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One Belt One Road: user opportunities through chain cost calculations

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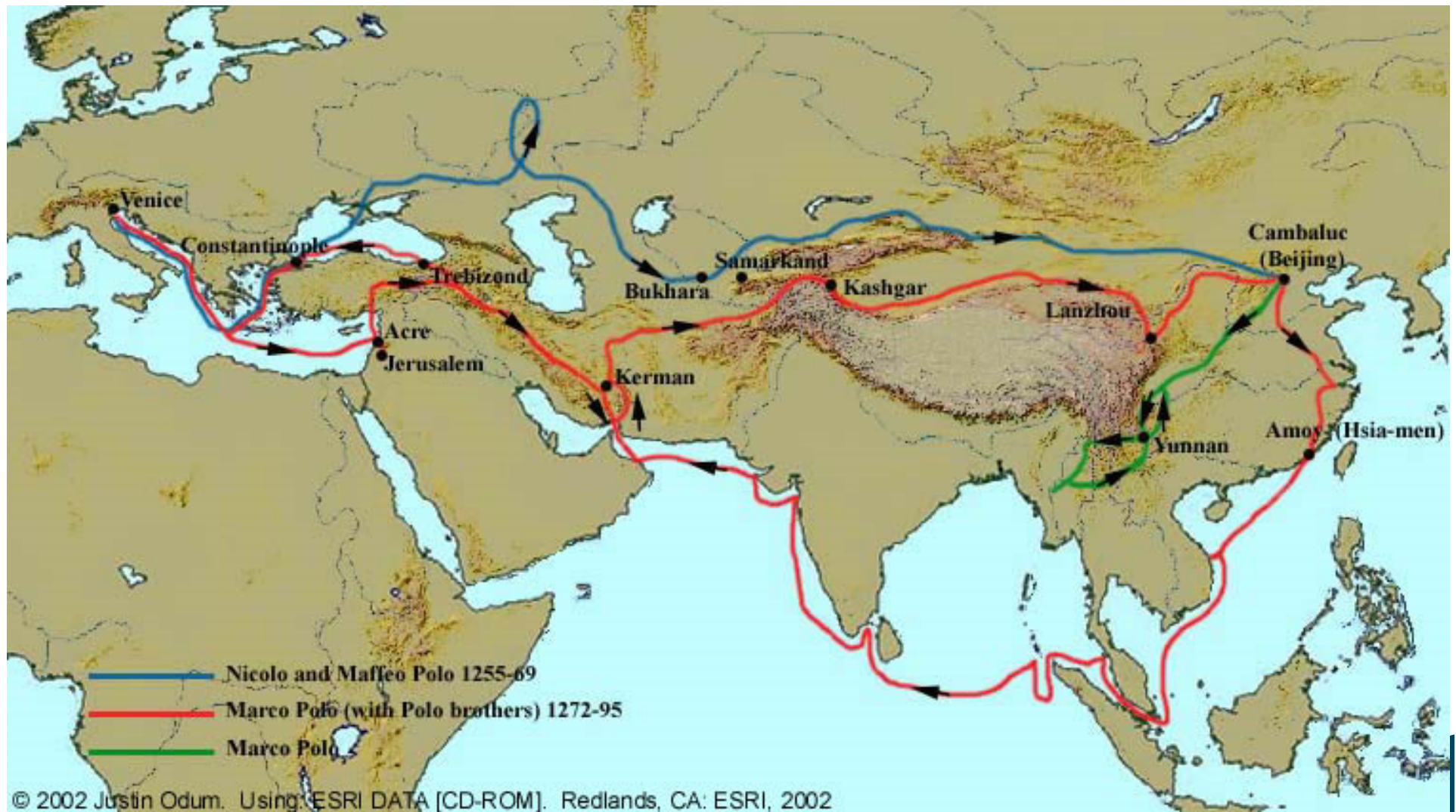
Outline of presentation

- Short introduction OBOR
- Modeling methodology
- Results
- First insights OBOR and further research



OBOR: old Silk Routes

The old Marco Polo Silk routes



OBOR: History

The Silk Road was a network of trade routes, formally established during the Han Dynasty.

The road originated from Chang'an (now Xian) in the east and ended in the Mediterranean in the west, linking China with the Roman Empire.

As China's silk was the major trade product, German geographer Ferdinand von Richthofen coined it the Silk Road in 1877.

→ Not just one road but rather a series of major trade routes that helped build trade and cultural ties between China, India, Persia, Arabia, Greece, Rome and Mediterranean countries.



OBOR: China developments

China is the largest beneficiary of this freight-focused rail network, having already shipped \$2.5 billion worth of goods on this route to Europe since 2011.

Labour and land costs in coastal cities like Shanghai and Shenzhen have gone up, the Chinese government has been pushing and inducing foreign investors and domestic producers to move inland through its “Go West” policy.

Interior megacities like Chongqing and Chengdu have been booming as major destinations for large new manufacturing projects.

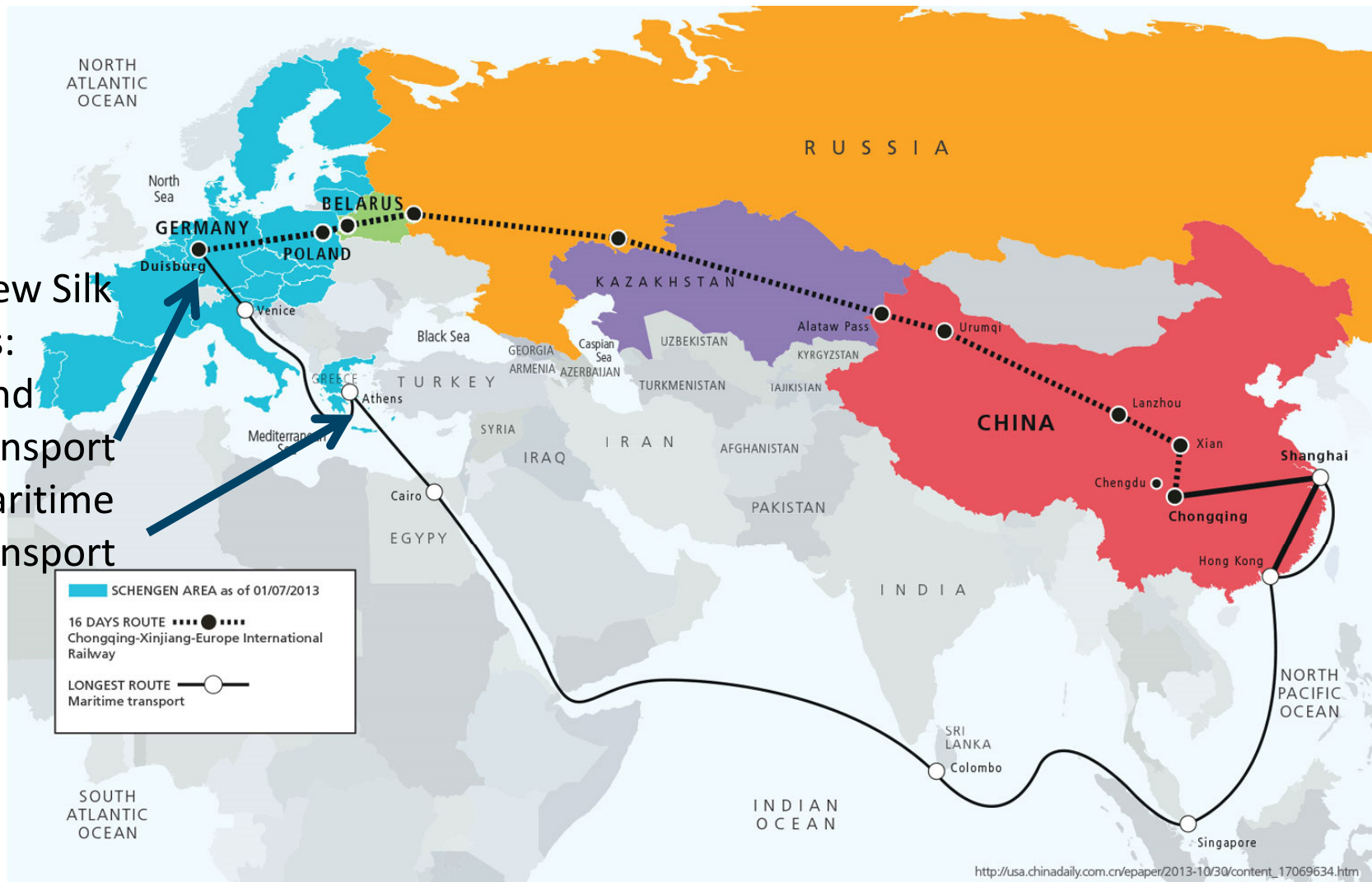
Having set up what would be Asia’s largest laptop factory in Chongqing, US computer giant Hewlett Packard has already shipped more than four million notebook computers to Europe by the Chongqing-Duisburg rail since 2011



OBOR: The future (1)?

The new Silk routes:

- Land transport
- Maritime transport



http://usa.chinadaily.com.cn/epaper/2013-10/30/content_17069634.htm

Figure 1: The Chongqing-Duisburg Trans-Eurasia Railroad & Schengen Area

TRANS-EURASIA RAILROAD

The 11,179-kilometre rail line is the most important connection to Europe. Launched in 2011 by a joint venture with Germany, China, Kazakhstan, and Russia, the rail goes from the city of Chongqing in southwestern China to Duisburg, Germany.

SCHENGEN AREA

It is an area without internal borders, within which citizens, many non-EU nationals, business people and tourists can freely circulate without being subjected to border checks. Since 1985, it has gradually grown and encompasses today almost all EU States and a few associated non-EU countries.

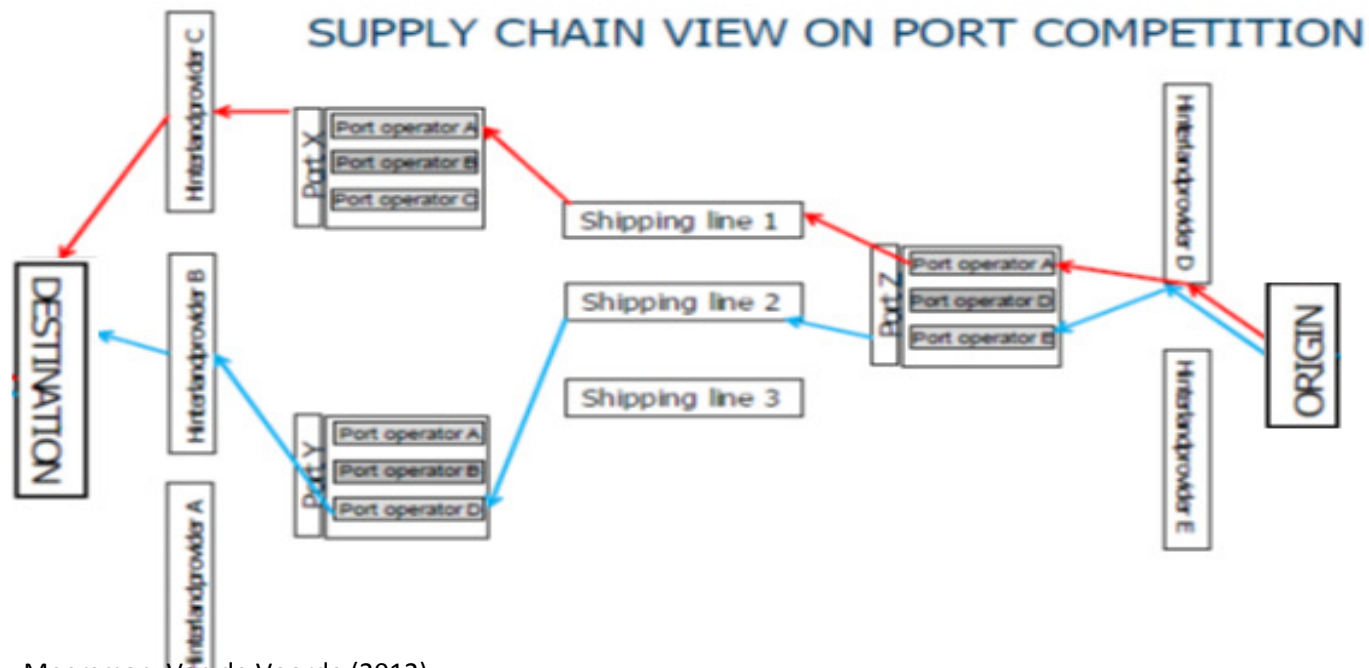
http://ec.europa.eu/dgs/home-affairs/what-we-do/policies/borders-and-visas/schengen/index_en.htm

Method: Overall goal of TPR's chain cost model

The main goal is to come to integrated model a complete maritime logistic chain

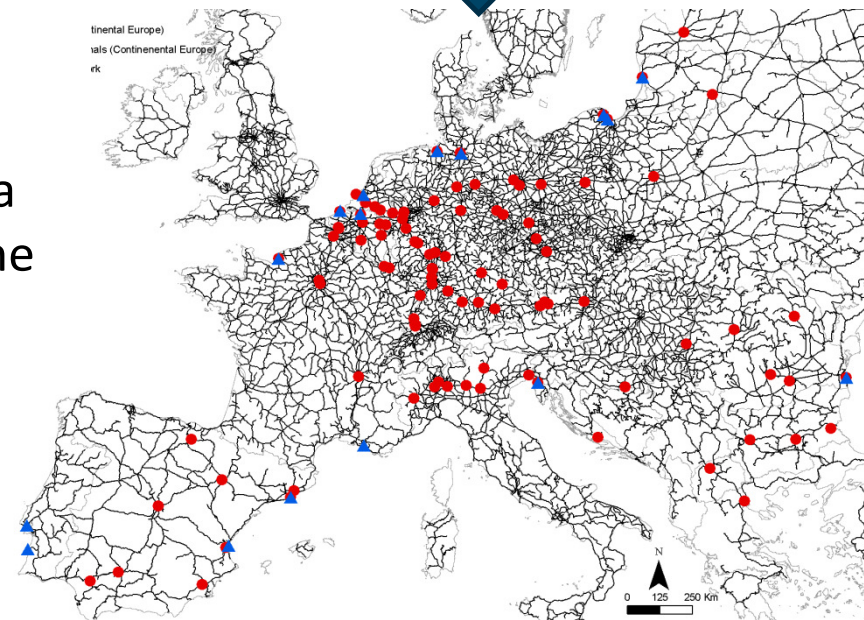
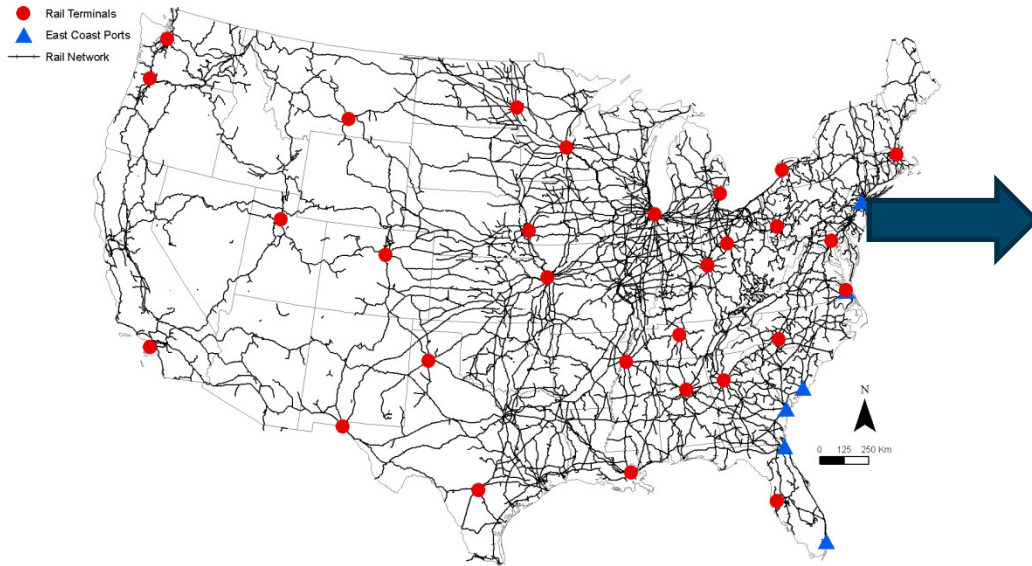
It should be possible to determine the competitive power of a port (or set of ports) in a complete logistic chain

Focus of the research is now on containers



Meersman, Van de Voorde (2012)

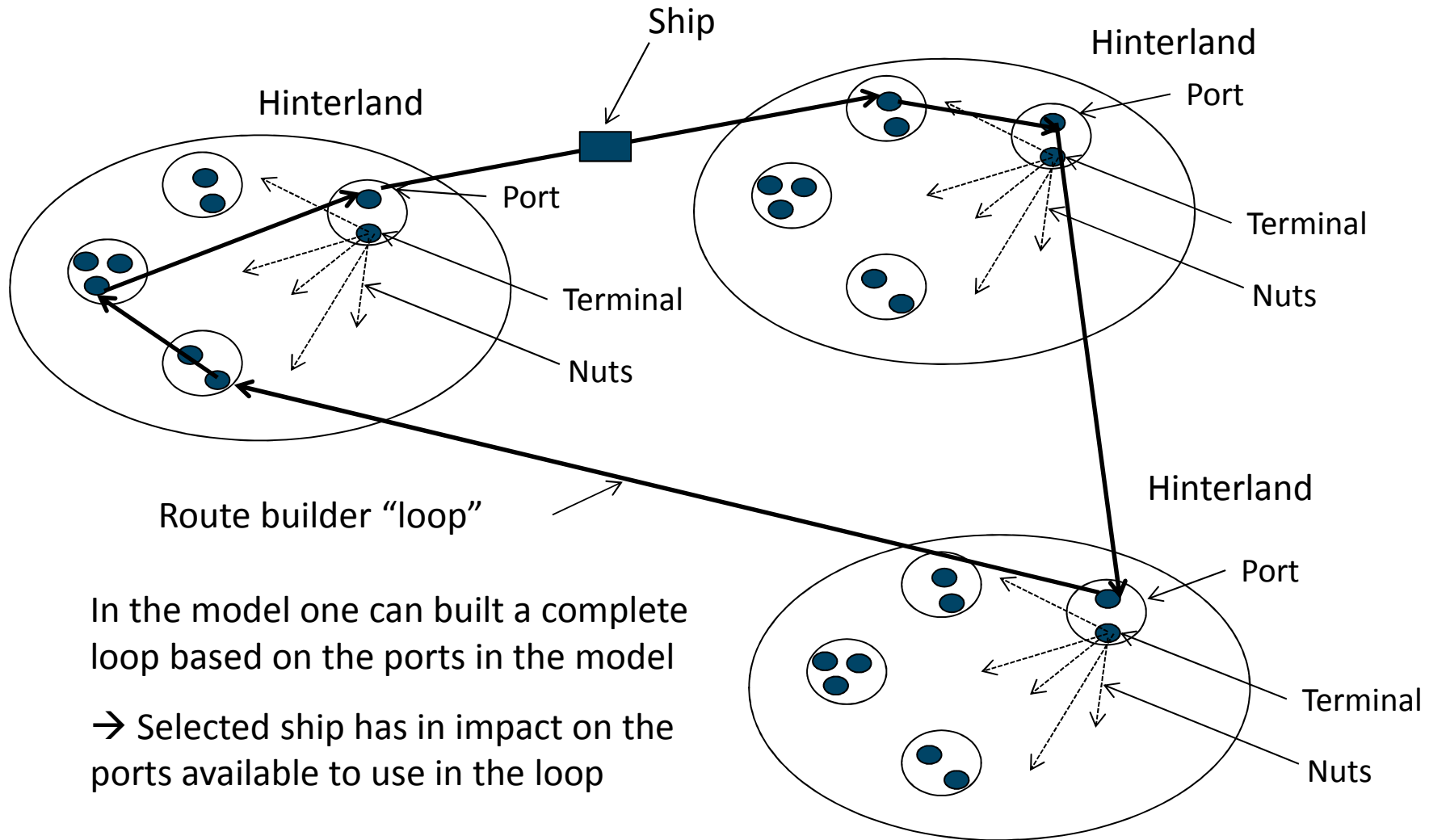
Method: Overall goal of TPR's chain cost model (2)



The model allows to design and to analyze different network options of a container loop. In the network also the ports and hinterlands are included. Therefore a complete chain can be calculated



Method: Model structure (1)



Method: Model structure (2)

The model has the following components:

- “Hinterlands” (region's in the world)
- Ports (62 ports in the model)
- 20 in EU, 6 in GB and 10 USA ports have one or more terminals, other ports have not yet been defined at terminal level
- Three complete sets of hinterlands (EU → from each terminal to 240 NUTS-2 regions + UK → 40 NUTS-2 regions + USA → 48 states)
- Three hinterland modes (Road, Rail and IWT)
- Container ships (database of 22 ships → range 700 TEU to 20.000 TEU)
- Maritime distances between ports (matrix with +/- 1000 data points)

Method: Output

Screen shot of the Excel output → (Gen. cost from origin to destination)

Hinterland	Europa				
Port	Zeebrugge				
Terminal	APMT				
Currency	EUR				
Hinterland-code	Hinterland-name	Road [EUR/TEU]	Rail intermodal [EUR/TEU]	IWT intermodal [EUR/TEU]	Agg Gen. cost [EUR/TEU]
AT11	Burgenland	1,041.46	874.58	1,008.50	880.62
AT12	Niederosterreich	983.34	881.50	1,014.66	891.83
AT13	Wien	996.93	855.26	989.18	862.53
AT21	Karnten	964.47		1,198.16	965.01
AT22	Steiermark	990.13		1,104.44	995.70
AT31	Oberosterreich	842.97	750.29	1,093.33	757.97
AT32	Salzburg	870.14		1,020.00	873.12
AT33	Tirol	807.49		885.69	816.55
AT34	Voralberg	750.14		766.32	756.55
BE10	Brussels Hoofdstedelijk Gewest	171.85	249.31	200.82	186.80
BE21	Prov. Antwerpen	180.42	241.03	194.58	192.18
BE22	Prov. Limburg (B)	227.13	274.29	247.36	240.82
BE23	Prov. Oost-Vlaanderen	149.40	260.35	179.21	162.54
BE24	Prov. Vlaams-Brabant	185.45	264.20	205.30	198.20
BE25	Prov. West-Vlaanderen	137.93	219.72	166.74	152.61
BE31	Prov. Brabant Wallon	195.57	302.70	193.78	197.81
BE32	Prov. Hainaut	189.05	299.53	303.95	199.93
BE33	Prov. Liege	251.68	303.39	239.88	250.70
BE34	Prov. Luxembourg (B)	288.41	382.68	300.37	297.69
BE35	Prov. Namur	236.78	293.04	223.99	234.95



Calculation results (1)

Origin of a transport chain in one of the Chinese provinces.

Destination in Munich (Germany)

Three different routes:

- Maritime via HLH range (1)
- Maritime via Trieste/Koper region (2)
- Land based (rail connection) (3)



Calculation results (2)

Main results of the calculations from different origins to Munich (Germany)

Origin	Cost		
	Current route [EUR/TEU]	New Maritime Route [EUR/TEU]	Land based route [EUR/TEU]
Chengdu	3,288	2,917	2,318
Chongqing	2,500	2,150	2,000
Wuhan	1,905	1,535	2,245
Guiyang	2,923	2,488	6,906
Hong Kong	1,559	1,180	7,615
Shanghai	1,676	1,306	7,419
Hangzhou	1,625	1,254	2,920

Calculation results (3)

Red: Land based route
Blue: New maritime route

First observation:

- The further the location in China is located away from the major sea ports, the more the use will be made from the land based route
- The new maritime route outperforms the “old route” → shorter sailing time



Calculation results (4)

Some remarks:

- Only one EU and 6 Chinese destinations are researched → More destinations are needed.
- Some variations were made with the value of the transported cargo (base case = €60,000/TEU)
 - High-value cargo will opt for faster transport (→ land based route)
 - The route choice of low-value cargo will less be influenced by transport time
- Calculations are based on generalized cost and not (yet) on other attributes like: reliability, service, language barriers, etc.
- Impact of the imbalance in cargo flows (return cargo for the land based route)

Conclusions

First insights:

- Chinese regions located near the coastal region will prefer the new maritime route to the center of Europe.
- Chinese regions located more the heart of China will prefer the new rail link to Europe.
- The new maritime route (via Koper/Trieste/Venice) will outperform the maritime routes via the HLH range for destinations in the center of Europe
- Transport volumes of the maritime flows are, at this stage, much larger than for the land based route. → what happens if China starts to produce high value merchandized cargo? → **higher share of the land based route!?**

Ports in the HLH range could face some serious competition for both the maritime and land based silk routes

Thank you very much!

Questions?

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