



Universiteit Antwerpen
| Faculteit Bedrijfswetenschappen
en Economie

Facilitating the modal shift: demand management strategies & arbitration mechanisms

- Case study in Belgium

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Outline



Problem setting



Main concepts



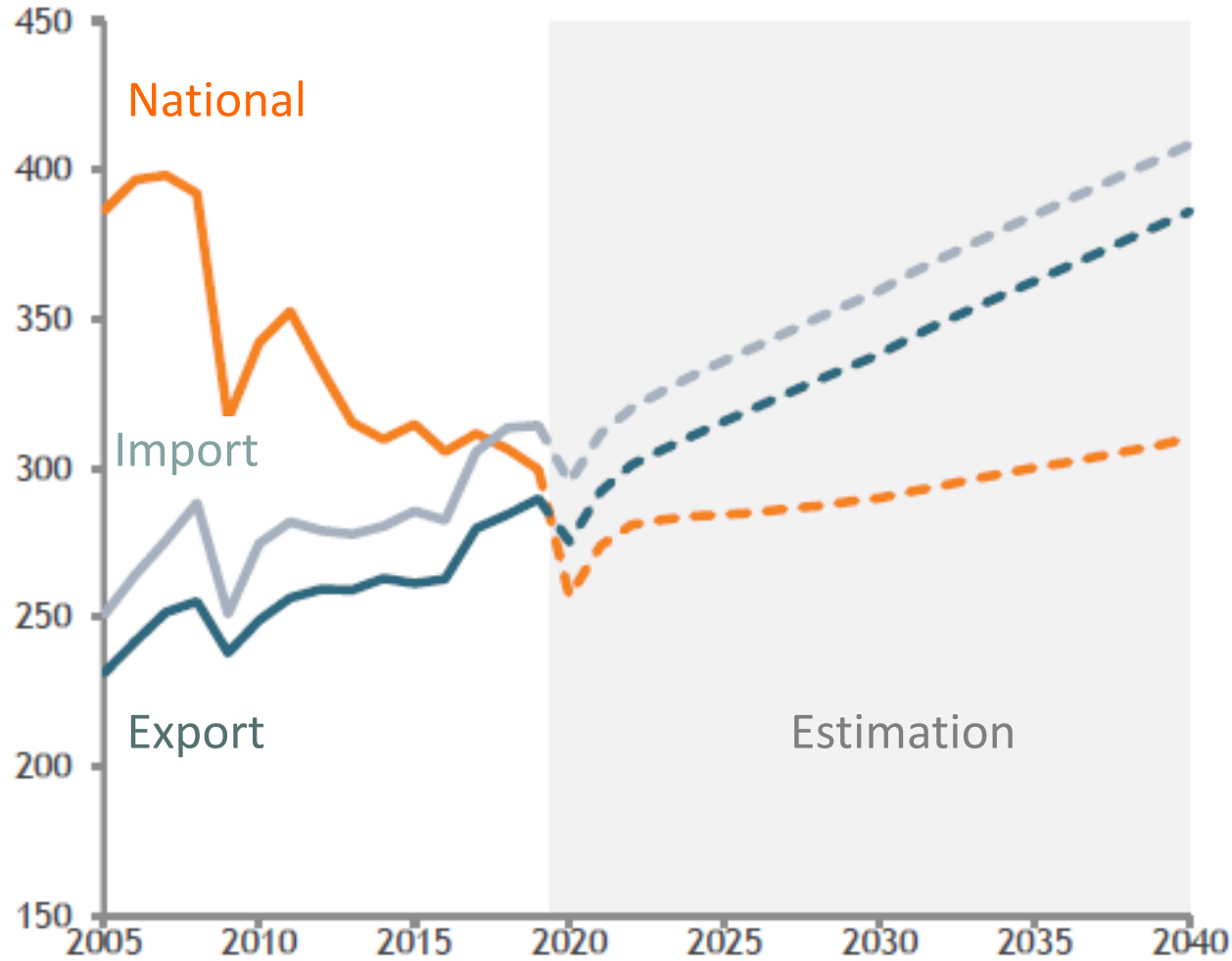
ABM framework



Next steps

1. Problem setting

Million tonnes transported

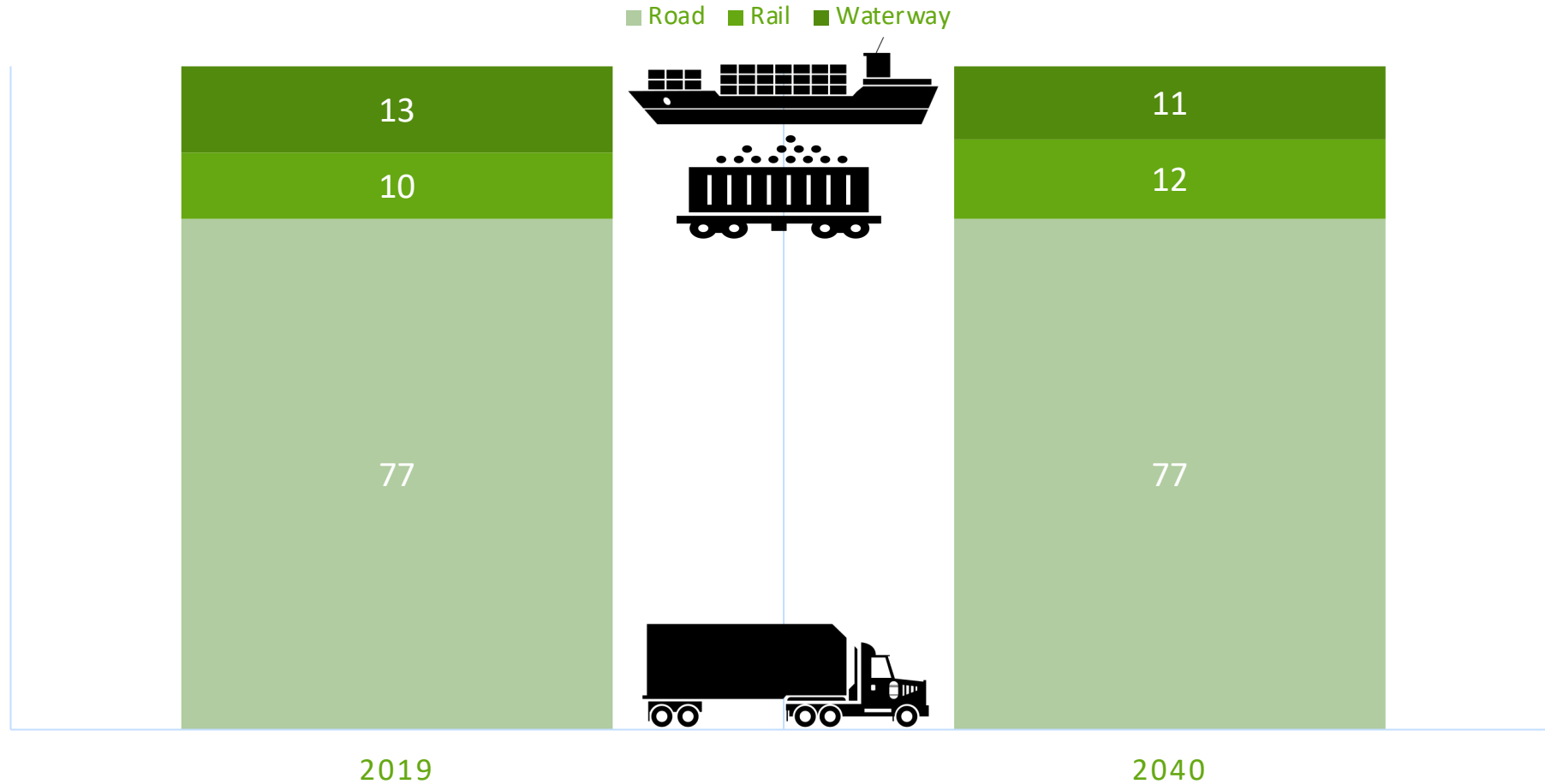


- **Import & export freight traffic:** expected increase of approx. 30% by 2040
 - Presence of large seaports: Antwerp – Bruges, North-Sea-Port & Ostend
 - Well connected international infrastructure
- **National freight traffic:** expected increase of 3% by 2040

Source: NR, MALTESE, PLANET v5.0.

1. Problem setting

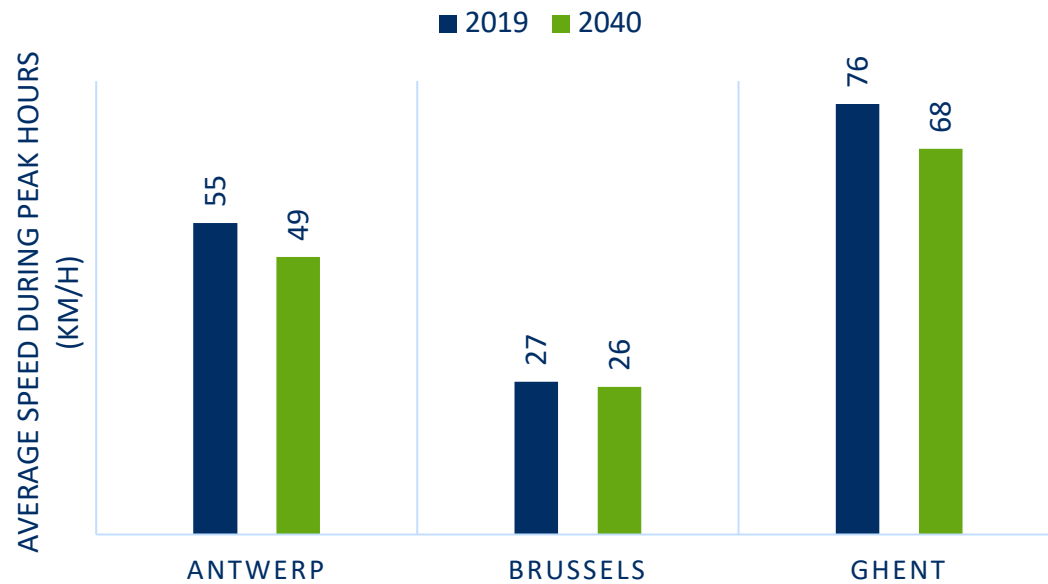
CURRENT AND FORECASTED MODAL SPLIT FREIGHT TRANSPORT BELGIUM (% BASED ON T-KM)



1. Problem setting

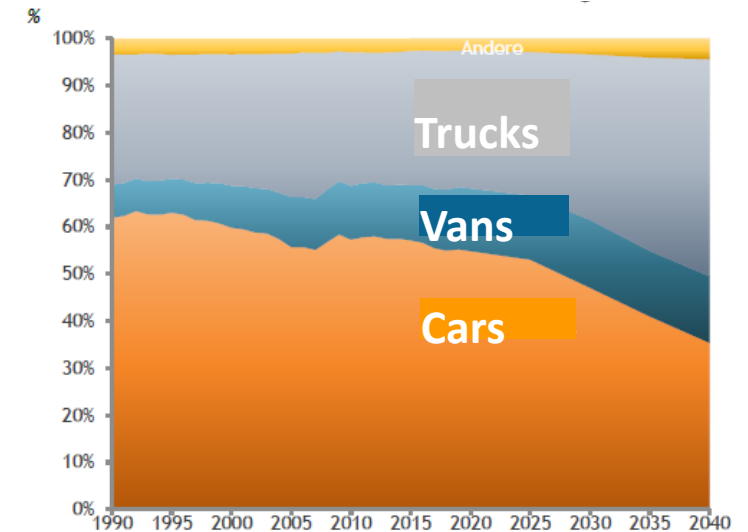
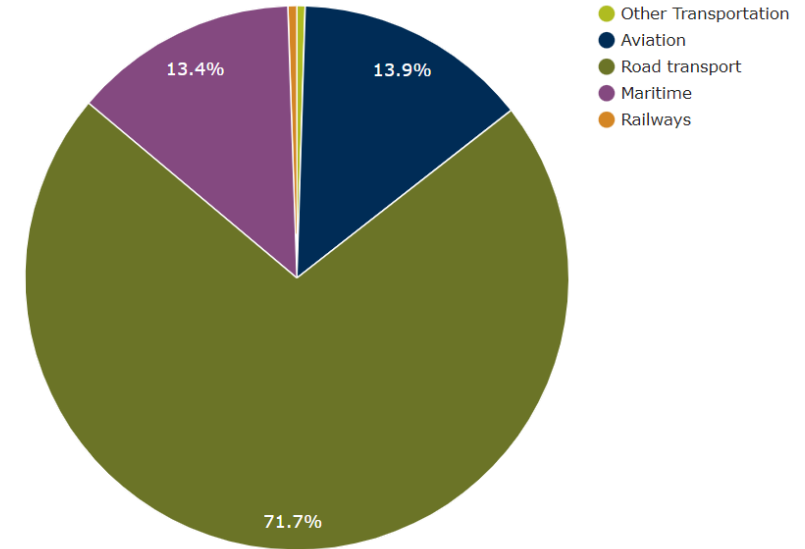
External effects

EVOLUTION SPEED ON MAIN ROADS DURING PEAK HOURS



Source: Own creation based on Federaal Planbureau (2022)

EU (CONVENTION) – SHARE OF TRANSPORT GREENHOUSE GAS EMISSIONS

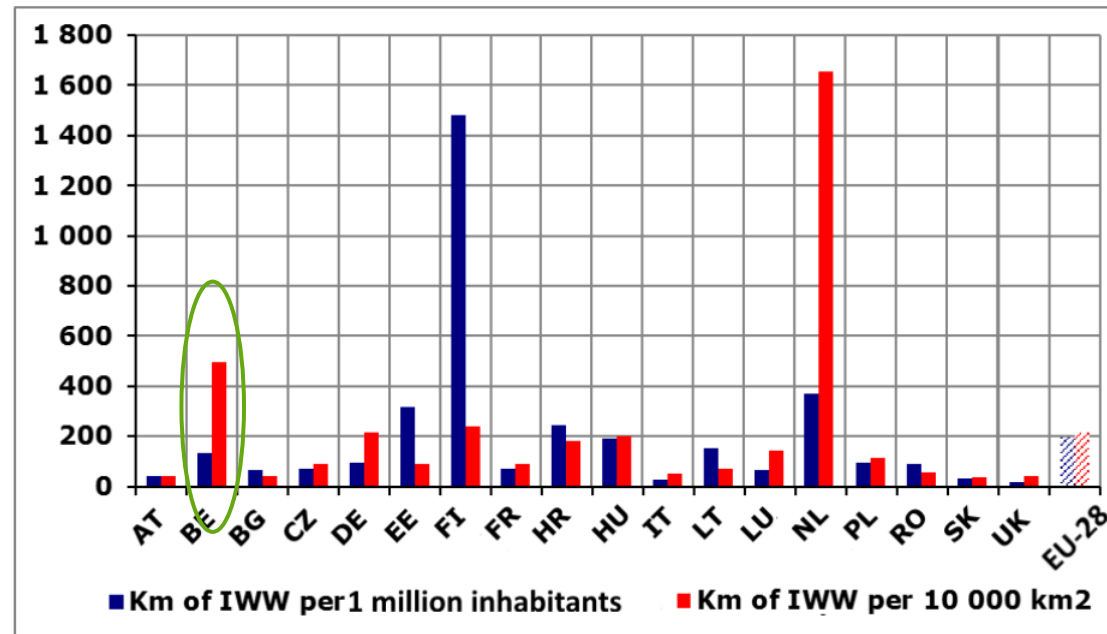


Source : Databank Transport en PLANET V5.0 (Federaal Planbureau)

1. Problem setting

- **Waterborne transport:**
 - Large & branched waterway network in Belgium

Figure 14: Inland waterway network density in the EU-28 by Member States



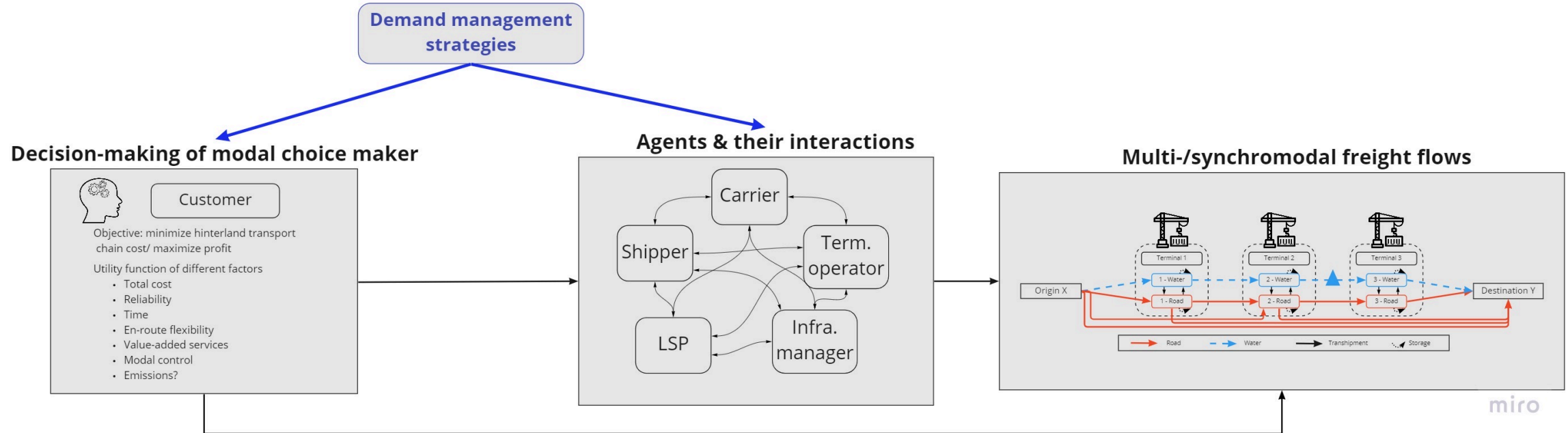
Source: Authors' own elaboration based on Eurostat data

- Safest and most reliable mode
- Transport emissions per ton-mile are lower compared to trucks

1. Problem setting

- **To stimulate modal shift: inter-, multi-, co-, synchronomodality**
 - Operational research: maturity phase
 - ↔ not yet often implemented in practice
 - Industry reluctance
 - CSF: Coordination, cooperation and control
- **Main observations of today's practices:**
 - Still heavy reliance on truck transport → externalities
 - Operationalization of multi- and synchronomodality: challenged by CSFs

2. Main concepts



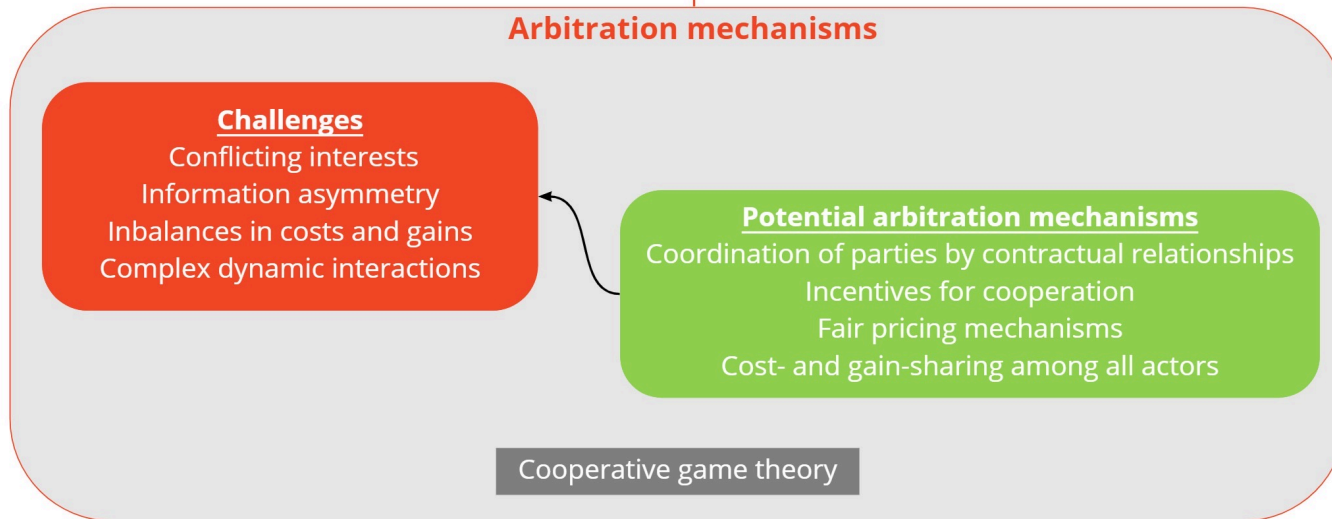
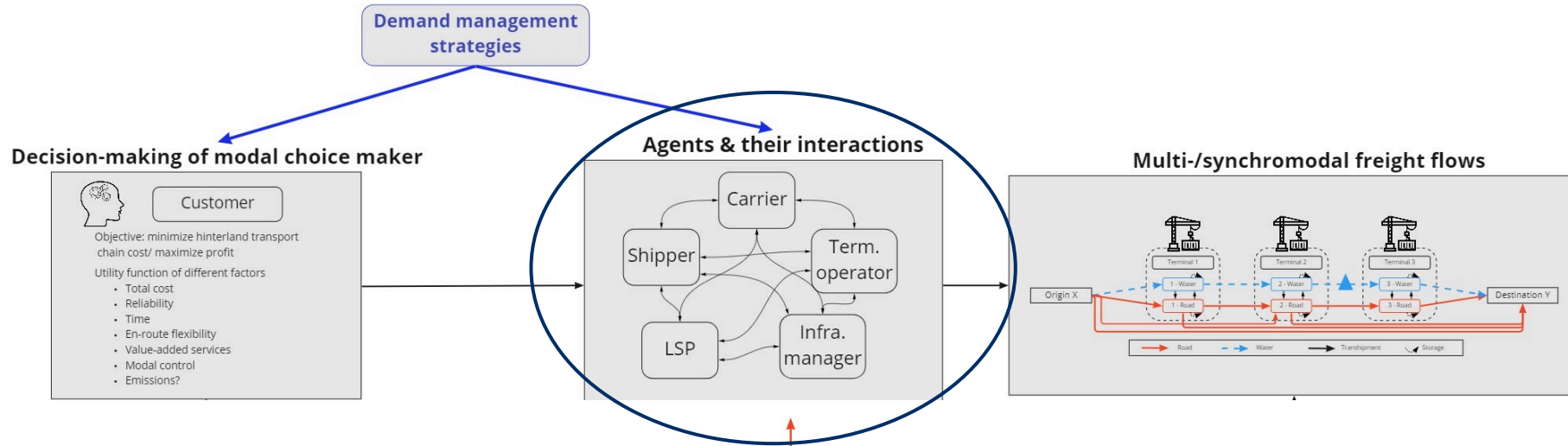
miro

1. Freight demand management strategies

- Which **freight demand management strategies** can be implemented to better utilize the available capacity on other modes and thus stimulate the modal shift?

Scope: Hinterland transport chain for import and export containers

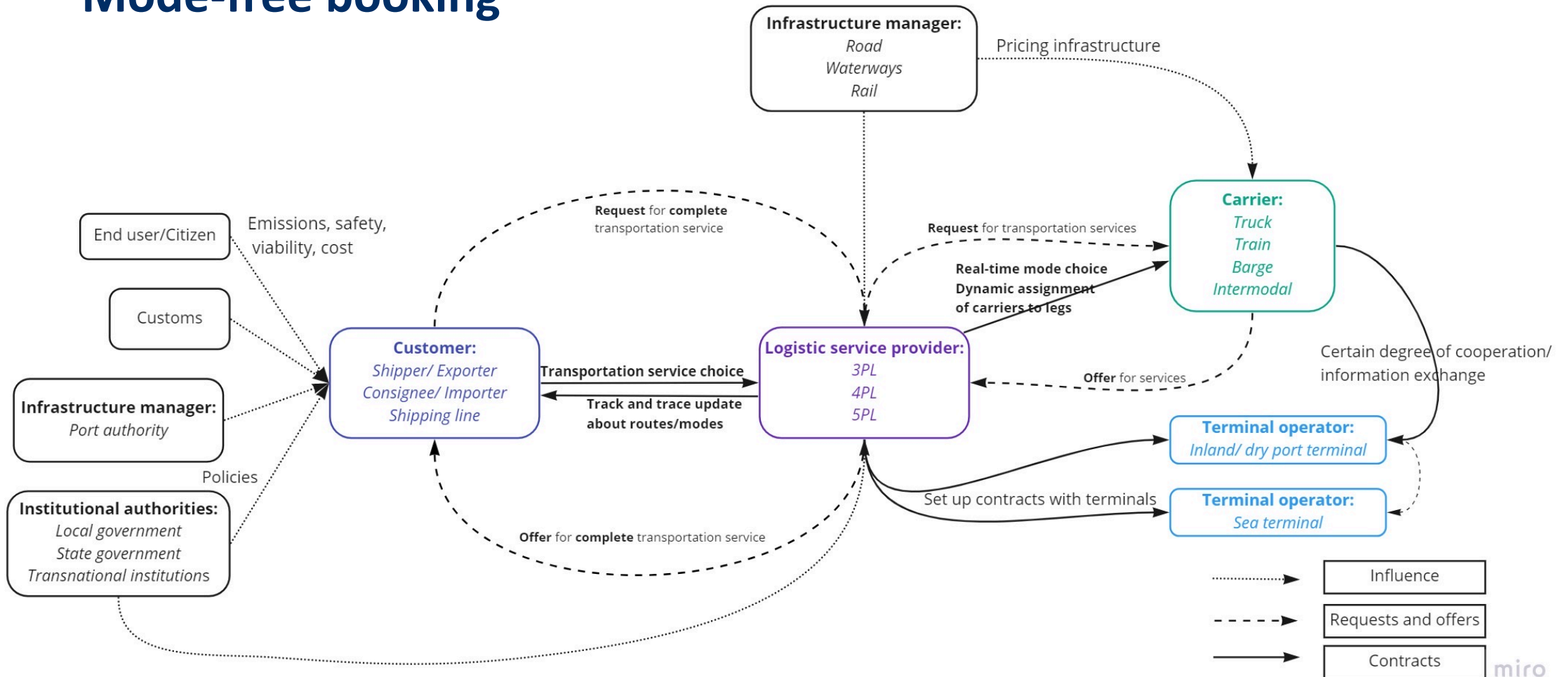
2. Main concepts



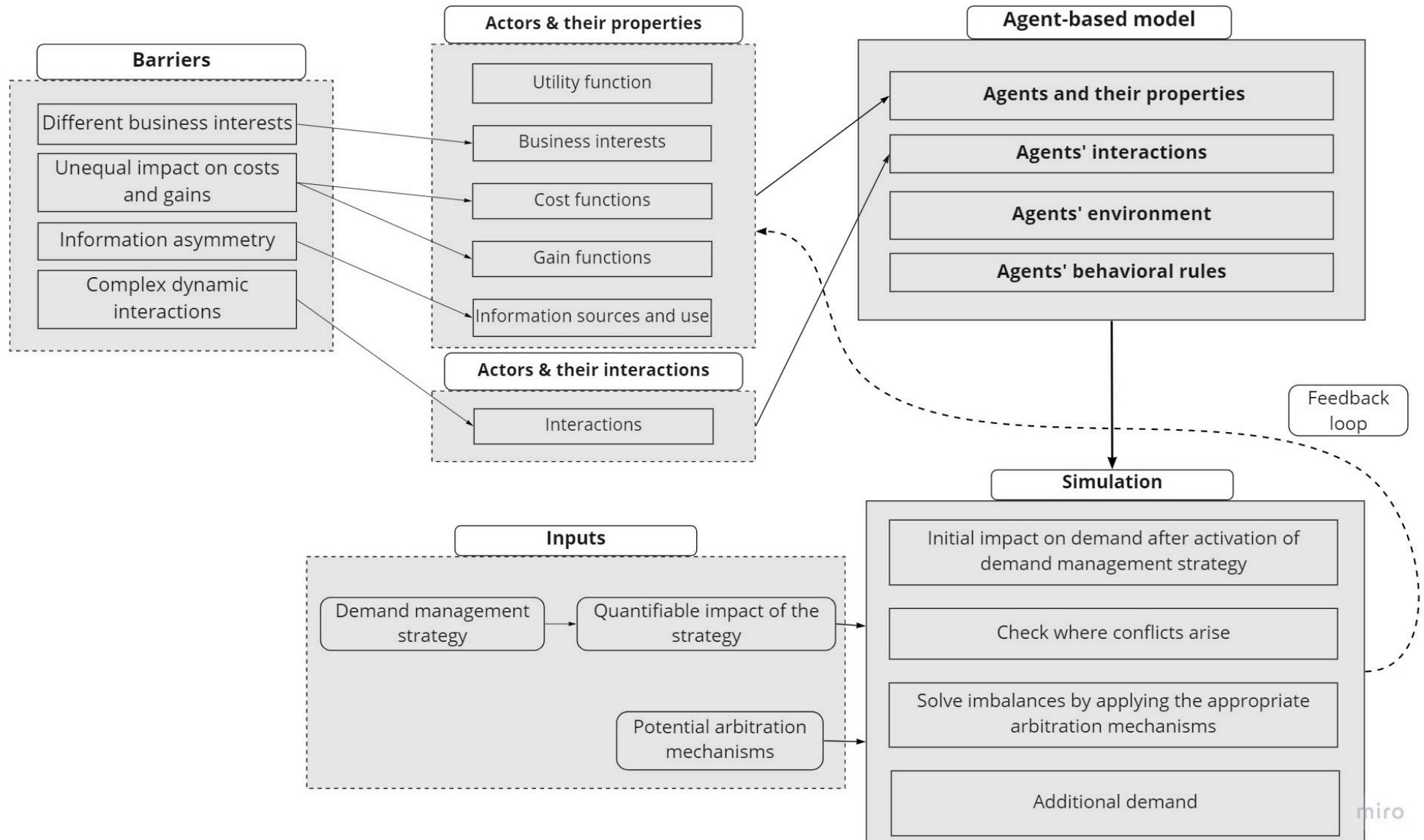
2. Arbitration mechanisms
- **Where** in the transport chain should these be implemented?
 - **Which and how** should arbitration mechanisms be implemented?

2. Main concepts

Mode-free booking



3. ABM framework



4. Next steps & corresponding methodologies

1. Literature review

- Freight demand management strategies
- Arbitration mechanisms

2. Interviews & workshops

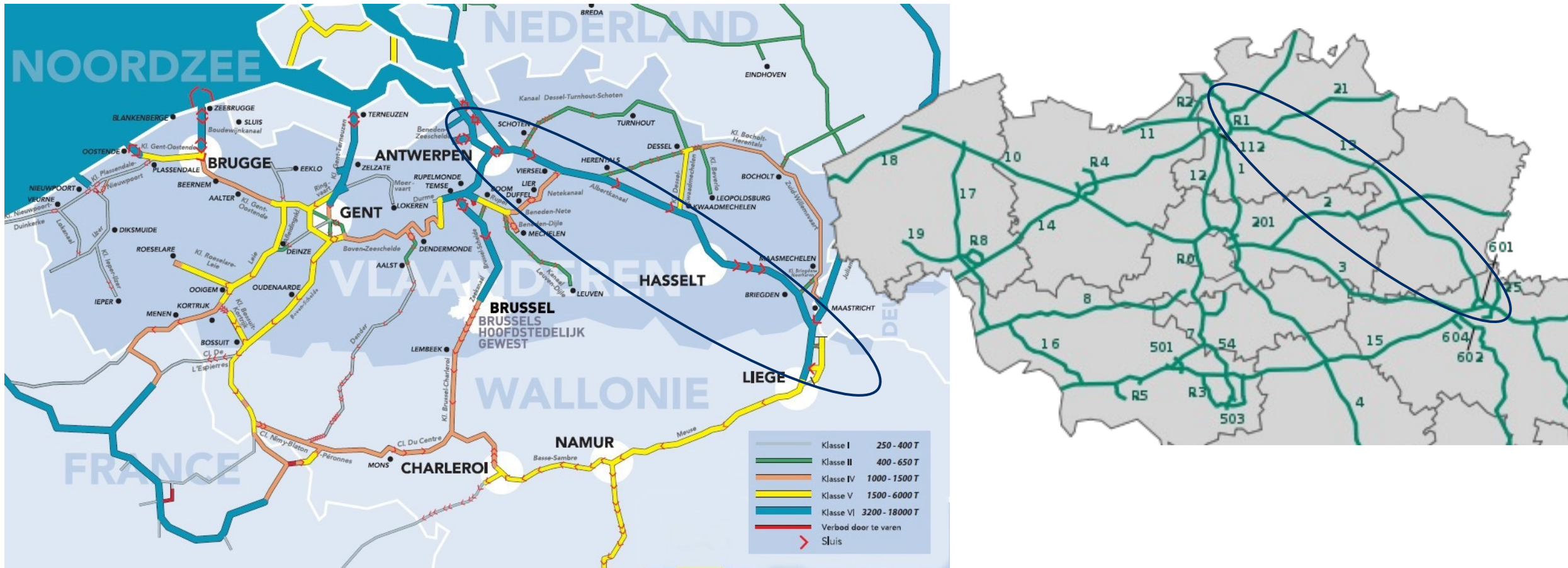
3. Data exploration

4. Next steps & corresponding methodologies

■ Data:

- *Strategic Freight Model Flanders*
- *On-board Unit (OBU): GPS points*
 - New point emitted every 15 sec
 - Infrastructure level: calculate densities
 - ↔ truck level: origin-destination information
- *O-D data for barges*
 - Flemish Waterways

4. Next steps & corresponding methodologies





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Thank you!