

#### THE CURRENT STATE OF SYNCHROMODALITY:

AN APPLICATION OF A SYNCHROMODAL

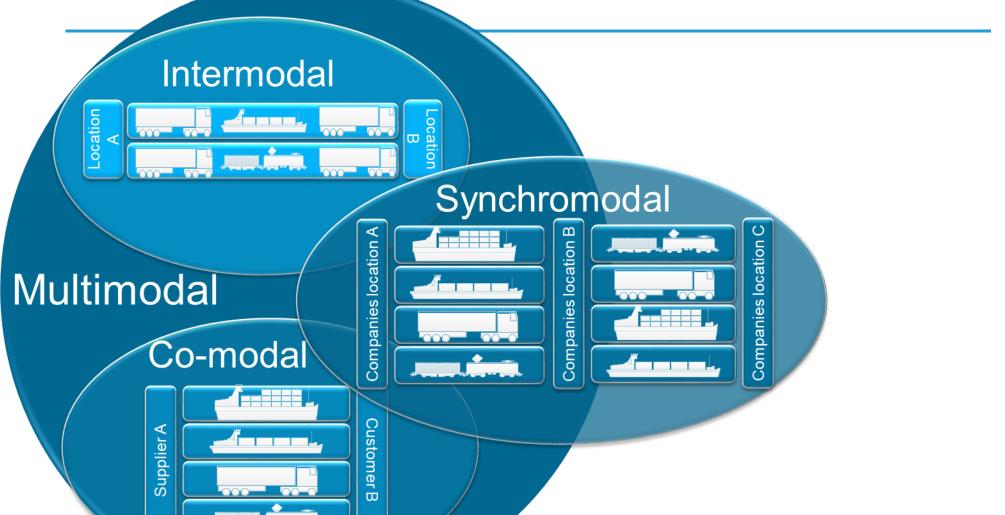
MATURITY MODEL ON CASE STUDIES IN THE NETHERLANDS AND BELGIUM

Kristel Alons<sup>1</sup>, Guy Somers<sup>1</sup>, and Ron van Duin<sup>2,3</sup>

1 Fontys University of Applied Sciences, 2 Rotterdam University of Applied Sciences, 3 Delft University of Technology

#### Synchromodal transport





Adjusted from: Somers and Tißen (2014), & Singh, van Sinderen, and Wieringa (2016)

#### Synchromodal maturity model



Extension synchromodal

Level 5

Structural intermodal Ad-hoc intermodal

Level 1

Truck => 80%

Spot market

transport

Level 3

Synchromodal

**Execution of transport** Transport planning Ad-hoc, no forecast Data exchange Per container Key performance indicators Price and time Shipper 81-100% of **Decision making power** orders Type of relationship Transactional

**Pricing** 

Train or barge => 40% 0-40% planned based on forecast Forecast per customer Price and time per modality More than 20% a-modal booking by other party Limited vertical Alignment on tariff (tender)

Level 2

Train or barge => 60% 41-100% planned based on forecast Forecast per customer Price, time, reliability Orders shared in supply chain Intensive vertical, limited horizontal Tariff per modality and

Train or barge => 80% Real time orders in supply chain Control tower to share data with more parties Price, time, reliability and utilization degree Real time orders in supply chain Intensive vertical and horizontal A-modal booking and a modal pricing

Real-time synchromodal

Level 4

Train or barge =100% Real time orders and stock levels Control tower + real time stock levels Price, time, reliability, utilization degree and service level Real time stock level in supply chain Intensive vertical and horizontal + real time stock levels A-modal booking, a modal pricing and real time stock levels

a-modal booking

#### **Application maturity model (1)**



- Fontys University of Applied Sciences (Netherlands)
- Rotterdam University of Applied Sciences (Netherlands)
- HAN University of Applied Sciences (Netherlands)
- PXL University of Applied Sciences (Belgium)



### **Application maturity model (2)**



- Online tool development
- Advise and benchmark companies
- More widespread application of intermodal and synchromodal transport











#### Supply chain transport analysis







Project: Synchro Maturity Model 3.0

Partners: Fontys Hogescholen

Hogeschool Rotterdam

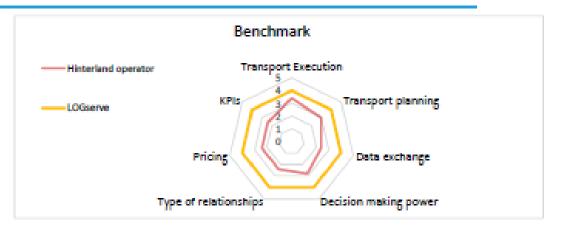
Hogeschool van Arnhem en Nijmegen

Hogeschool PXL

With financial support from: KennisDC Logistiek & Connekt















| Maturity model matrix      | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|----------------------------|---------|---------|---------|---------|---------|
| Transport execution        |         |         |         |         |         |
| Transport planning         |         |         |         |         |         |
| Data exchange              |         |         |         |         |         |
| Key Performance Indicators |         |         |         |         |         |
| Decision making power      |         |         |         |         |         |
| Type of relationship       |         |         |         |         |         |
| Pricing                    |         |         |         |         |         |





















Student workshop

Practice 2nd time with cases

Contact company

1st interview with questionnaire







Receive results



Discuss results with company



Write final report



#### Sample

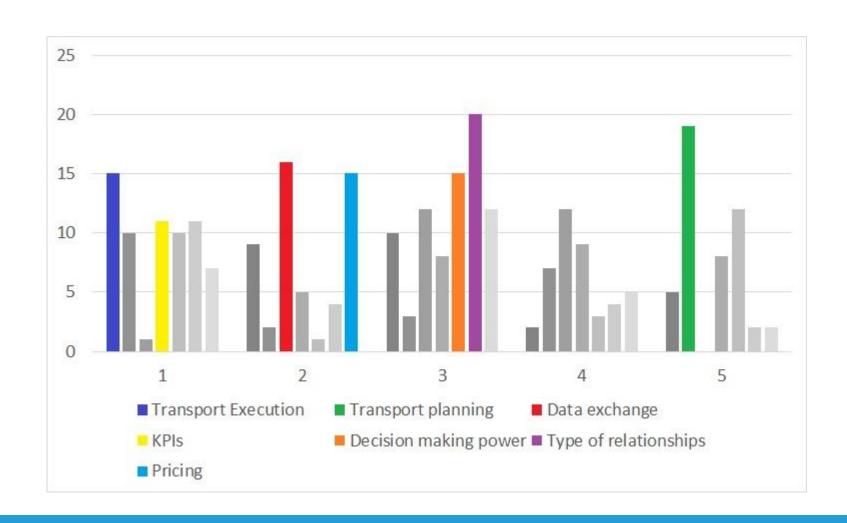
- 41 companies
  - 23 Logistics service providers
  - 15 Shipper/ Manufacturers
  - 1 Forwarder
  - 1 Hinterland operator
  - 1 Shipping line
- 32 based in the Netherlands, 7 in Belgium, 2 other

# Usage of modalities in Belgium and Netherland Sennis DC Logistiek

- Road is preferred modality
  - For 75% preferred modality in the Netherlands
  - For 57% preferred modality in Belgium
- Rail is used more in Belgium (29% first and 57% 2nd)
- Barge is used more in the Netherlands (16% first and 47% 2nd)



### Score count for maturity factors



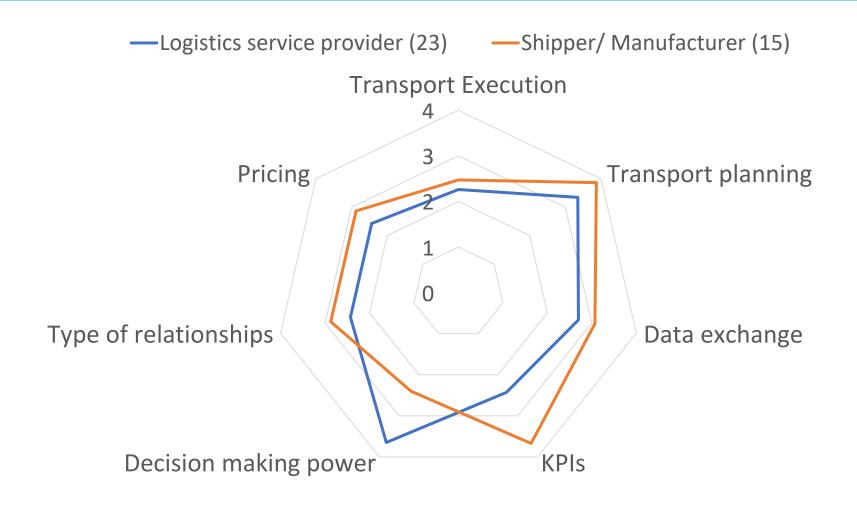


# Maturity score per component

| Component                    | Average score | Predicting score |
|------------------------------|---------------|------------------|
| <b>Transport Execution</b>   | 2.34          | 0.34             |
| Transport planning           | 3.56          | 0.29             |
| Data exchange                | 2.85          | 0.44             |
| KPIs                         | 2.95          | 0.34             |
| <b>Decision making power</b> | 3.15          | 0.39             |
| Type of relationships        | 2.56          | 0.54             |
| Pricing                      | 2.51          | 0.46             |



#### Average maturity scores per role



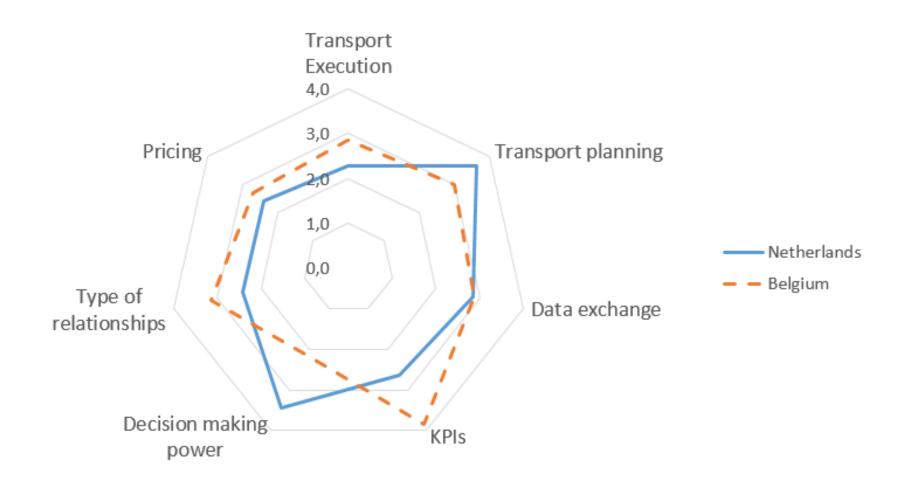


# Maturity scores per role

|                       | Logistics service provider (23) |                    | Shipper/<br>Manufacturer (15) |                    |  |
|-----------------------|---------------------------------|--------------------|-------------------------------|--------------------|--|
|                       | Average                         | Standard deviation | Average                       | Standard deviation |  |
| Transport Execution   | 2.26                            | (1.63)             | 2.47                          | (0.99)             |  |
| Transport planning    | 3.35                            | (1.87)             | 3.87                          | (1.25)             |  |
| Data exchange         | 2.70                            | (0.97)             | 3.07                          | (0.70)             |  |
| KPIs                  | 2.43                            | (1.38)             | 3.67                          | (1.50)             |  |
| Decision making power | 3.65                            | (1.30)             | 2.40                          | (1.50)             |  |
| Type of relationships | 2.43                            | (1.34)             | 2.87                          | (0.74)             |  |
| Pricing               | 2.43                            | (1.12)             | 2.87                          | (0.92)             |  |



### Maturity scores per country





#### **Relation between factors**

- Strong correlation between:
  - Transport planning and data exchange
  - Data exchange and decision making power
  - Relationship type and KPIs

#### From intermodal to synchromodal transport

n Logistiek

Ad-hoc interrintermodal

Level 1

Structured intermodal

Level 2

Synchromodal transport

Level 3

Flexibel synchromodal

Level 4

Extension synchromodal

Level 5

- + More intermodal and less truck
- + Limited vertical collaboration
- + Organizational development at same level

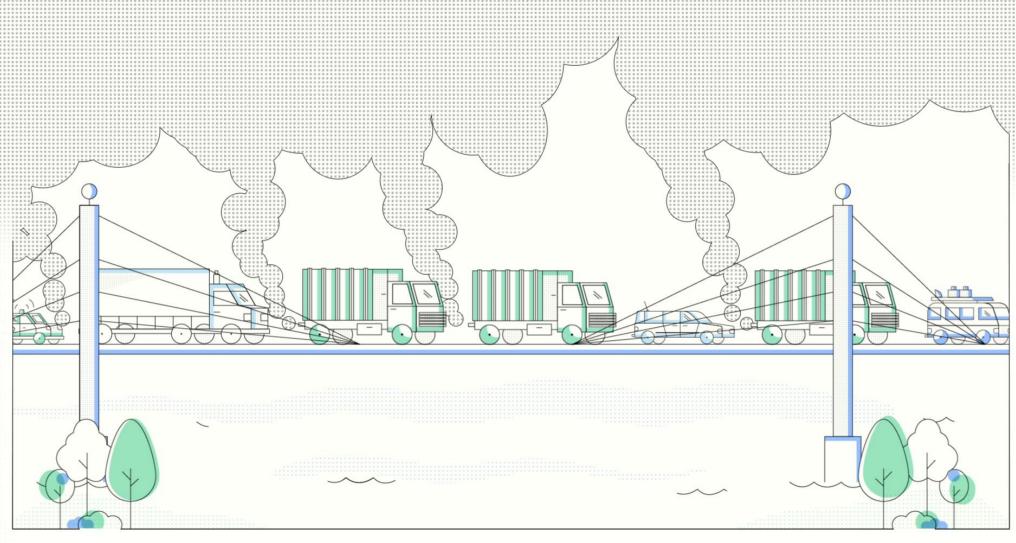
- + A-modal booking
- Forwarders decisionmaking power
- + More focus at on-time delivery
- + Simplifying data exchange

- Introduction of real-time planning
- + Introduction of control tower
- + Integral tariff
- + Horizontal collaboration

- + Increased stock level visibility
- + Intensive long term collaboration

#### **Future application within Europe**







#### Thank you for your attention!



www.synchromodaleurope.eu

k.alons@fontys.nl g.somers@fontys.nl j.h.r.van.duin@hr.nl