



Collaboration at the Hong Kong Port – Benefits from Facility Sharing

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決策科學學院
SCHOOL OF DECISION SCIENCES
恒生管理學院
HANG SENG MANAGEMENT COLLEGE



Policy Research Institute of
GLOBAL
SUPPLY CHAIN

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決策科學學院
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The **School of Decision Sciences** at **Hang Seng Management College** encompasses science, engineering and business, with special emphasis on managing information.

We educate students on how complex business decisions are made using knowledge and methodologies rooted in mathematics and statistics, computer science and information management, and supply chain management.

About Us



Established in 2016, the **Policy Research Institute of Global Supply Chain** undertakes relevant, high-quality academic and policy research in supply chain and logistics management.

A major role of the Institute is to facilitate communication between regional stakeholders, sharing their mutual interests in advancing the development of supply chain and logistics in the region.

About Us



Prof. Lawrence Leung

- Dean of School of Decision Sciences



Dr. Collin Wong

- Associate Dean (External) of School of Decision Sciences
- Director of the Policy Research Institute of Global Supply Chain



Dr. Helen Ma

- Lecturer at the Department of Supply Chain Management

Past Reports – Mainland Cabotage Study

世界排名第五 勢擠出「十大」 沿海運輸權倘全開放 港貨櫃吞吐減14%



香港是全球貨櫃處理量最多港口，但近年已退居第五位。恒生管理學院一項最新研究更警告，國家正研究逐步開放沿海運輸權，對香港貨櫃運輸業將帶來沉重打擊，估計最嚴峻將損失三角地區以外的港口貨櫃量；以去年的吞吐量計算，損失可高達二百四十萬箱，即減少一成四，足令本港港口排名擠出十大之列，並喪失船轉運地位。學者建議本港物業業加強轉型，增加處理進口貨物的平台。

根據《中華人民共和國海商法》(海商法)規定，只有雙邊中華人民共和國與外國的運輸，才可在內地港口之間進行海上運輸。例如中國郵政海上郵政特快輪船，便不可以向香港開航。如果此一限制對下一頁不受《海商法》中有關海運權規定的約束，外國貨輪可以從內地港口運往香港，然後再轉運往內地和香港。這有利香港作為轉口港的地位。

學者建議本港物業業加強轉型，增加處理進口貨物的平台。

倘放寬沿海運輸權 港或失14%貨櫃量

恒生管理學院日前發表研究報告，若中國全面開放沿海運輸權，將對本港貨櫃運輸業帶來沉重打擊。恒管決策科學學院院長梁志堅(圖)指，不少國家實施沿海運輸權，意指除本國船隻外，其餘船隻不得在國家港口間運輸貨物。由於本港不受《中華人民共和國海商法》的約束，故外國貨輪多承運貨物來港，再轉運至國內各港口。

但中央政府近年推出自由貿易區試驗計劃，於區內逐步放寬沿海運輸權限制，讓中資非五星旗貨輪從事沿海捎帶業務，對本港的港口地位構成威脅。報告警告，若貨櫃吞吐量進一步下跌，將影響本港連接其他港口的能力；按現有的降幅計算，「最嚴峻預測」在5年內失去非珠三角地區的中轉量(240萬標準箱)，相等於總貨量減14%。



內地推沿海捎帶 港轉口料年減240萬貨櫃



左起：香港恒生管理學院黃彥璋博士、梁志堅教授、供應鏈及資訊管理學系系主任及副教授黃惠虹博士、助理教授巫耀榮博士。 莊程敏 攝

香港文匯報訊(記者 莊程敏)香港恒生管理學院供應鏈及資訊管理學系上週四發表題為「放寬沿海運輸權及珠三角地區對香港海運物流業之影響」的研究報告，報告指國家若全面開放沿海運輸權，對香港貨櫃運輸業將帶來沉重打擊。在最嚴峻的預測下，香港轉口貨櫃量將減少240萬箱，佔全部貨量的12%。

內地倘開放沿海運輸 港或失一成貨櫃吞吐

【明報專訊】面對鄰近地區競爭，本港貨櫃吞吐量近年持續下跌，香港恒生管理學院發表研究報告，推算內地若全面開放沿海運輸權，對香港貨櫃運輸業將帶來沉重打擊，以2015年本港貨櫃吞吐量推算，損失或高達240萬箱或佔全部貨量的12%，香港作為全球十大港口之一的地位隨時不保。

內地港口間運輸只限中國船

2015年香港與內地港口吞吐量排名表



香港急須保持區內樞紐港角色

梁志堅

香港是人才匯聚、資本可自由流動和貨物出入頻繁的城市，被譽為經濟充滿能量和生命力。過去數十年，香港經濟可以保持穩定發展，社會繁榮，其中一重要原因是香港擔當區內貨運樞紐的角色。今天，我們賴以為生的其中一項支柱——貨物物流業，正受到嚴重威脅。自2014年7月起，本港港口吞吐量已連續下跌28個月。

恒生管理學院決策科學學院最近發表《放寬沿海運輸權及珠三角地區對香港海運物流業之影響》研究報告，探討內地近年在海運政策上放寬沿海運輸權，對香港海運業帶來沉重打擊。報告指出，若內地全面開放沿海運輸權，香港轉口貨櫃量將減少240萬箱，佔全部貨量的12%。

香港急須保持區內樞紐港角色，完善的軟硬件支援，但最重要的還是擁有頻繁的船班至世界各地。現時香港貨櫃碼頭每間有340艘船班次，連接全球共470個港口。這船運網絡吸納區內的航運、轉運、相關貿易和物流業務，對穩定本港整體經濟有莫大幫助；可是這船運網絡正受到多方面挑戰，包括以上談及的沿海運輸權放寬及珠三角地區競爭。

深圳港目前有131條國際班輪航線，半數以上的航線都同時停靠或覆蓋香港和深圳的港口。如香港貨量下降，這些航線將不再停靠香港，香港樞紐港的地位將岌岌可危！

過去10年，香港港口的角色已由主要是服務內地腹地出口港，慢慢轉成中轉港口。2015年，中

SHIPPING HK likely to lose transshipment hub advantage

Relaxation of cabotage rules on the mainland may see city lose edge in container throughput

Cella Chen
cella.chen@cmp.com

as Qingdao, Ningbo and Guangzhou have been lobbying hard for a relaxation of their own cabotage rules on foreign vessels.

A full relaxation in the mainland's laws prohibiting foreign-flagged vessels from moving cargo from one mainland coastal port to another, could deal a serious blow to Hong Kong's container freight industry, according to the highly influential Hang Seng Management College (HSMC).

It claims in a new report that in the worst-case scenario, Hong Kong could lose all transshipment rights in the non-Pearl River Delta region, which could translate into a loss of 2.4 million container twenty-foot equivalent units (TEU) – a measurement of standard container sizes – which would translate into 14 per cent loss of the city's total container throughput.

China's rules were considered a foreign port for these purposes. The relaxation of the transportation rules, commonly called cabotage in the industry, started in 2013. Up until then Hong Kong was seen as the most convenient

At the same time, the Nansha Free Trade Zone in Guangdong province, is progressively introducing measures to promote transshipment trade. 'Mainland China's cabotage relaxation is weakening Hong Kong's status of being a key transshipment hub in the region, and creating uncertainty for the local jobs market and economy,' said

14%
The expected loss in city's container throughput if cabotage rules are eased on the mainland

Lawrence Leung, dean of HSMC's school of Logistics sciences. 'Any further relaxation will

Past Reports – Greater Bay Area Study

‘Government inaction has cost Hong Kong advantages over other bay area cities’

But all is not lost, says report from academics, adding that quick action could revive city’s innovation prospects

PUBLISHED : Friday, 01 December, 2017, 9:48am
 UPDATED : Friday, 01 December, 2017, 11:04am



恒管發表大灣區報告 探討物流業未來機遇

港珠澳大橋通車在即，香港、澳門以至珠海的物流業者終於可以選擇運輸更為靈活可靠的陸路運輸，這對香港的物流業不啻是新機遇。

專欄：灼見商業 作者：本社編輯部 日期：2017-12-06

何順文 恒生管理學院 梁志堅 物流 粵港澳大灣區 貿易 陳帥夫 香港中文大學 黃惠虹



(左起) 恒生管理學院全球供應鏈管理政策研究所主任吳志雄博士、香港中文大學亞洲供應鏈及物流研究所所長張惠民教授、恒生管理學院決策科學學院院長梁志堅教授、何順文校長、恒生管理學院全球供應鏈及資訊管理學系系主任黃惠虹博士，以及恒生管理學院及資訊管理學系助理教授何煥權博士。(文灼峰攝)



INTEGRATION CHALLENGES OF BIG BAY AREA

A major study has identified five main areas of concern related to logistics and trade facilitation issues in the Guangdong-Hong Kong-Macau Greater Bay Area.

One concern among stakeholders is the lack of clarity on the approach to integration of the cities in the context of ‘One Country Two Systems’ Dynamics between market economy and policy driven economy, and given such dynamics, whether there is a division of services in the region, were two more issues that were identified.

Concerns were also raised on whether customs practices in the region will be reformed. The fifth concern was about creating a single window to facilitate trade and logistics.

These issues formed part of the findings in a report, ‘Logistics and Trade Facilitation in Guangdong-Hong Kong-Macau Bay Area: Stakeholders Concerns, Comments from Central Government, and Policy Recommendations’, by a team that included members of the Policy Research Institute of Global Supply Chain of Hang Seng Management College and the Asian Institute of Supply Chains & Logistics of the Chinese University

Bringing disparate cities of the Big Bay Area together is a daunting undertaking. **Joyce Chen reports**

development at Hong Kong International Airport, notes that the airline business is a key industry for collaboration. Guangzhou has plans for a second airport, while Shenzhen International Airport is building the 4th terminal, to move 60 million more passengers. These airports altogether offer more than 300 air routes to the mainland, while Hong Kong only has less than 50 accessing the mainland.

These airports could help Hong Kong attract more transit passengers, he says. The airports have also entered into partnerships with air ticket sellers such as Ctrip.

Last month, Hong Kong airport teamed up with DHL Express to expand capacity at the logistics center.

However, since aviation is highly regulated and involves the government, an authority or commission for regional coordination is necessary, Cheung says. Hong Kong airport, so far, has set up an office in Guangzhou.

“Before nine cities and two special administrative regions integrate, we have to settle this as soon as possible to avoid unhealthy competition internally,” he says.

要聞港聞

大灣區融合助物流便利化

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大灣區融合助物流便利化



1/1 恒管及中大發表大灣區物流及貿易便利化研究報告。

(星島日報報道) 恒生管理學院及中大發表有關粵港澳大灣區物流及貿易便利化的研究報告，指出港澳兩個特區與內地九個城市協調發展，尤其香港、廣州及深圳等可以發揮優勢互補，本港透過完善法制及專業服務協助內地城市與國際接軌。兩校將在七月七日舉行大灣區專題論壇，邀請政商界代表及業界分享。



Cannix Yau

Government failure to maintain Hong Kong’s economic advantages in innovation and technology has caused it to fall behind local rivals, a group of academics said on Thursday.

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2 SHARES



But the city can still rekindle its niche in logistics and high-value-added services



Rundown

1. Overview of the Hong Kong Port (HKP)
2. Challenges faced by the HKP
3. Port collaborations overseas
4. Collaboration Model (simulation setup and analysis)
5. Recommendations

Overview

Background

- HKP was built in the 1970s to mainly cater for direct shipments.

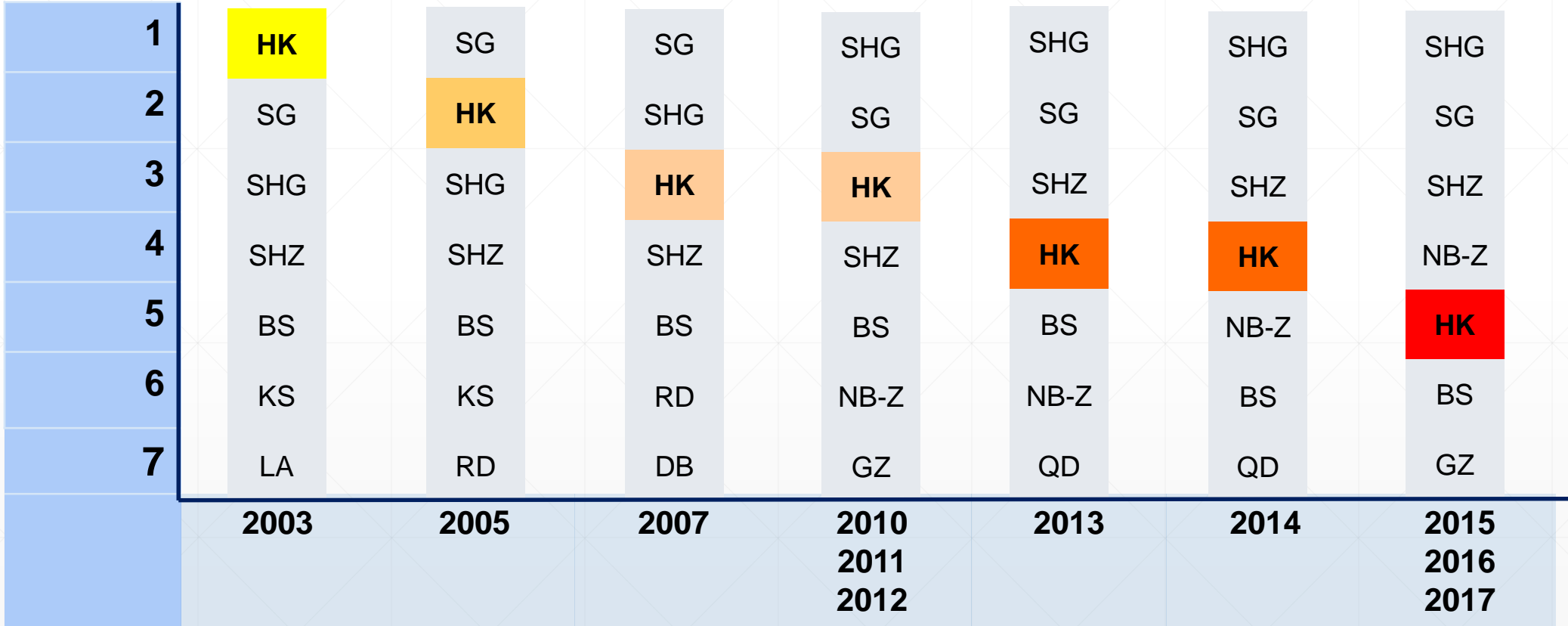
Economic impact of the HKP

- 88,000 direct employees in 2017
- 300,000 direct and indirect employees
- 7.8% of total employment
- 3.4% of total GDP



Overview

HKP ranking continues to drop over the years

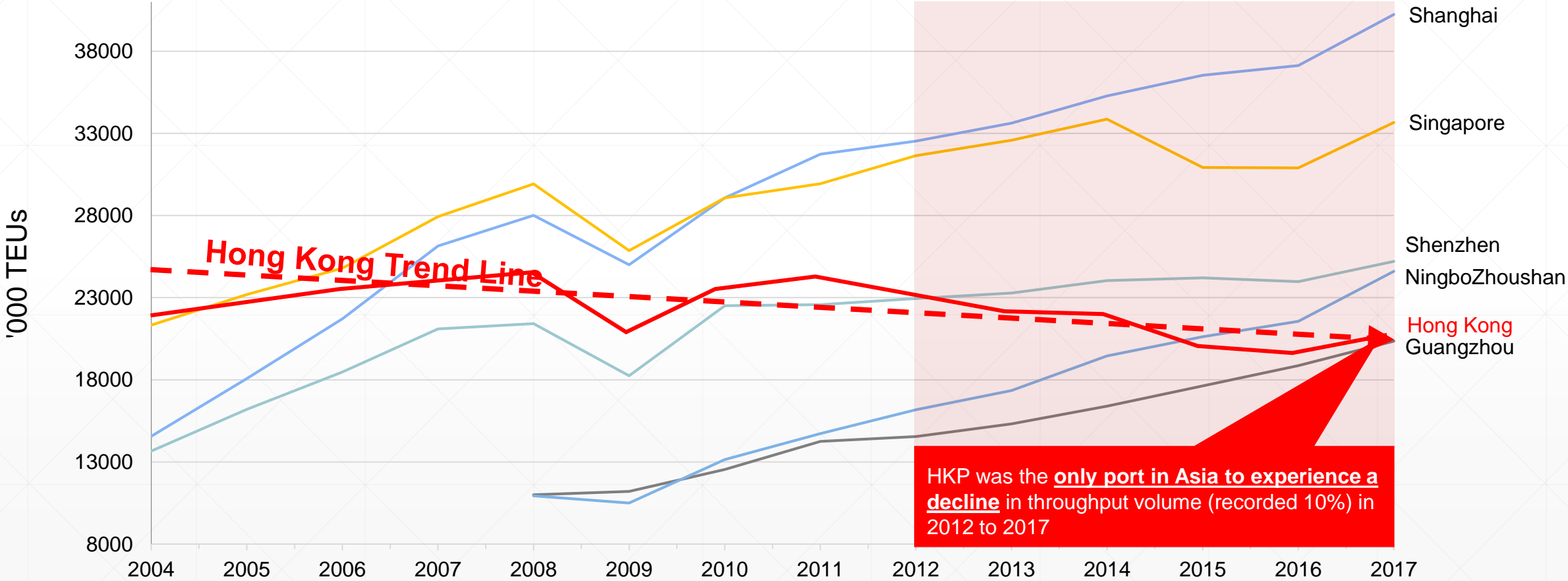


HK – Hong Kong; SG – Singapore; SHG – Shanghai; SHZ – Shenzhen;

BS – Busan; KS – Kaohsiung; NB-Z – Ningbo-Zhoushan; GZ – Guangzhou; LA – Los Angeles; RD – Rotterdam; DB – Dubai; QD – Qingdao

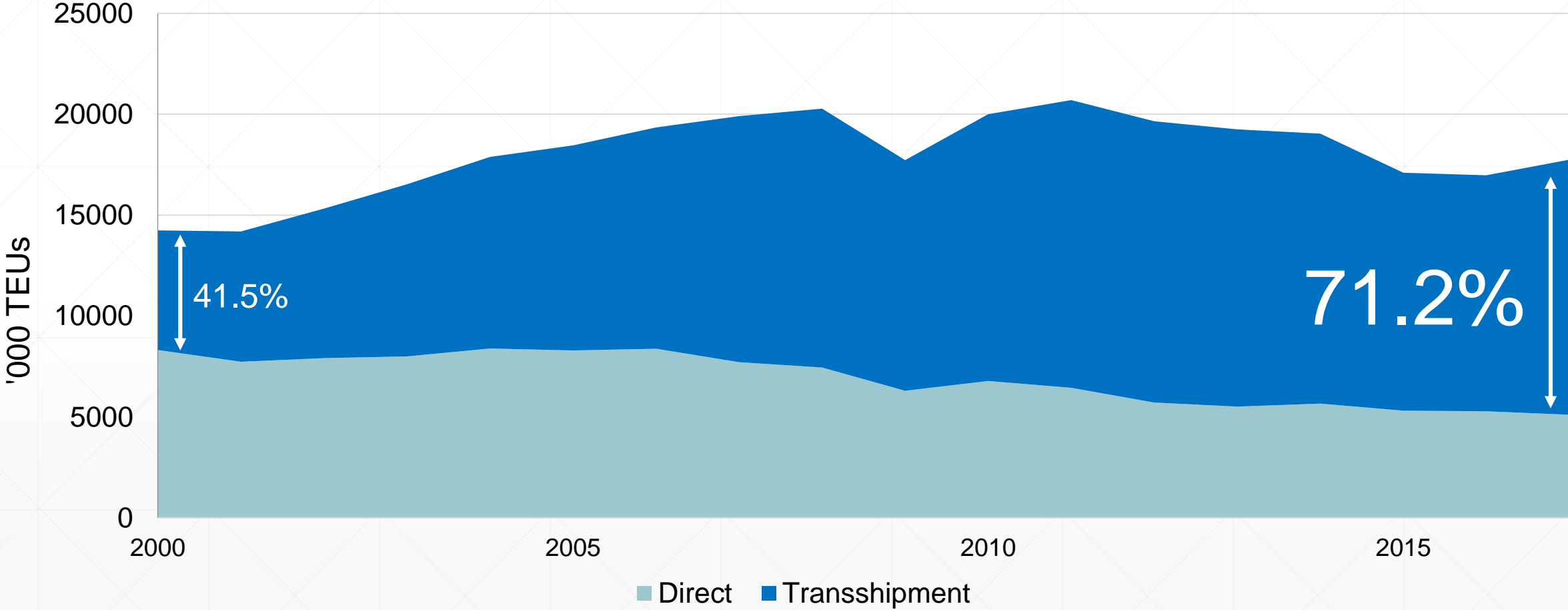
Overview

Steady decline of HKP throughput from 2004-2017



Overview

Composition of laden containers

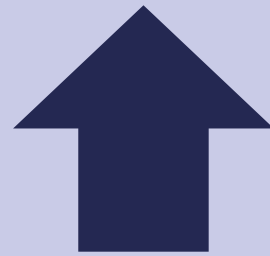


Overview

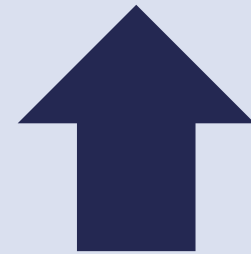
Reasons for increase in HKP's transshipment business



**Larger Carrier
Alliances**



**More
Cargo Co-loading**

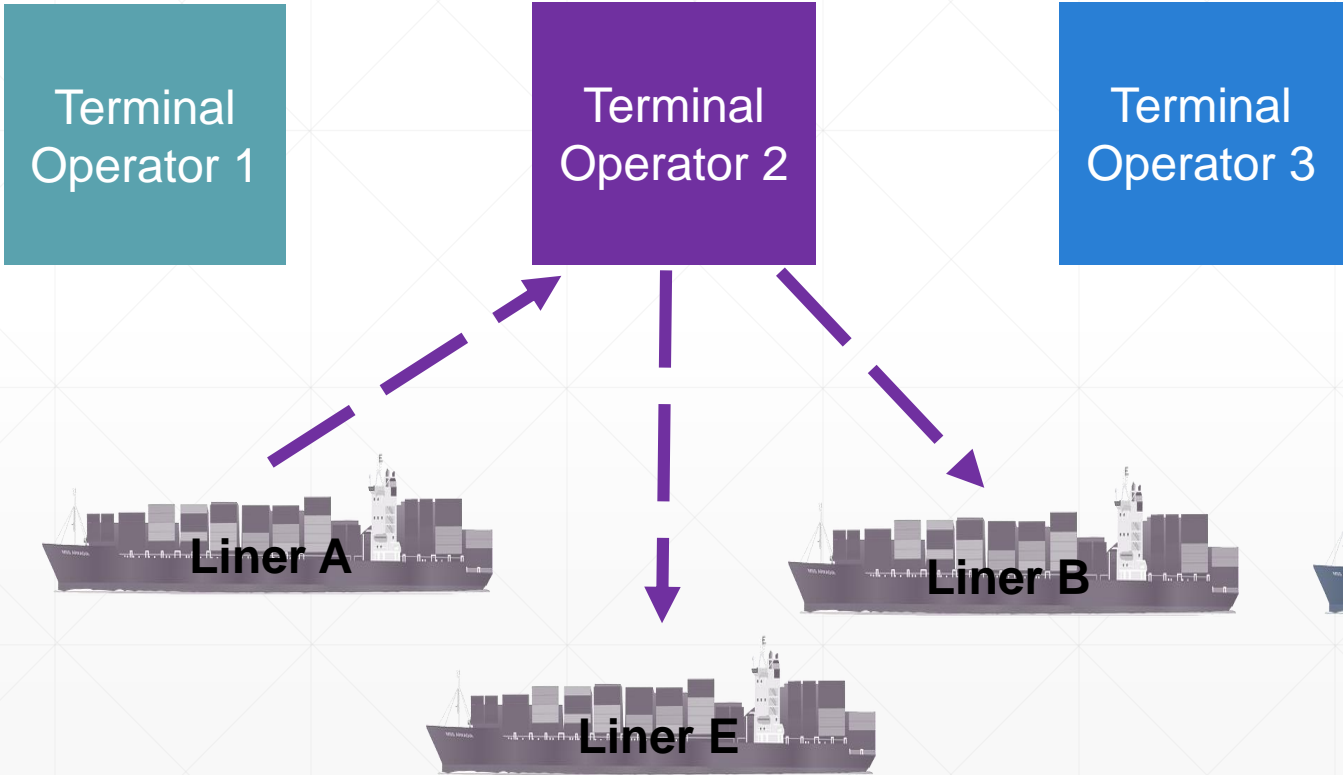


**Increase
in Vessel Size**

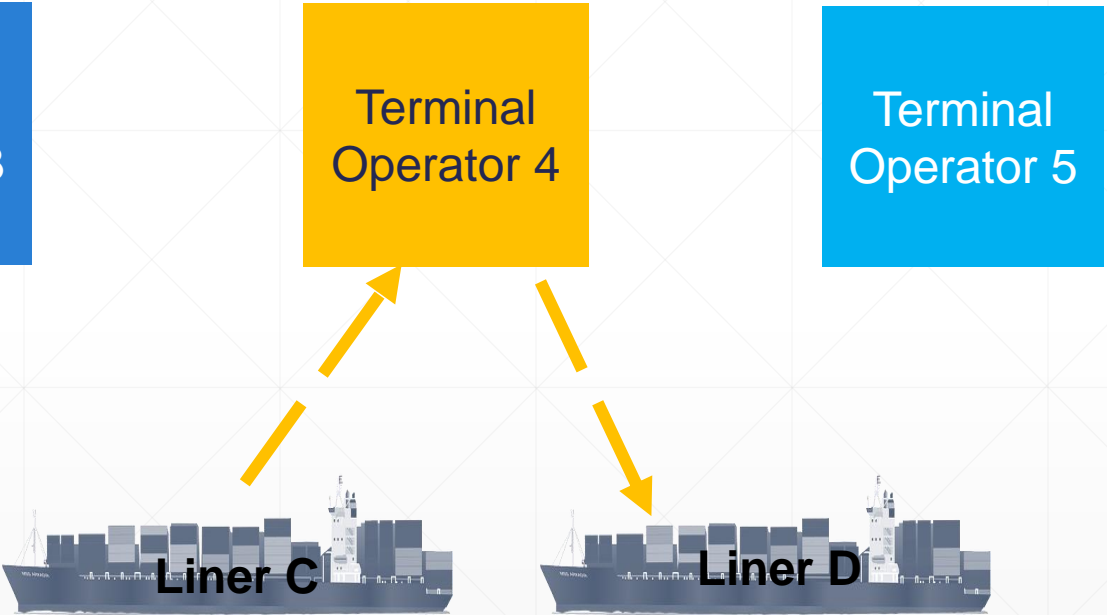
Challenges

Carrier Alliances

Direct Transshipment

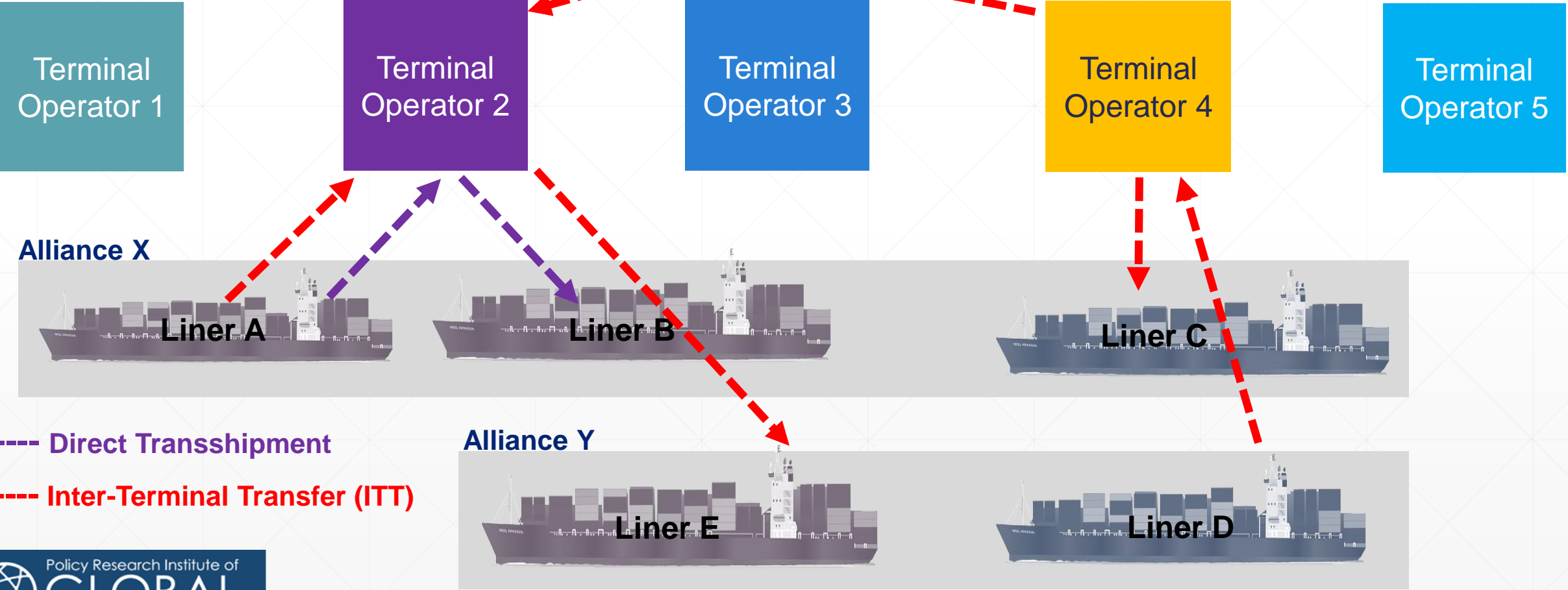


Direct Transshipment



Inter-Terminal Transfer

↑ Cargo co-loading
↑ Vessel Size



----- Direct Transshipment
----- Inter-Terminal Transfer (ITT)

Note: Liner A, B and E use terminal operator 2; Liner C and D use terminal operator 4.

New Shipping Alliances

**April
2017**

(1) 2M Alliance:

Maersk, MSC, HMM

(2) THE Alliance:

Yang Ming, Hapag-Lloyd (with UASC),
ONE (NYK, MOL, K Line; as of April 2018)

(3) Ocean Alliance:

CMA CGM, Evergreen, OOCL,
COSCO Shipping

Comprises

96%

of all East-West
trade

Comprises

77.2%

of global container
capacity

Asia-Europe Services:

Singapore

+7

weekly calls

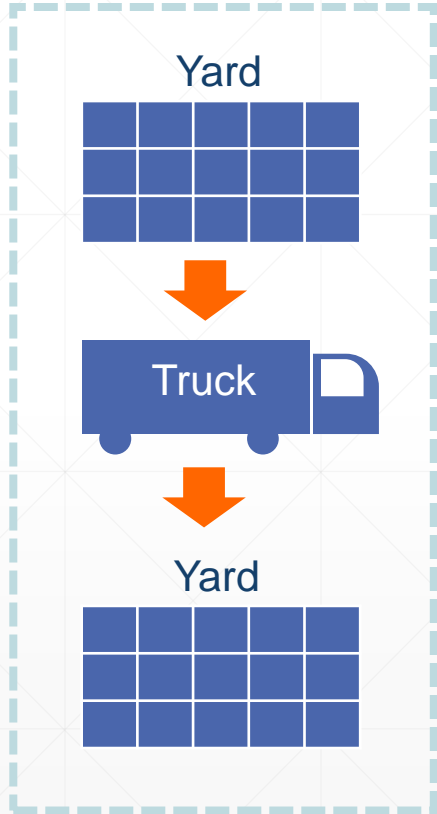
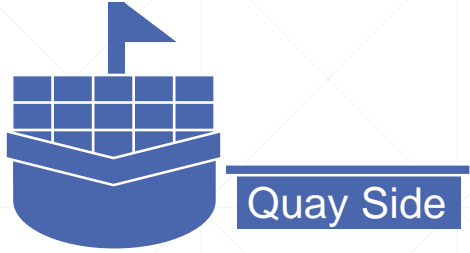
Hong Kong

-5

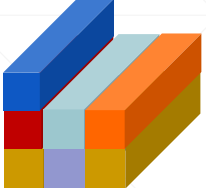
weekly calls

Current Procedures

Terminal A



Terminal B



About 15% of containers require ITT

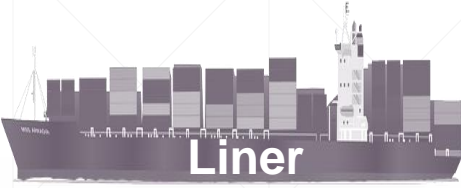
- Extra yard operations
- Extra truck movements
- Higher costs
- Lower operation efficiency

Current Charges



Shippers

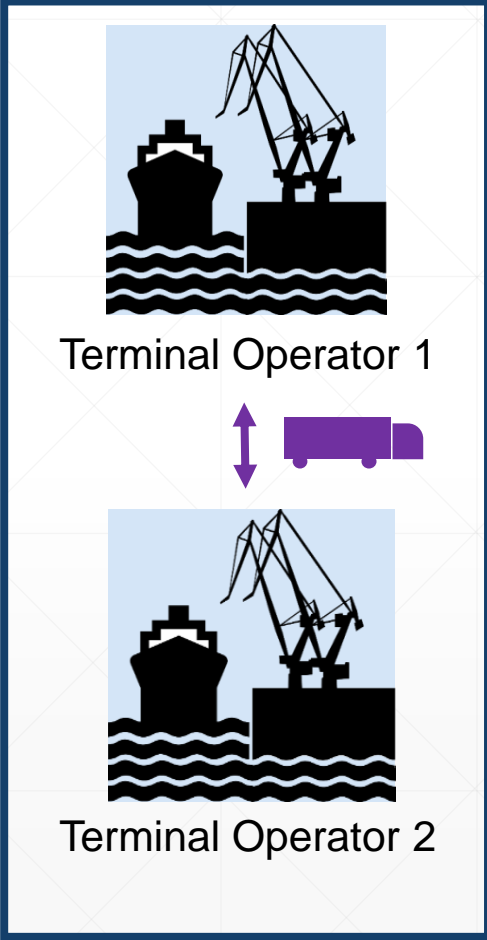
Terminal Handling Charges
a lump sum of charges (HK\$2,140*) levied by the shipping lines



Container Handling Charges
a levy by the terminals onto the carriers

Inter-Terminal Transfer(s)
container movement between terminals

Terminal Operations



*Source: Research Office of the Legislative Council Secretariat, 2017.

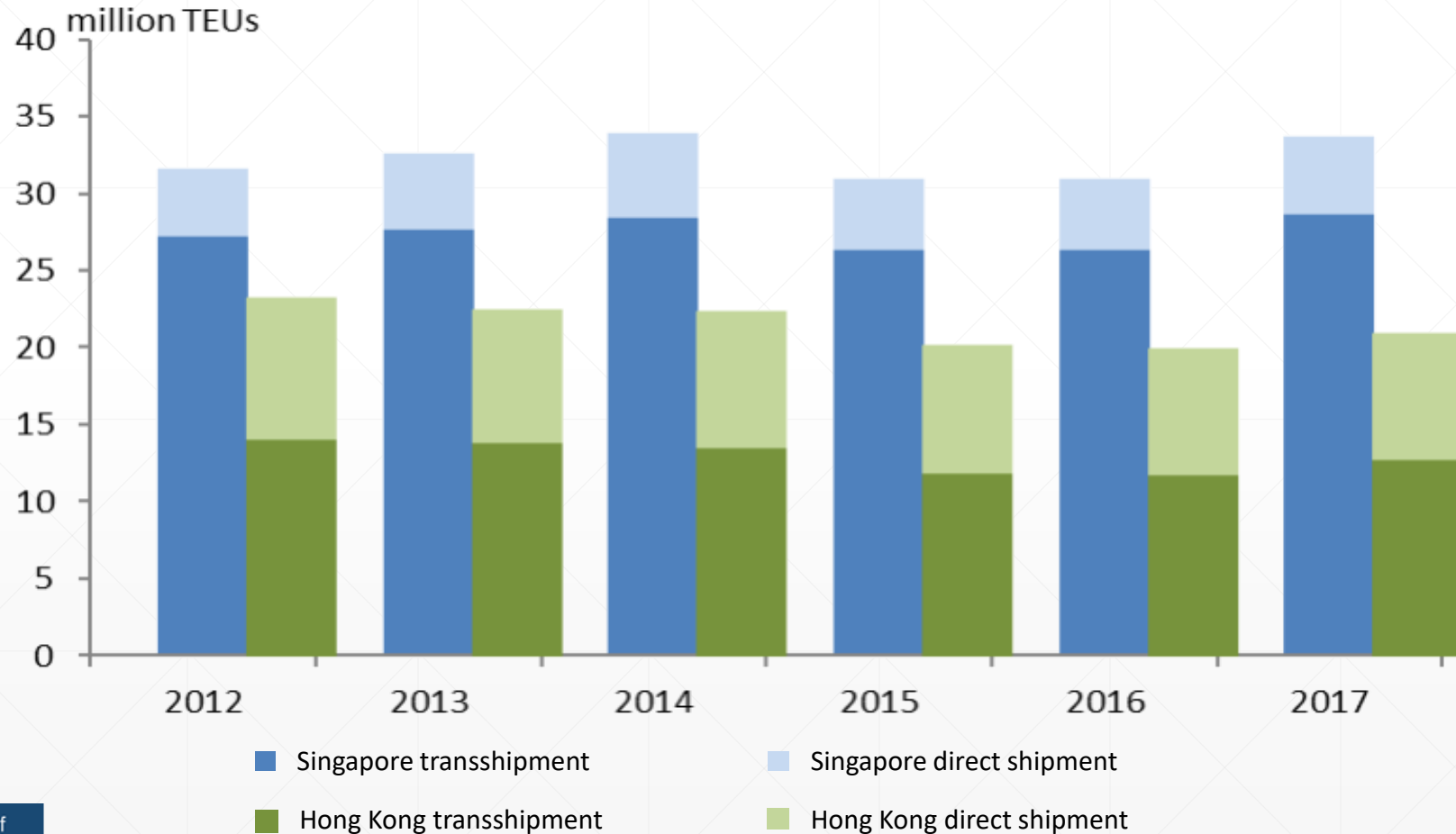
Limited Yard Capacity

Port	No. of Berths	Yard Areas
Singapore	67	700 ha
Shenzhen	41	792 ha
Hong Kong	24	279 ha
Guangzhou	16	643 ha

- Higher re-shuffle rate
- Extra yard operations
- Low yard operation efficiency

Singapore vs. Hong Kong

- Singapore has consistently outperformed Hong Kong in terms of container throughput



Port Collaboration Around the World

The Northwest Seaport Alliance
(Seattle, Tacoma)



Port of Portland
Port of Vancouver

Port of Los Angeles
Port of Long Beach

Port of Miami
(South Florida
Container Terminal
and Port Miami
Terminal)

Port of Hamburg
Port of Cuxhaven
Port of Brunsbüttel
Port of Glückstadt
Ports of Lübeck and Kiel



Port of Rotterdam
Port of Amsterdam

Hanshin Port
(Kobe, Osaka, Amagasaki-Nishinomiya-
Ashiya, Sakai-Semboku)



Port of Tokyo
Port of Yokohama
Port of Kawasaki



Port of Ningbo-Zhoushan
(Ningbo, Zhoushan, Jiaxing,
Taizhou and Wenzhou)

The Proposed “Collaboration Model”

Benefits According to Previous Studies

- Reduce costs
- Eliminate non-value-added activities
- Increase flexibility and utilisation
- Provide better customer service
- Market as one terminal
- Unify and simplify procedures for using any terminal

Hoshino, H. (2010) Competition and collaboration among container ports. The Asia Journal of Shipping and Logistics, 26(1), 31-47.

People's Daily Online (2016). Ningbo Zhoushan Port becomes first port with annual cargo exceeding 900 million tons, <http://en.people.cn/n3/2016/1220/c90000-9157169.html>

Collaboration Model

- We studied the benefits of facility sharing between the nine container terminals and five operators at HKP.
- Our goal was to minimise the overall ITT

ACT, CHT and HIT signed co-management agreement in Dec, 2016.



Collaboration Model

1. Zone Allocation

- Alliance Volumes
- Zone capacity
(Quarterly)

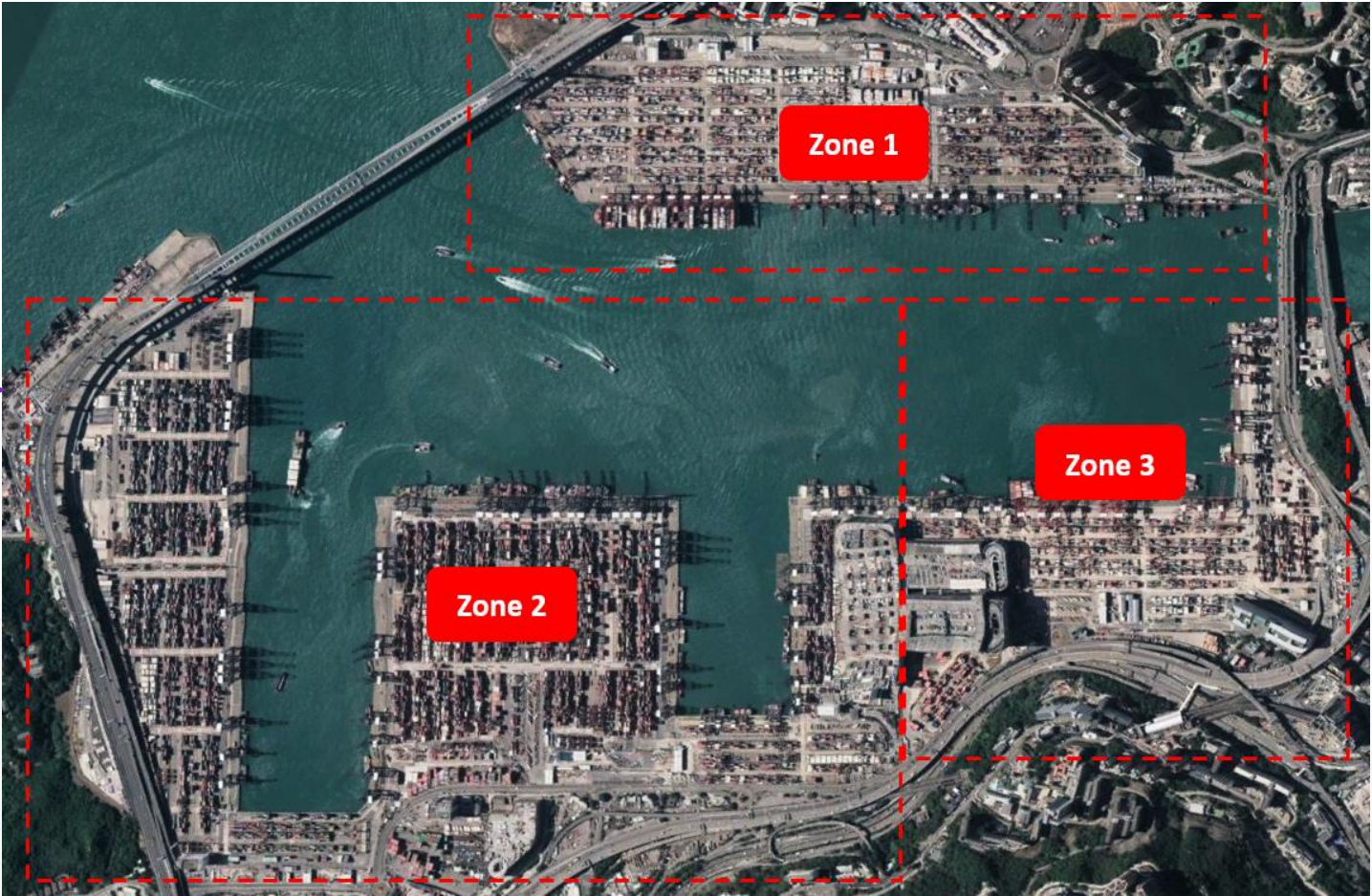
2. Berth Allocation

- Vessel size, schedule, unload and load volume
- Berth availability
- Transshipment dependency
(Daily/ Weekly)

3. Facility Sharing Simulation

- ITT Status
- Handling Time
- Heuristics

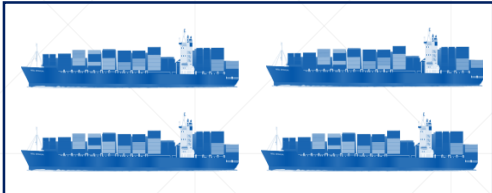
Collaboration Model



Alliance B



Alliance A



Alliance C



Collaboration Model – Simulation Setup

- One month historical data in 2017
- Over 200 arriving vessels per week

Six scenarios:

- S1: Average scenario
- S2: High container volume scenario (+25% volume)
- S3: Low container volume scenario (-25% volume)
- S4: Extremely high container volume scenario (+50% volume per container)
- S5: Extremely low container volume scenario (-50% volume per container)
- S6: High vessel number scenario (+50% vessels)

Collaboration Model – Simulation Setup

Benchmarking Approach

- Without Collaboration (A1)
 - Existing approach simulates the existing practice, in which terminal operators operate with limited collaboration

Proposed Approach

- With Collaboration (A2)
 - Majority of ITT can be replaced by direct operations

Results

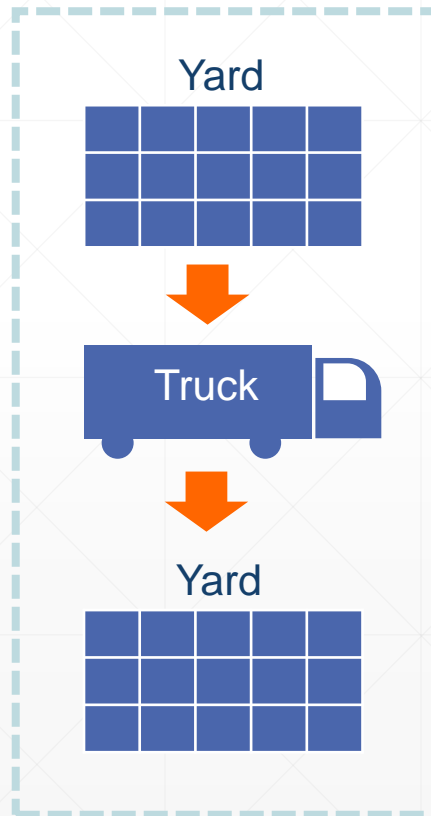
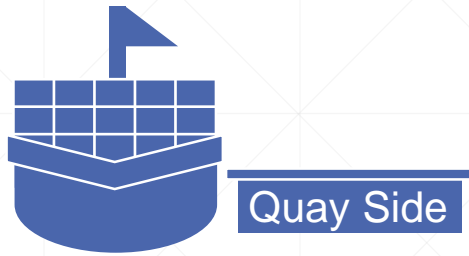
(I) Analysis on ITT performance

	Simulation no.:	Without Collaboration (A1)	With Collaboration (A2)	Improvement With Collaboration	
		1-year estimation	1-year estimation	Absolute terms	(%)
ITT (Number of moves)	S1	589,110	298,066	-291,044	-49%
	S2	682,863	375,446	-307,417	-45%
	S3	404,524	198,351	-206,173	-51%
	S4	836,545	499,285	-337,260	-40%
	S5	274,880	130,166	-144,714	-53%
	S6	561,283	361,871	-199,412	-36%
Charges (HK\$ 000,000)	S1	177	89	-88	-49%
	S2	205	113	-92	-45%
	S3	121	60	-61	-51%
	S4	251	150	-101	-40%
	S5	82	39	-43	-53%
	S6	168	109	-59	-36%

Results

(I) Analysis on Cost (Port Charge) Performance

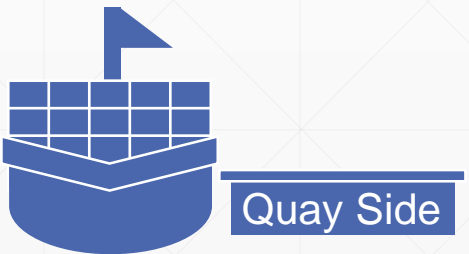
Terminal A



Inter-Terminal Transfer (ITT)

- **Without Collaboration (A1)** a total 589,110 ITT in S1 ≈ **HK\$ 177M** annually
- **With Collaboration (A2)** save about **49%** cost in ITT in S1 ≈ **HK\$ 88M** annually

Terminal B



Results

(II) Analysis on Environmental Performance – CO₂ Emission per '000 (KG)

Simulation no.:	Without Collaboration (A1)	With Collaboration (A2)	Improvement With Collaboration	
	1-year estimation	1-year estimation	Absolute Value	(%)
S1	11,595	6,940	-4,655	-40%
S2	12,500	8,934	-3,566	-29%
S3	7,757	4,538	-3,219	-41%
S4	16,134	12,020	-4,114	-25%
S5	5,289	2,957	-2,332	-44%
S6	10,816	8,629	-2,187	-20%

Results

(III) Analysis on Traffic Congestion

291,044

unnecessary round trips per year

1,595

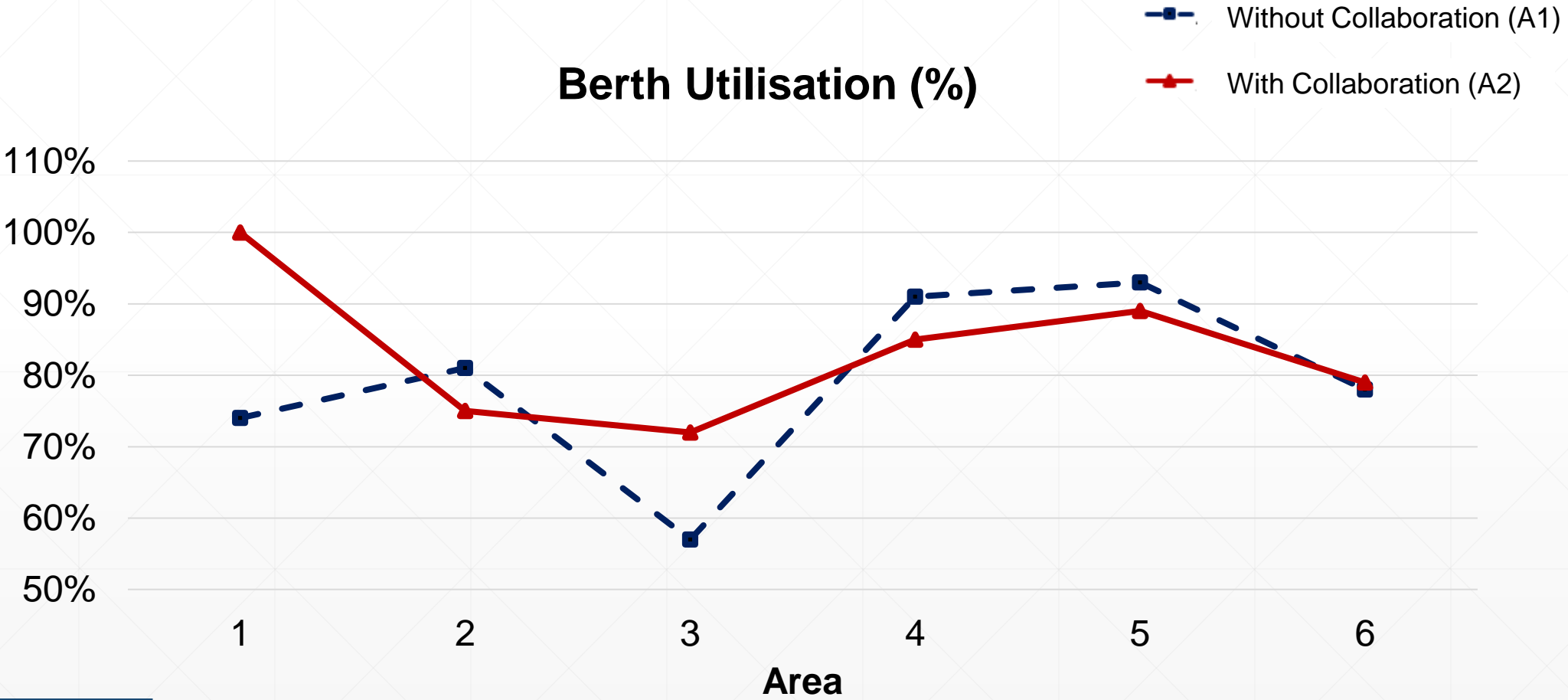
unnecessary trips per day



Relieve road usage

Results

(IV) Analysis on Berth Utilisation



Results

(V) Analysis on Service Quality Performance – Delayed Vessels

Simulation no.:	Without Collaboration (A1)	With Collaboration (A2)	Improvement with Collaboration
	Estimation of the annual number of delayed vessels (>4 hours)	Estimation of the annual number of delayed vessels (>4 hours)	Change in number of delayed vessels
S1	278	243	-35
S2	800	435	-365
S3	17	70	53
S4	2,138	1,147	-991
S5	0	35	35
S6	8,690	6,275	-2,415

Results

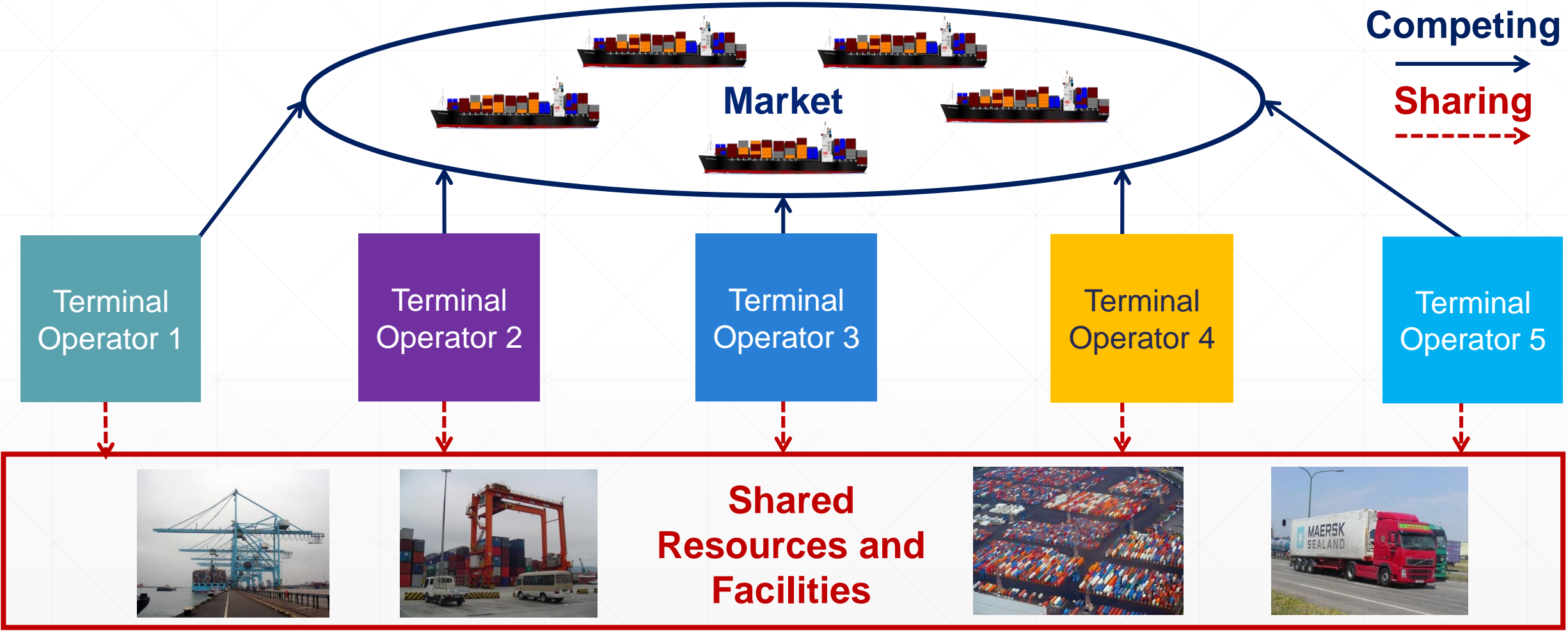
(V) Analysis on Service Quality Performance – Waiting Time

Simulation no.:	Without Collaboration (A1)	With Collaboration (A2)	Improvement with Collaboration
	Average waiting time (hours)	Average waiting time (hours)	Change in waiting time (hours)
S1	4.1	3.3	-0.8
S2	4.7	3.8	-0.9
S3	1.4	2.0	0.6
S4	7.6	4.9	-2.7
S5	1.1	3.4	2.3
S6	15.6	8.7	-6.9

Summary of Benefits (Average Scenario, S1)

1. ITT could be cut by **49%**
2. Shipping lines could save **HK\$88 million** annually
3. Improved service quality: waiting time could be reduced by **almost an hour**
4. Potential port charges reduced
5. The port will be better utilised
6. Minimise negative impact on the environment (**4,655 tonnes** of CO₂)

Strategic Collaboration



Recommendations

- Terminal operators to collaborate and share facilities (e.g. berths, cranes, yards, etc.)
- Entire port operations integrated:
 - Real-time facilities status
 - Scheduled and actual vessel status
 - Transshipment container information
- The operational collaboration details must be well planned
- To stay competitive, breakthroughs are needed to create new values and provide value-added services

Thank you!

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