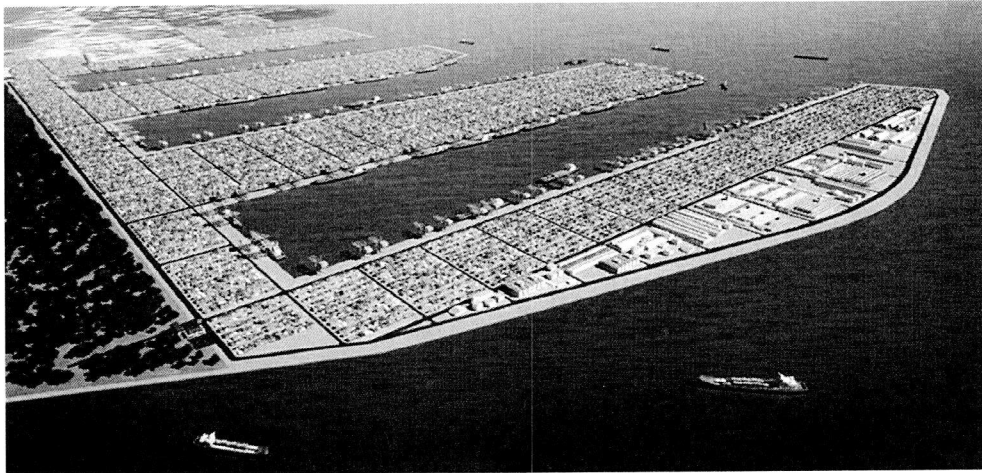
Speakers: **Dr. Tan Kok Choon**, BSc (Hons) NUS, PhD MIT
Associate Professor, Department of Analytics & Operations, NUS Business School
Director (Degree Education), The Logistics Institute – Asia Pacific (TLIAP)

Speaker: **Mr Fong Kum Hor**

Outline

- Tuas Mega Container Terminal
- Re-inventing Port Management with new technologies
- Green Port: Growth and Liveability

Tuas Mega Container Terminal



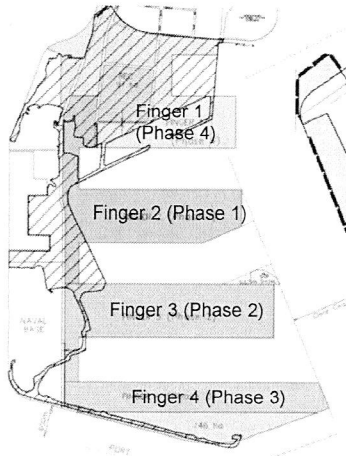
Source: <https://www.maritimesgconnect.com/features/spotlight/5-things-you-should-know-about-new-tuas-mega-port>

Tuas Mega Container Terminal

- Tuas Mega Port which will handle 65 million TEU annually was first announced by Minister for Transport Lui Tuck Yew in October 2012.
- Mr. Lui pointed out that "consolidation at Tuas will also free up prime land, which our City Terminals and Pasir Panjang Terminal are currently occupying, for re-development."
- "Given our land and manpower constraints, we have to strive for even greater efficiency and productivity."
- MPA and PSA had jointly launched the Port Technology R & D Program in April 2011, studying automated container port systems, optimization techniques and technologies, and green port technologies, among others. "We will be able to deploy some of the outcomes of these projects at Tuas Port."

Source: <http://sbr.com.sg/transport-logistics/news/singapore-erect-tuas-mega-port>

Tuas Mega Container Terminal – Development Schedule



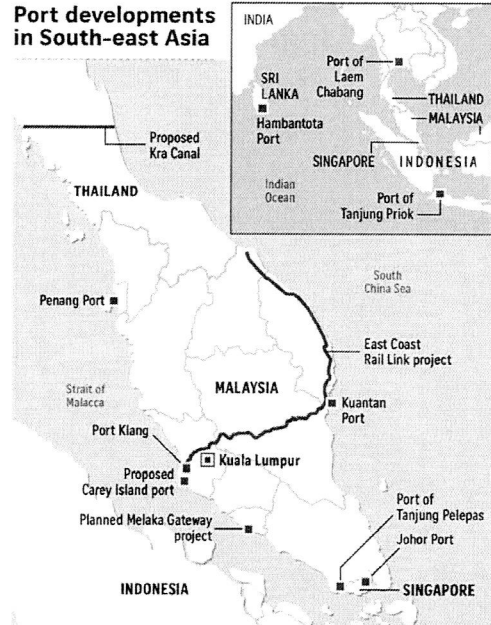
Reclamation Phase	Reclamation	
	Start	Finish
Phase 1	2013	2022
Phase 2	2016	2028
Phase 3	2025	2033
Phase 4	2031	2038

- Finger 1
 - For interim industrial use till 2030/2035
 - Reclamation by JTC from 2014 to 2018
- Finger 2
 - Bund construction on-going
 - Reclamation tender to close in March 2014
 - Construction to commence in Aug 2014
- Finger 3 reclamation design to commence in 2014

Tuas Mega Container Terminal

- Rising Port Developments in SE Asia & New Trade Route
 - Malaysia – Carey Island, Melaka Gateway, East Coast Rail Link
 - Indonesia – Port of Tanjung Priok
 - Thailand – Isthmus of Kra
 - Opening of Arctic Lane from Norway to S Korea – 30% saving in trip time
 - New Trading Route
- Will Tuas Terminal be enough?

Port developments in South-east Asia



Squaring Up For Port Competition

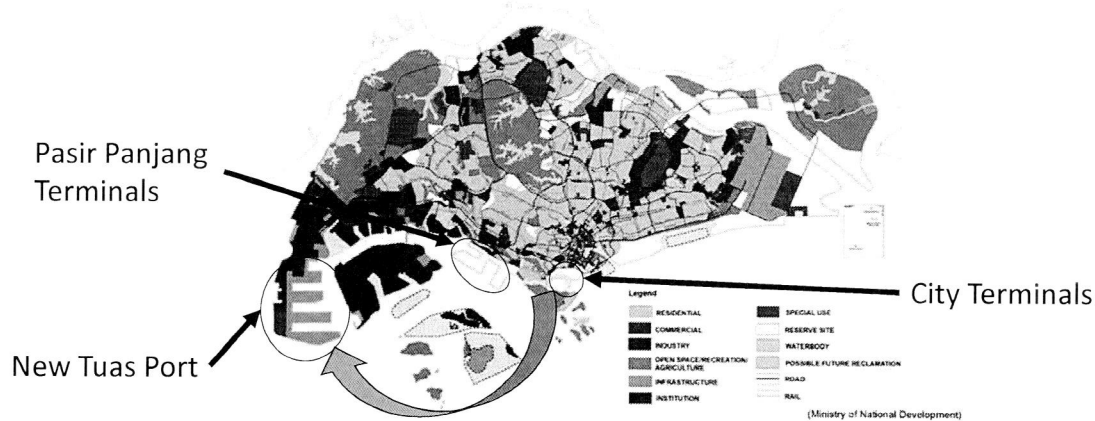
- Opening up of Trans-Pacific route linking seaway to rail connection
- Opening of Arctic route from S Korea to Norway
- Competitive advantage of LOCATION, COSTS, EFFICIENCY vs Evolution of New Trade Route, Channels, Shipping Line Alliances, Economic Zones, Modes of Distribution
- Big Hub Port vs vital node in Inter-Connected Port Network

Reading: <http://www.straitstimes.com/opinion/st-editorial/squaring-up-for-port-competition>

Tuas Mega Container Terminal – Why?

- Tuas has sheltered deep waters suitable for port operations – capable of handling big ships of 22,000+ TEU capacity, 23m draft, 26 rows across
- Proximity to International Shipping route and industrial areas in Jurong (logistics service providers, multi-purpose Jurong Port, etc.)
- Consolidating to one location boost efficiency – reduce the distance and complexity of transporting containers between terminals
- A new opportunity in terminal design, port infrastructure, port equipment & technology applications
- Building a Future-Ready maritime-skilled and technical-based labour force
- A Safe & Secure Port
- An Intelligent & Efficient Port – latest automation and analytics technology
- A Green & Community-Centric Port

Tuas Port Will Free Valuable Waterfront Land Near City



Tuas Mega Container Terminal – Will it be enough?

- Singapore's stable government, long-term thinking, flexibility and good track record are strong attributes to help it stay ahead of the competition.
- A port's success will continue to depend location, costs and efficiency.
- Being the biggest hub port may not be as important as being a vital port in an inter-connected port network.
- But the scale is warranted because of intensifying regional hub port competition, to attract mega shipping alliances.
- Major shipping companies shift their operations to Singapore under new alliance agreements (e.g., Ocean Alliance in April 2017).

Tuas Mega Container Terminal – Will it be enough?

- Singapore's stable government, long-term thinking, flexibility and good track record are strong attributes to help it stay ahead of the competition.
- Advanced technologies are deployed for port operations, planning and optimization, to handle increasing numbers of ultra-large container ships – essential for container transshipment.
- Top-notch infrastructure (automated gantry cranes and AGVs, etc) are necessary but not sufficient.
- A core of highly skilled workers also needed to ensure high-tech port operations are reliable, efficient, safe and secure, and constantly updated.

Tuas Mega Container Terminal – Will it be enough?

- Singapore must remain as a vital port in an inter-connected port network by staying on top in container transshipment.
- Key factors to remain as a competitive transshipment hub:
 - Efficiency, Flexibility, Reliability, Security, Safety, Connectivity, Cost, Service Level (e.g., tight connections)
- JV to lock in key customers.
- Sufficient handling capacity – invest in infrastructure and technology.
- Skilled workers and stable & supportive government.
- Strategic location (along trade routes) is an advantage.

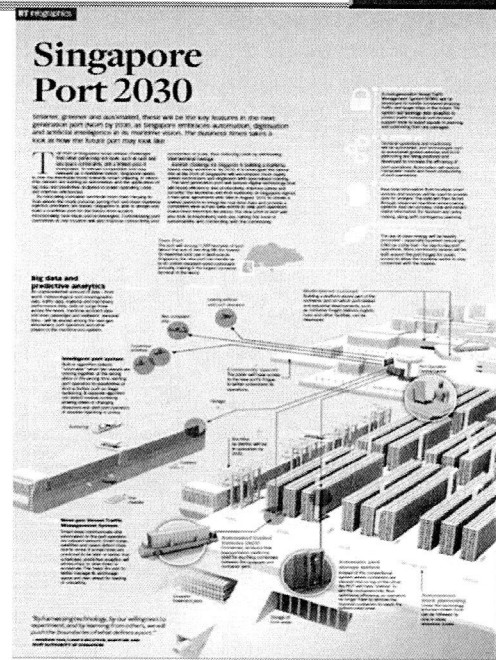
Innovating For The Future

“By harnessing technology, by our willingness to experiment, and by learning from others, we will push the boundaries of what defines a port.”

— Andrew Tan, Chief Executive, Maritime & Port Authority of Singapore, at SMI Forum, 22 Oct 2015

References:

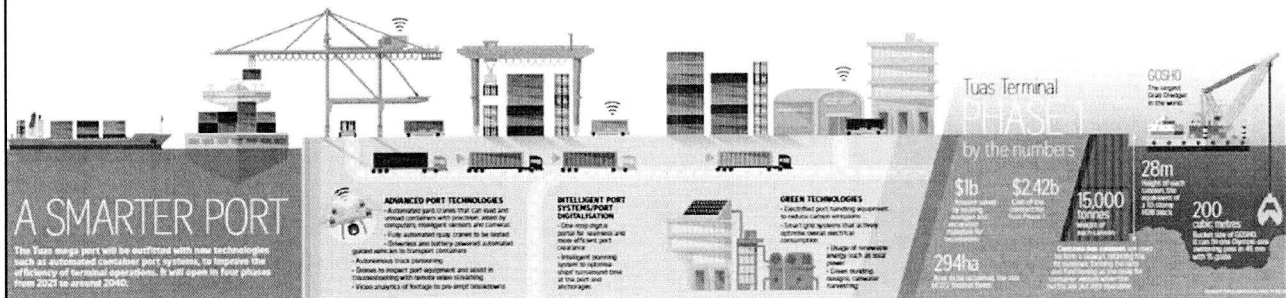
<https://www.mpa.gov.sg/web/portal/home/media-centre/news-releases/detail/45bf0831-c7db-4259-ab25-cf7c674335b0>
http://www.businesstimes.com.sg/sites/default/files/attachment/2016/04/29/BT_20160429_PORT29C_2252905.pdf



Innovating For The Future

- Wharf: Mechanised Winch
- Quay: Automated Wharf Supervisors
- Yard: Automated Crane Operations Centre
- Yard: Automated Yard & Unmanned Rail-Mounted Gantry Cranes
- Operations :Smart Machines Drones
- Operations : Automated Guided Vehicles (AGV)
- Operations : Road Train, Super B, Truck Platooning

Innovating For The Future



Source: <http://www.straitstimes.com/singapore/keeping-the-ships-sailing-in-why-the-mega-port-matters#main-content>

Re-inventing Port Management with New Technologies

- Pasir Panjang Terminals 4/5/6 going big on Automation
 - 186 Automated Yard Cranes, 30 AGVs
- PSA UnBoxed Venture Capital arm investing in Start-ups & Incubators
- Use Predictive Analytics to lower operation costs & improve efficiency
- Digital technology to improve efficiency, safety & security
- Unified Platform to integrate real-time data & provide consistent view across various channels to help operators make timely informed decisions
- Intensifying land use UGS, AGS, raising level of sustainability & connecting with the community

Re-inventing Port Management with New Technologies

WITH keen support from the Maritime and Port Authority of Singapore (MPA), PSA Singapore Terminals - which operates the world's largest container transshipment hub in Singapore - is increasing its R&D efforts to develop innovative technologies for effective application in the port environment.

Automated guided vehicles (AGVs) will play a key part when all container operations are moved to the new megaport at Tuas. AGVs are unmanned transportation platforms used for shuttling containers between the quayside and container yard.



<http://www.businesstimes.com.sg/hub/charting-maritime-singapore-rd/psa-develops-advanced-technologies>

Re-inventing Port Management with New Technologies

"PSA has moved quickly to embrace advanced port technologies and intelligent systems, such as data analytics, automation and robotics, at our terminals as we prepare for Singapore's container port of the future in Tuas. We have embarked on a plan to redesign jobs and build competencies, to continue to create exciting new career pathways for our present and future employees," says Mr Ong Kim Pong, Regional CEO Southeast Asia, PSA International.

<https://www.safety4sea.com/singapore-advances-port-technologies-and-intelligent-systems/>

Singapore advances port technologies and intelligent systems

Professor Tan Eng Chye, NUS Deputy President (Academic Affairs) and Provost, and Mr Ong Kim Pong, Regional CEO Southeast Asia, PSA International at the MOU signing ceremony / Credit: NUS

The National University of Singapore (NUS) and PSA Corporation Limited (PSA) have signed a Memorandum of Understanding (MOU) to develop Human Capital, aiming to cultivate a new generation of Engineering and Infocomm Technology professionals for Singapore's Next Generation Port in Tuas.

The new Tuas port is expected to leverage automation technologies and intelligent interconnected systems to enhance terminal productivity and optimise processes.

To build up the competencies required, PSA will jointly develop curriculum and programmes with the NUS School of Computing and NUS Faculty of Engineering, where students will have opportunities to advance their knowledge in a wide range of areas, including data analytics, cyber security, automation and intelligent systems. Problem statements and case studies provided by PSA will help NUS students better understand how new technologies and intelligent systems are applied to modern port operations and equipment.

Green Port: Growth and Liveability

- Sustainable Environment: Reduction in Carbon Emission, Eco-Friendly, Energy Saving, Go Green, 3 Rs and Waste Management.
- Green Technologies : Solar power, fuel cell, LNG to manage every consumption recycle and regeneration.
- Maritime Singapore Green Initiatives featuring 3 Programs:
 - Green Ship
 - Green Port
 - Green Technology
- Vessel Shore-to-Ship Power on Berth (Cold Ironing).
- Caissons, each 15,000 tonnes, for wharf structure foundation on seabed.
 - As at Dec 2017, 138 caissons have been installed (about 62% of 222 caissons needed for Phase 1 wharf).

Some Useful References

- Singapore's Effort Towards a Sustainable Next Generation Port
– highlighting 3 main challenges for Maritime Singapore:
 - (1) Higher Global Emission Standards,
 - (2) Land & Sea Space Constraints,
 - (3) Manpower

<http://www.innovasjon Norge.no/globalassets/arrangementer/0-cap-m-segar.small.pdf>
- Why the Tuas mega port matters – Keeping the ships sailing in

<http://www.straitstimes.com/singapore/keeping-the-ships-sailing-in-why-the-mega-port-matters#main-content>

Discussion 7

**Challenges faced providing training needs to manage
new technology implementation.**

Questions?