Dynamics in interoceanic canals, straits and rail landbridges: the competitive position of the upgraded Panama Canal

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Co-Director Port Economics.eu

BIPC Conference
Busan – November 5, 2015
• The future of shipping and ports is not only guided by future trade flows.

• It is more about how and under which conditions these flows will move globally within a supply chain perspective.
Part 1.
Dynamics in long-distance routes & strategic passages

Part 2.
The factors that matter in route competition
The view of a five-year old boy on terminals and the global shipping network
Maritime routes and strategic passages

Source: adapted from Rodrigue & Notteboom, 2013

= (interoceanic) passages

= new / alternative shipping routes

= landbridges (rail-based)
1. THE ARCTIC SHIPPING ROUTES

- **Northwest Passage**
  - Current route: San Francisco to Rotterdam

- **Northern Sea Route**
  - Current route: Rotterdam to Yokohama
    - 9300 miles
    - 12100 miles
Northern Sea Route (NSR) – fact sheet and prospects

- From Barents Sea to Bering Strait
- Year-round navigation since 1978 in western NSR
- Vessel traffic rapidly increasing from 4 vessels completing the route in 2010 to 71 in 2013
  - 71 vessels sailed the whole route and transported 1,355,900 tons of cargo in 2013
  - 620 ships had permits to sail parts of NSR in 2013
- Avoids unrest of Suez Canal, seasonal supplement, current season is from July to November
- Energy-hungry Asian markets - shipments of liquified natural gas (LNG) and oil from Barents Sea & Siberia
- Russia investing in infrastructure along the route: 16 current ports & 2 ports under development (Sabetta & Teriberka)
- Increased commercial traffic in NSR link to economic development of Russian Arctic
- Shipping costs potentially competitive with time savings if large ships can sail with full cargo loads
- Ice breaker escort through NSR $200,000 (Lloyds)

Major opportunities
- Ice Class vessel development
- Port and pier infrastructure, safety and service development
- Mapping, navigation and communications technology
- Energy, oil and natural gas transportation to Asia

- 5-15% of China’s European trade could use NSR by 2020
- LNG transport from Norway to Japan possibly in 2018

www.arctic.sea.com, Northern Sea Route Information office
2. THE SUEZ CANAL EXPANSION
• New Canal of 37 km opened in August 2015
• Increase two-way traffic to 50%
• Capacity from 49 now to 97 passing ships a day by 2023
• Achieve direct unstopped transit for 45 ships in the two directions
• Permissible draft to 66ft (24m) all through the Suez Canal
• Transit time: from 18h to 11h (southbound convoy)
3. THE PANAMA CANAL EXPANSION

Existing locks' maximum vessel: 4,800 TEU

New locks' maximum vessel size: 12,000 TEU
Challenges and Opportunities of the New Panama Canal
The Nicaragua Canal: a ‘fata morgana’ or the emergence of a real local contender?
4. THE SOUTH-SOUTH ROUTE
Potential markets for the South-south route

Main port regions for intercontinental interlining/relay

- East-West mainline routes
- North-South and diagonal routes (mostly secondary)
- Market potential for the Cape route
5. EURASIAN LANDBRIDGES

With China on the rise and Europe standing strong, Eurasia is rapidly becoming the world's new economic centre. Obsolete seaports and vulnerable transport systems have shifted the focus to a network of railways - also known as the Iron Silk Road. The project is set to revolutionise the region, facilitating the transport of goods between China and Europe and, at the same time, unlock the vast potential of the Silk Road.

The Northern Corridor of the Iron Silk Road follows the existing Trans-Siberian Railway, while the Central Corridor mainly includes the route of the ancient Silk Road to Beijing. The Southern Corridor aims to connect the highly populated countries of Turkey, Pakistan and India with Europe and China.

Construction is expected to commence in 2014 with the aim to complete the multi-country railway network within ten years. It will include at least one line running 250 km/hour and will reduce transport time between London and Beijing from 15 to only two days.

Legend:
- Major local railway networks (Europe & China)
- Major regional railway networks (Europe & China)
- High-speed railway networks (Europe & China)
- Existing high-speed railway network
- Coastal cities
- Major cities
- International airports
- European capital cities
- Chinese capital cities
- National borders
- Current railway lines
- Proposed railway lines
- Iron Silk Road project

Travel times: London - Beijing
- By land: 90 to 120 days
- By sea: 15 to 20 days
- By air: 5 days

Map credits: Thoen Seefinger and KU China
The Trans-Siberian Railway

- Russia-China trade lane: about half of total (about 420,000 TEU in 2014)
- Russian RZD plans to invest $6 billion by 2020
  - Average travel time will be less than eight days, with a speed of about 1200km a day (now 900 km per day)
- RZD has also plans to implement the Hasan-Rajin project (Trans-Korean Railway see map).
New Silk Road and New Maritime Silk Road
(source: Xinhua net)
Railways and proposed Kra Isthmus Canal (Thai Canal) in South Asia
Part 1.
Dynamics in long-distance routes & strategic passages

Part 2.
The factors that matter in route competition
1. Dynamics in the trade-off affecting route choice

‘Ships follow cargo’ principle
Route choice affected by differences and variation in
1. cargo potential on routes including associated risks (cf. recent problems in ports along West Coast US);
2. cargo balance on routes (e.g. eastbound vs. westbound);
3. earning potential/‘willingness to pay’

Vessel/network operational considerations
Route choice affected by differences and variation in
1. service frequency and stability;
2. fleet size, vessel size, fleet mix;
3. number of ports of call, transhipment or direct calls

=> Shipping network considerations > cargo/customer consideration or vice versa?
2. Dynamics in scale increases in vessel size

- Ships of up to 20,000 TEU capacity
- Leader/follower
- Impact on no. of ports of call and call sizes
- Cascading of vessels to north-south routes + upscaling of feeder vessel sizes
- Panama Canal upgrade: game-changer at level of possible ship sizes on certain routes

Mary Maersk (18,000 TEU) and Evelyn Maersk (14,000 TEU) at Deurganckdock – Port of Antwerp – 19 Oct 2013
### Average vessel sizes (in teu) on major container trade routes for selected years (source: Drewry)

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<thead>
<tr>
<th>Trade route type</th>
<th>Trade route</th>
<th>Average vessel size (teu)</th>
<th>Increase</th>
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<td>Mid 2014</td>
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<td>Asia-Mediterranean</td>
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Table 1: Development of average container ship size, 2011-2014

**Future impact Panama Canal on further scale increases on Asia - ECSA**

## Services Far East US East Coast: Suez Canal vs. Panama Canal (situation in April 2015)

### FE-US East Coast: Current and new services with slot breakdown by carrier

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<th>Service Name</th>
<th>Via</th>
<th>Maersk</th>
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<th>HMM</th>
<th>NYK</th>
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**Total no. of weekly sailings (F):** 4 2 7 8 8 8 8 7 7 6 7 4 6 2 5 2

**Source:** Alphaliner, Newsletter volume 2015, issue 17

Future impact Panama Canal on further scale increases on Asia - USEC
3. Dynamics in fuel costs and sailing speed

- Route choice: slow steaming combined with high fuel costs improves competitive position of shorter maritime routes and landbridges
- Environmental policy: low sulphur fuel and ECAs (Marpol Annex VI)
- Future: will slow steaming remain the dominant approach?
4. Dynamics in the number of port calls

- Larger vessel sizes and slow steaming did not necessarily lead to a lower no. of ports of call per service

- Advantages of multiporting:
  - Closer to the markets and the customers
  - Shorter transport distances

- Drawbacks of multiporting:
  - Smaller bargaining power vis-à-vis ports
  - Additional costs for stowage and rehandles
  - Less opportunities to benefit from economies of scale/density in hinterland transport
5. Dynamics in the configuration of port systems

Port system's reliance on hub-and-spoke (sea-sea transhipment)

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<thead>
<tr>
<th>High</th>
<th>Low</th>
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<tbody>
<tr>
<td>High</td>
<td>Dominant hub/gateway port and multiple small feeder ports</td>
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<td>Low</td>
<td>Single gateway system</td>
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Source: adapted from Notteboom (2009)
6. Other influencing factors (not exhaustive)

- **Schedule integrity**: can make longer and more expensive routes more competitive

- Freight rates, canal charges, rail pricing: **more competitive pricing strategies** unavoidable?

- Port level: port efficiency, cargo potential and balance, **connectivity**, cost, reliability
Example of an emerging route competition

Prof. Theo Notteboom

Via Panama: 16,042 nm
Via Suez: 12,292 nm
Via Cape: 9,336 nm
Identification of relevant routes for the Cape route in competition with the Suez route and the Panama Canal route

<table>
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<th>North Africa (Maghreb)</th>
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<th>Europe Med</th>
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<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>S/P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>Oceania</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>S/P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
</tbody>
</table>

**Legend:**
- **S** = Suez Canal now typically used
- **P** = Panama Canal now typically used
- **S/P** = now via Suez Canal and/or Panama Canal
- Empty cell = trade route that does not represent a market for relay/interlining via the Cape
- Grey cell = trade route that might represent a market for relay/interlining via the Cape
Route competition analysis
The Suez route as competitor – summary graph for 2008

Interlining via SA takes less time, but is more expensive than interlining via Algeciras

Interlining via SA takes more time, but is less expensive than interlining via Algeciras

Interlining via SA takes more time and is more expensive than interlining via Algeciras

Interlining via SA takes less time, but is cheaper than interlining via Algeciras

WAfrica-SEAsia
SAmerEC-SEAsia
WAfrica-India/Pak.
SAmerEC-India/Pak.
WAfrica-Oceania
SAmerEC-Oceania
S AmerEC-EAfrica
WAfrica-EAsia
SAmerEC-EAsia
SAmerEC-MEast

Average cost difference (base = interlining via Algeciras)

Average transit time difference (base = interlining via Algeciras)

= Pure interlining traffic
= Interlining traffic, but hub-and-spoke solution (feeder) also possible
= Area of strongest competition between Suez route and SA route

Estimation for year 2008
Route competition analysis
The Suez route as competitor – summary graph for 2020

Interlining via SA takes less time, but is more expensive than interlining via Algeciras

Interlining via SA takes more time and is more expensive than interlining via Algeciras

Estimation for year 2020
Conclusions

- Route competition between Suez Canal, Panama Canal and Cape route is rising

- NSR and landbridges will grow in significance, but overall volumes will remain small compared to the main maritime routes

- A myriad of factors will determine the outcome of route competition
  - A route’s competitive position can be gained or lost in a matter of years;
  - Prepare for increased volatility in route choice.
Thank you for your attention!

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