University of Antwerp
Faculty of Business and Economics

Synchromodality opening up corridor opportunities

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Agenda

- **Synchromodality – what?**

- **Pain point(s)**

- **Collaborations starting-up**

- **Opportunities: Insights from a West-Europe**

- **Smart port barometer**

Synchromodality

What?

Synchromodality is an innovative concept where the **dynamic integration of road, rail and inland waterways transportation modes** plays a crucial role in the effort to **optimize logistics networks** involved in the mobilization of the growing cargo demand between supplier origins and delivery destinations (OD) distributed among **interconnected geographical areas** (Ambra et al., 2019a).
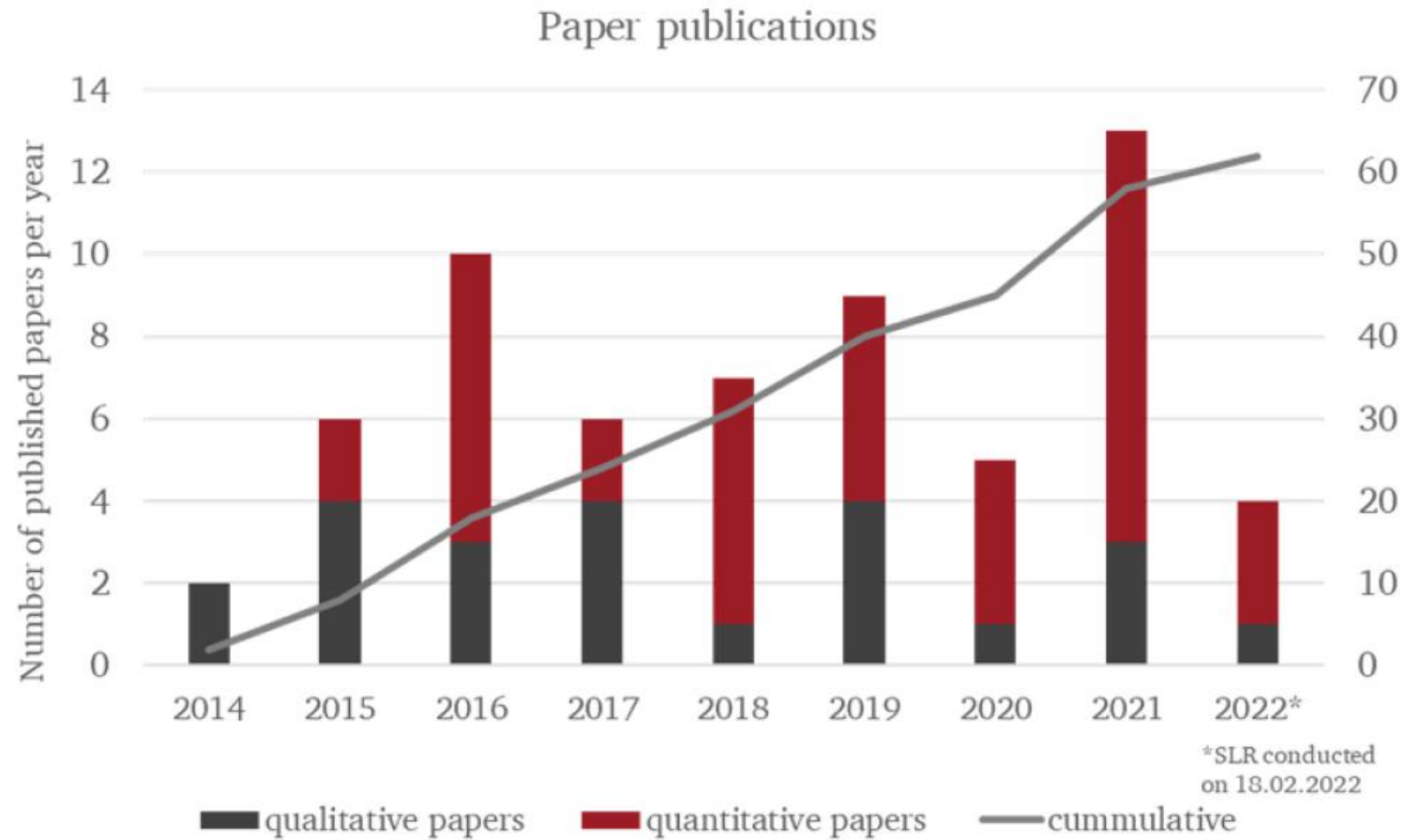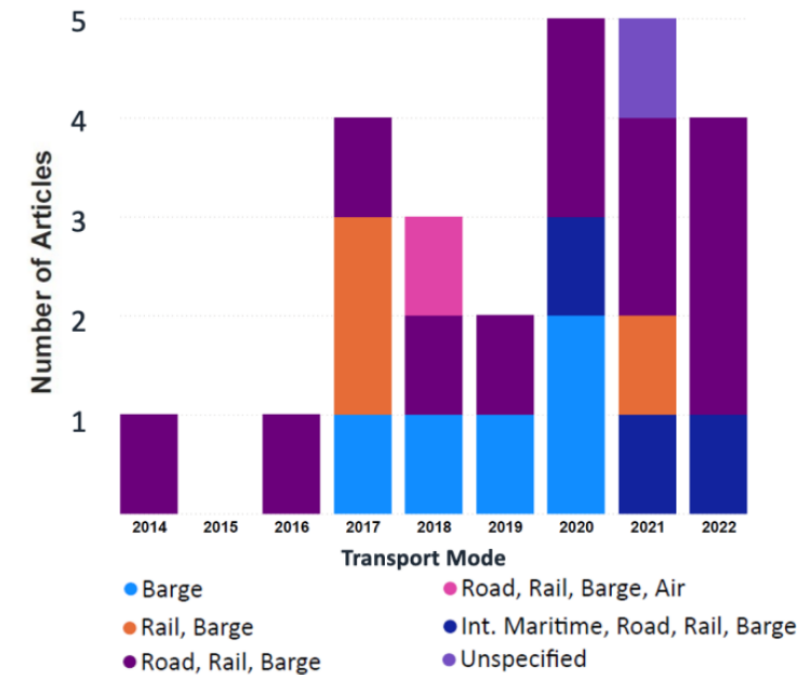
Synchromodality

$$e^{i\pi} + 1 = 0$$

et al., 2019a).

Area of application

Paper publications

Number of published papers per year

*SLR conducted on 18.02.2022

qualitative papers   quantitative papers   cummulative

Area of application

Cargo Type	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
Container	1	0	1	3	1	2	3	4	2	**17**
Unspecified	0	0	0	0	2	0	1	1	2	**6**
Ro-Ro	0	0	0	1	0	0	2	1	0	**4**
Freight Unit	0	0	0	0	0	1	0	1	0	**2**
Dry Cargo	0	0	0	0	0	0	1	0	0	**1**
Pallets	0	0	0	0	1	0	0	0	0	**1**
Tanker Market	0	0	0	0	0	0	1	0	0	**1**
Bulk	0	0	0	0	0	0	0	1	0	**1**
Modular Boxes	0	0	0	0	0	0	0	1	0	**1**

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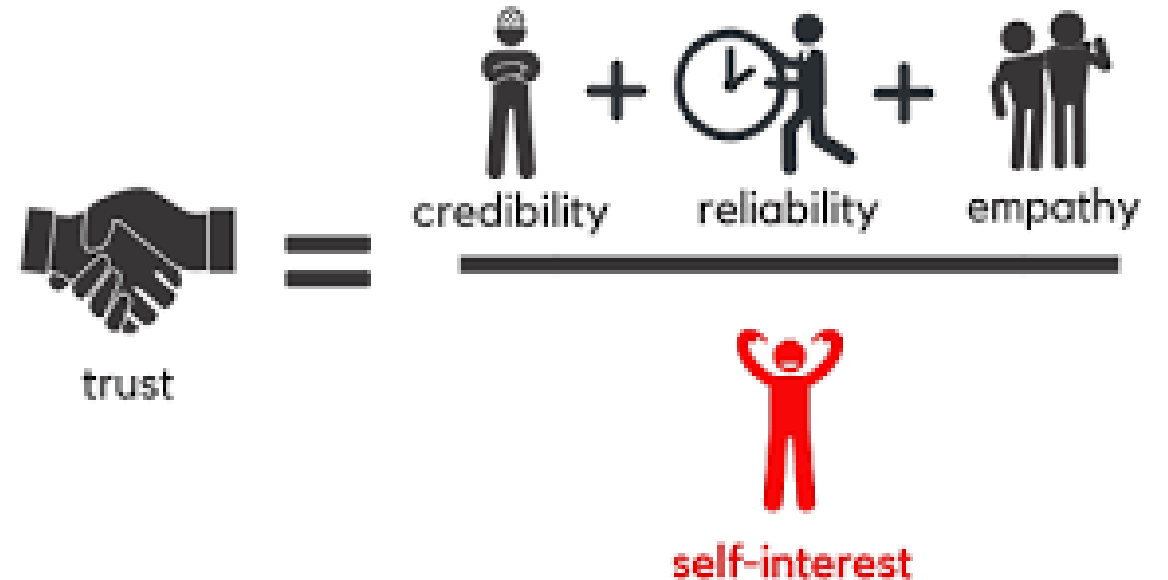Faculty of Business
and Economics

Area of application
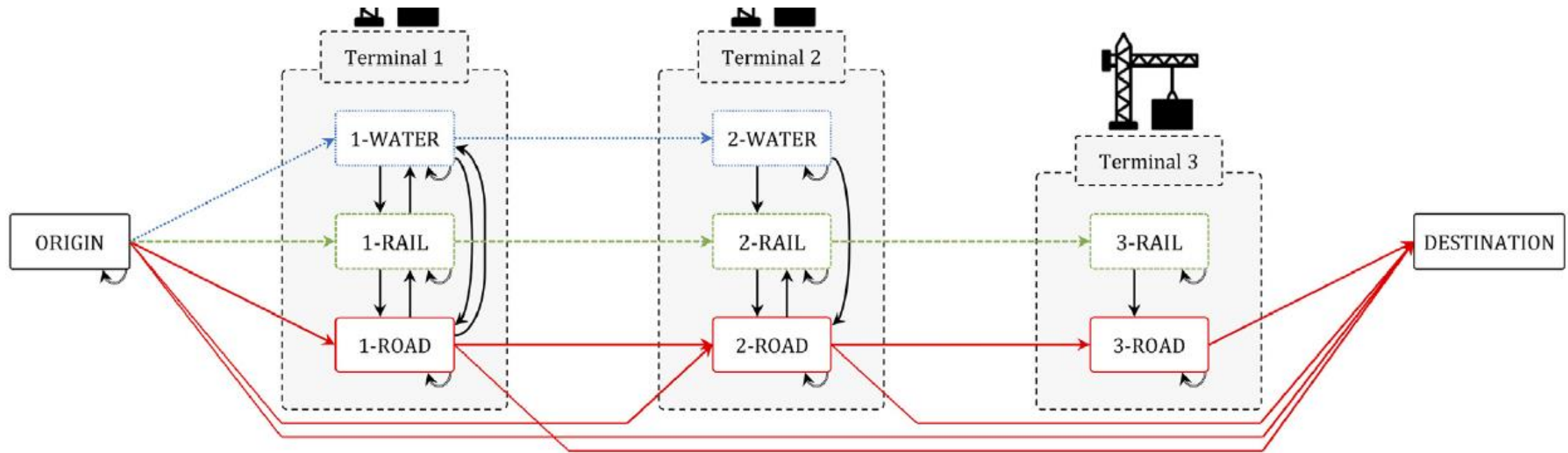
Pain points

- **Optimization – for who?**

- **For cargo owners?**
- **For logistics service providers?**
- **For terminal operators?**
- **For infrastructure administrators?**
- **For the society?**

Synchromodality

The uber of logistics

The need for orchestrator!

replace the opportunistic behavior with demand-driven services and prices

secure services by offering economies of scale

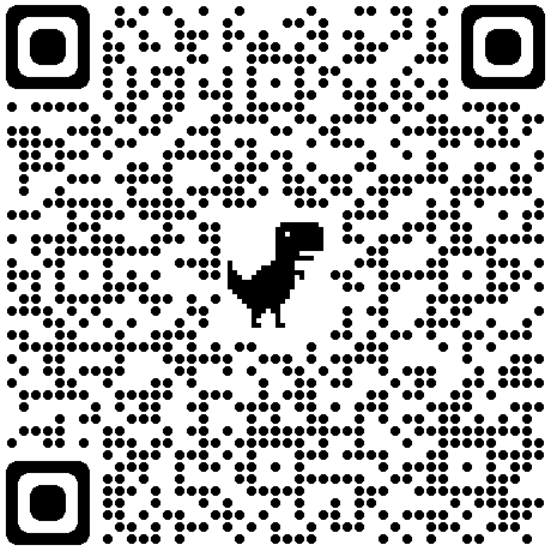# The introduction of synchromodality?

" – How did you go bankrupt?"
   – Two ways. Gradually, then suddenly."

Ernest Hemingway,
The Sun Also Rises

SyTaDel project

SYnchromodal proTotype for Data Sharing and Planning

https://researchportal.be/nl/project/sytadel

ArcelorMittal

Synchromodal Ambition

Technological innovation

Find **new business cases** in their transport & logistics operations.

ArcelorMittal Gent consists of a "one-stop-shop" concept comprising:

- Inbound quay for raw material that typically receives Panamax vessels (three positive tests entering Post Panamax vessels in Gent)

- Steelworks facilities that deliver final products – Flat products (coils of 26 ton)

- Outbound connection to maritime, inland waterways, rail system and road network (**Lineas, IWT operators, 25+ truck companies/ ~600 trucks per day**).
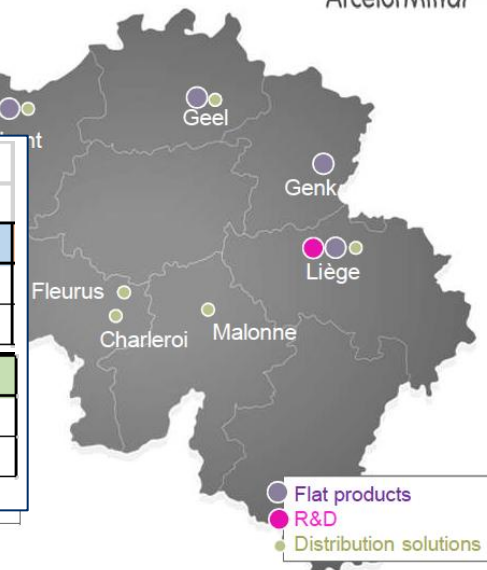
ArcelorMittal

ArcelorMittal Inland waterways customers

ArcelorMittal in Belgium

2020 (in mT)		
	MARITIME	BARGE
INBOUND	6,7	2,82
OUTBOUND	1,1	0,87
	TRUCK	RAIL
INBOUND	0,43	0,22
OUTBOUND	2,53	1,61

Flat products
R&D
Distribution solutions

Rail transport – internal shunting yard

imec · University of Antwerp · BUSINESS SCHOOL · EMPOWERING LOGISTICS

P&G
Willebroek supply chain optimization

TCT Terminal

Export flow

Customs

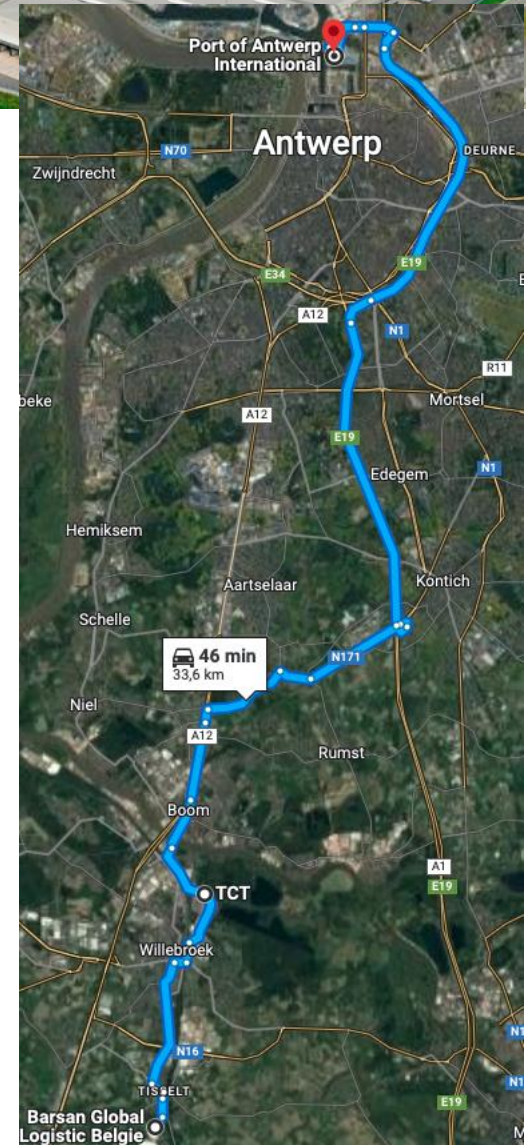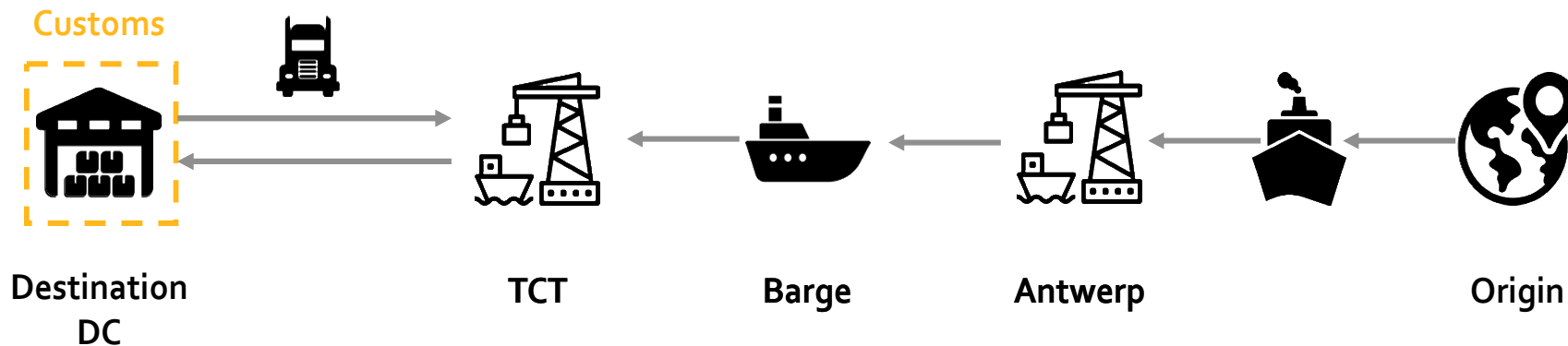| Origin DC | TCT | Barge | Antwerp | Destination |

Import flow

Customs

| Destination DC | TCT | Barge | Antwerp | Origin |

P&G
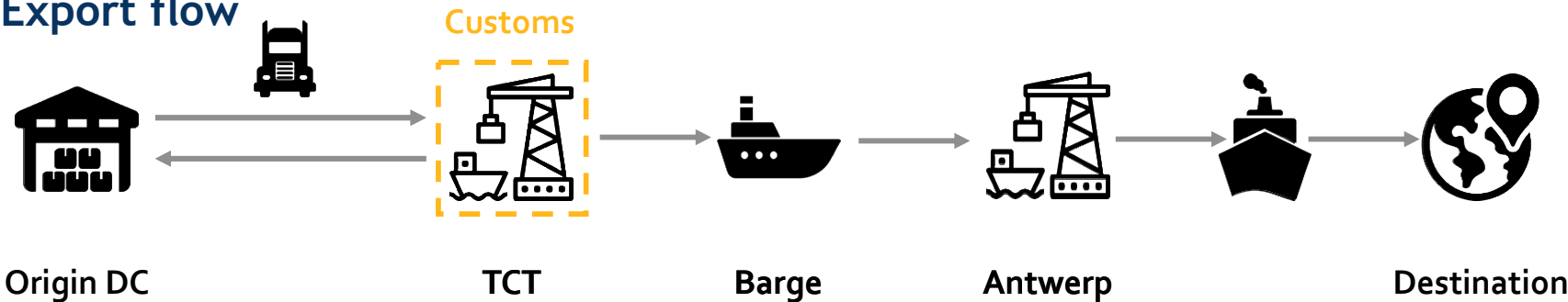
Synchromodal Ambition

- Utilization of data exchange between stakeholders to enable planning optimization

- FENIX project: include barge visibility in the flow systems and create digital connections

- Predict available vessels, optimize flow, make better use of assets and infrastructure and promote synchromodality

Optimization opportunities searched

- Combine existing silo-based data systems/apps/initiatives to create a synchromodal data space
- Real-time event detection – confirmation
- Allow dealing with administrative/customs operations
- Cope with deal-breaker inefficiencies (transhipment vs. cross-border waiting times)
- Aling working shift: 24/7 vs. 24/5 vs. 16/5

Workshop outcomes – June '22

Operational opportunities
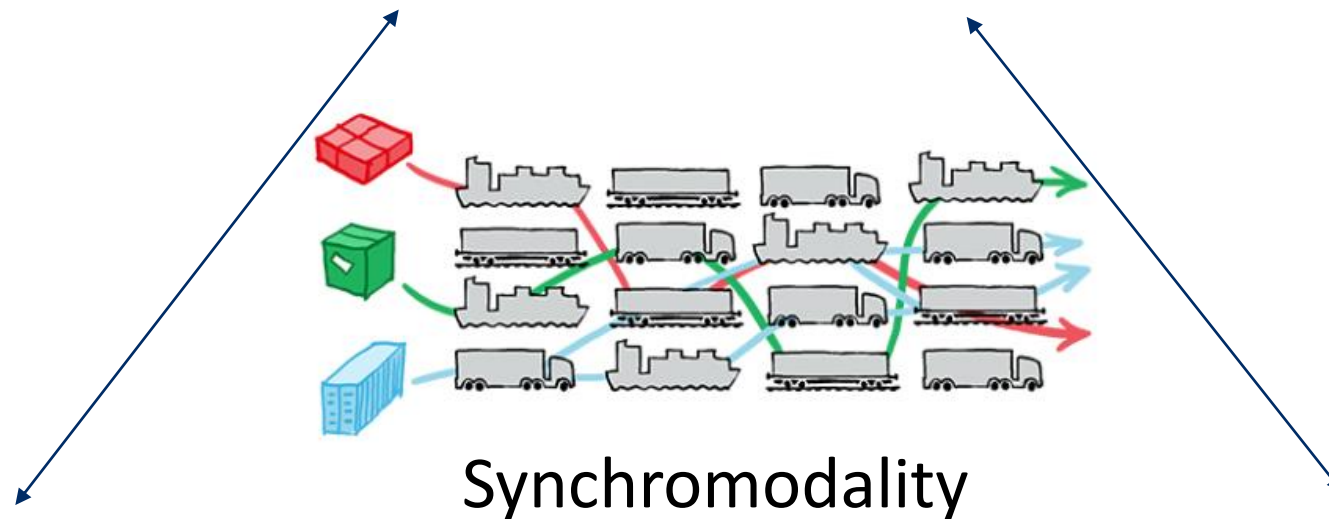
Synchromodality

Business model changes

Data space functional design

Workshop outcomes

Operational opportunities

- Get last minute booking possibilities at a spot price

- Synchromodal suggestions based on individual planning

- Realtime data: info on ETA and ETDs, and thus more efficient decision making based on updated real data. Visibility and capacity availability

- Retrieve the estimation of the duration of unexpected events at terminals and central schedules for arrival and departures of vessel and terminal schedules.

- Prove the real need for changing a mode

Workshop outcomes

Data space functional design

Types of data sources that need to connected to the synchromodal operations/platform	Sensor data from: cranes, machines, trailers, trucks/trains/vagons/barges and containers
	Data with regard to turn-around times/transfer time and delays
	Real-time planning data
Real-time planning suggestions made by enabling the following technologies:	IoT – for direct communications between machines
	AI – to learn from past activities by linking certain types of event to the different operational changes in the logistics type (bad weather's impact on transit type, traffic incidents' impact of delays etc)
	Digital twin – to be able to visualize movements of cargo and loading units in real-time and define simulations scenarios

Workshop outcomes

Business model changes

- Flatten out the opportunistic behavior, provide security of demand

- Making sure that the actors in the chain participating in the switch get paid

- Get insights in what is the real cost of certain handling activities (and not practice spot on inflated prices) make informed decisions

- Define the share of data between competitors

- Set up a mechanism in place to share data, but not give away its ownership

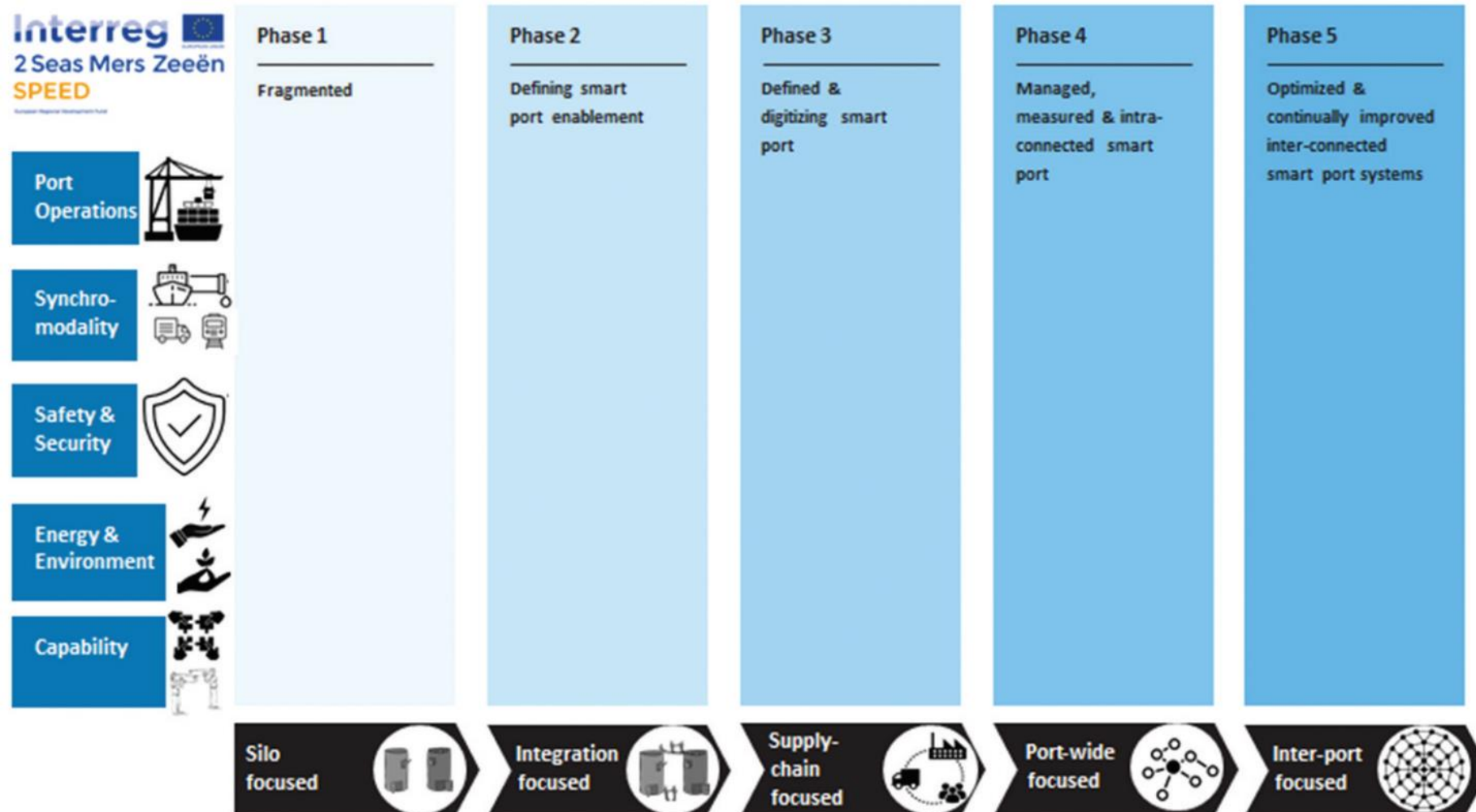# Smart Port Barometer

Port operations

Syncrhomodality

Safety and security

Energy and Environment

Capability

The smart port barometer

Credits to: Yassin BOULLAUAZAN

The Smart Port Barometer

The digital maturity benchmark for innovation-curious port stakeholders

1. Assess smart port maturity and ambitions

PHASE

1 Fragmented

2 Defining smart port enablement

3 Defining & digitizing smart port

4 Managed, measured & intra-connected smart port

5 Optimized & continually improved interconnected smart port systems

TOPIC

SAFETY & SECURITY

PORT OPERATIONS

SYNCHROMODALITY

ENERGY & ENVIRONMENT

CAPABILITY

FOCUS

SILO — INTEGRATION — SUPPLY-CHAIN — PORT-WIDE — INTER-PORT

2. Turn ambitions into a roadmap

Participate in the survey and:
→ Compare your maturity to relevant peers
→ Identify your strengths and development points
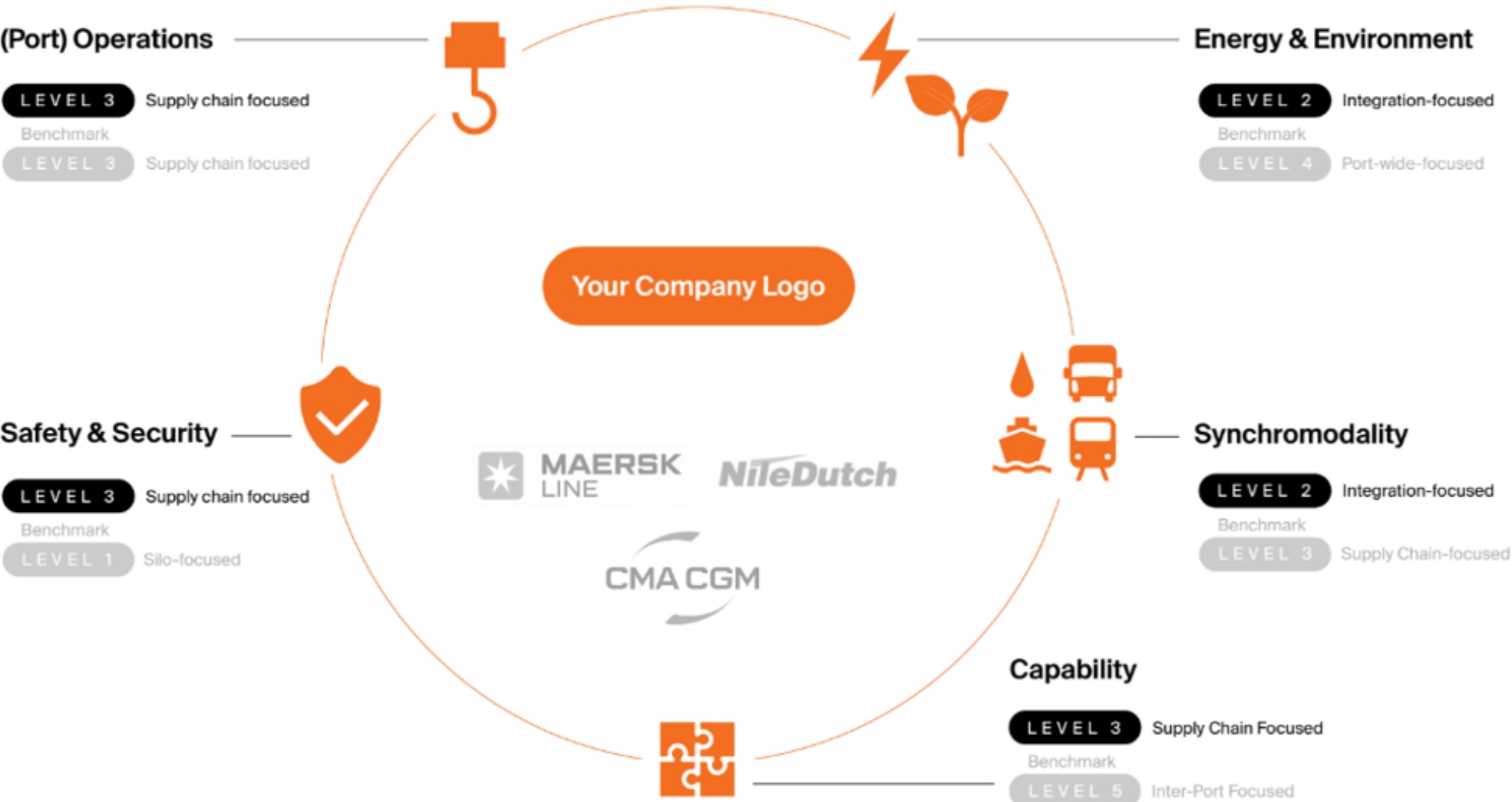→ Prioritize your next digitalization steps

Our promise:
→ Your organisation's benchmark report
→ A maturity assessment of your port community

Your commitment?
→ Fill in a 30' survey
→ Mobilize your network for better results

Your Maturity compared to your peers

The Benchmark score is based on actors similar to your organization.

Top digital strengths:

1 Strong port community system

2 Strong port community system

3 Strong port community system

4 Strong port community system

5 Strong port community system

(Port) Operations

LEVEL 3 Supply chain focused

Benchmark
LEVEL 3 Supply chain focused

Energy & Environment

LEVEL 2 Integration-focused

Benchmark
LEVEL 4 Port-wide-focused

Safety & Security

LEVEL 3 Supply chain focused

Benchmark
LEVEL 1 Silo-focused

Synchromodality

LEVEL 2 Integration-focused

Benchmark
LEVEL 3 Supply Chain-focused

Capability

LEVEL 3 Supply Chain Focused

Benchmark
LEVEL 5 Inter-Port Focused

Your Company Logo

MAERSK LINE

NileDutch

CMA CGM

How do you compare to your Port Community

|	Safety and Security	Port Operations	Synchromodality	Energy & Environment	Capability
IN WHICH PHASE IS YOUR COMPANY? ▼ Your port community ▲ Your current level	① ② ③ **④** ⑤ (community at 2, current at 4) Congrats, you are ahead of the community	① **②** ③ ④ ⑤ (community at 4, current at 2) Buckle up, you are trailing behind the community	**①** ② ③ ④ ⑤ (community at 4, current at 1) Take care, you are trailing far behind the community	① ② ③ ④ **⑤** (community at 2, current at 5) Wow, you are sailing far ahead the community	① ② **③** ④ ⑤ (community at 4, current at 3) Allright, you are on par with the community
WHAT DOES YOUR CURRENT LEVEL MEANS?	Your safety & security systems are integrated across the supply chain, allowing visibility and threat prevention from end- to- end in your port and hinterland.	Your port operations do not reach sufficiently adequate standards in terms of planning, organisation and efficiency, causing possible unforeseen events, hindrances and delays in the whole operation chain.	In your way of operating, there is still no efficient, reliable, flexible and sustainable service delivery through coordination and cooperation of stakeholders.	You have an optimal way to act on supply- chain waste minimization and re- use solutions (circular economy?).	You work at your best to organise and establish supply chain oriented structures, ... You are directed towards goals of global mindset, understanding of inter- connectedness, whole network vision,...
HOW DO YOU DIFFERENTIATE?	You differentiate from the community which in general cannot offer such a level to end customers.	You differentiate from the community which in general offers a higher level of accuracy and reliability to end customers.	You differentiate from the community which in general manage service provision with accurate precision thanks to a high level of synchromodality.	You differentiate from the community, which in general is unable to manage and offer this standards to end customers.	You do not differentiate from the community, which is currently running at the same speed as you and is able to offer to end customers what you as well.
THE BENEFITS OR ADDITIONS	Such a high level of integration in your safety & security systems is important because... (mention 1 or 2 benefits)	Improve the level of port operations execution by converging towards a smoother way of working with gains in safety, time and resources, pursuing the goal of fully automating operations.	Intensify the degree of synchromodality to achieve a more coordinated and integrated management of the offered services, which also gives a decisive impulse to the other maturity levels development.	Maintaining this level of maturity with regard to energy and the environment plays a central role in future your business, because...	Being able to maintain this level of maturity is important for...

Intro   3'

5 demographics questions

General maturity:

- 5 smart port dimensions
- Collaboration maturity
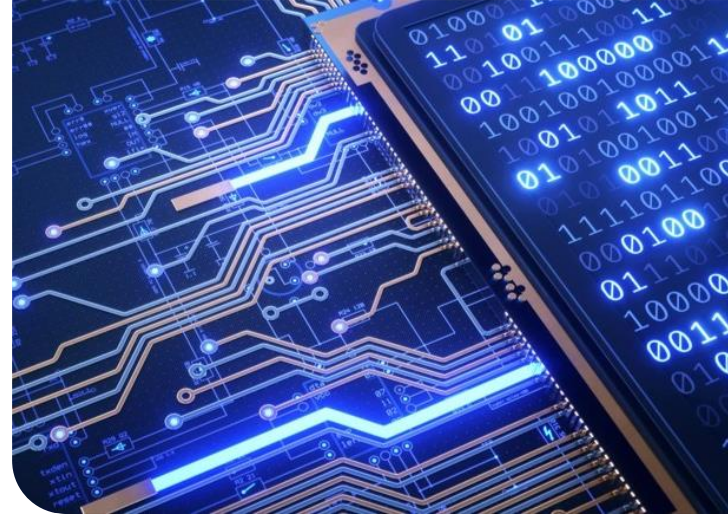
Tech maturity   4'

8 specific forwarder questions

5 generic tech maturity questions

Capability maturity   15'

55 questions

8 end of survey questions

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Thank you for your attention

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