Synchromodal transport: How are the benefits of collaboration distributed?

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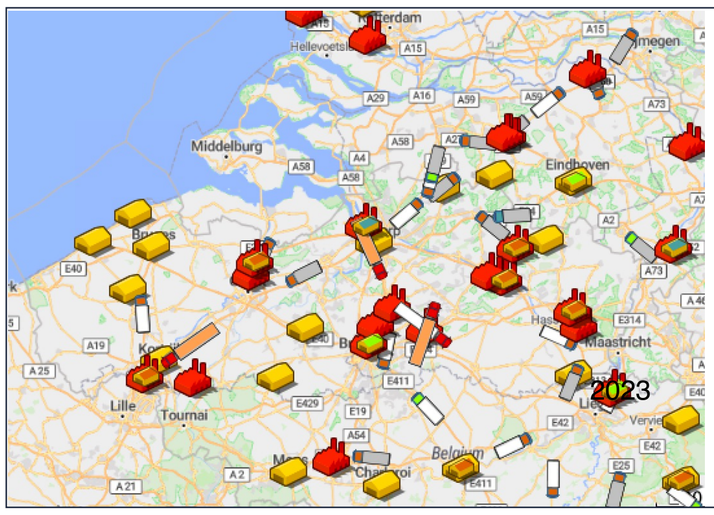
Synchromodal transport

Synchromodal transport aims for **more sustainable supply chains** through more flexible operations and horizontal collaboration. However, one of the key challenges to implement it is the lack of trust and fear of losing competitiveness from potential participants.

We propose a simulation model that represent a multimodal logistic network, to estimate the benefits generated by synchromodal transport and how these are distributed among logistic service providers.

Simulation model



An **agent-based simulation** model is proposed to represent a multimodal logistic network in which different logistic service providers (LSPs) interact to satisfy transport requests. When a request enters the system, LSPs make offers depending on their own resources (trucks and train slots) and the cheapest option is selected.

The model represents trucks, trains and containers in a **GIS environment**, so LSPs consider real-time information when making their offers.

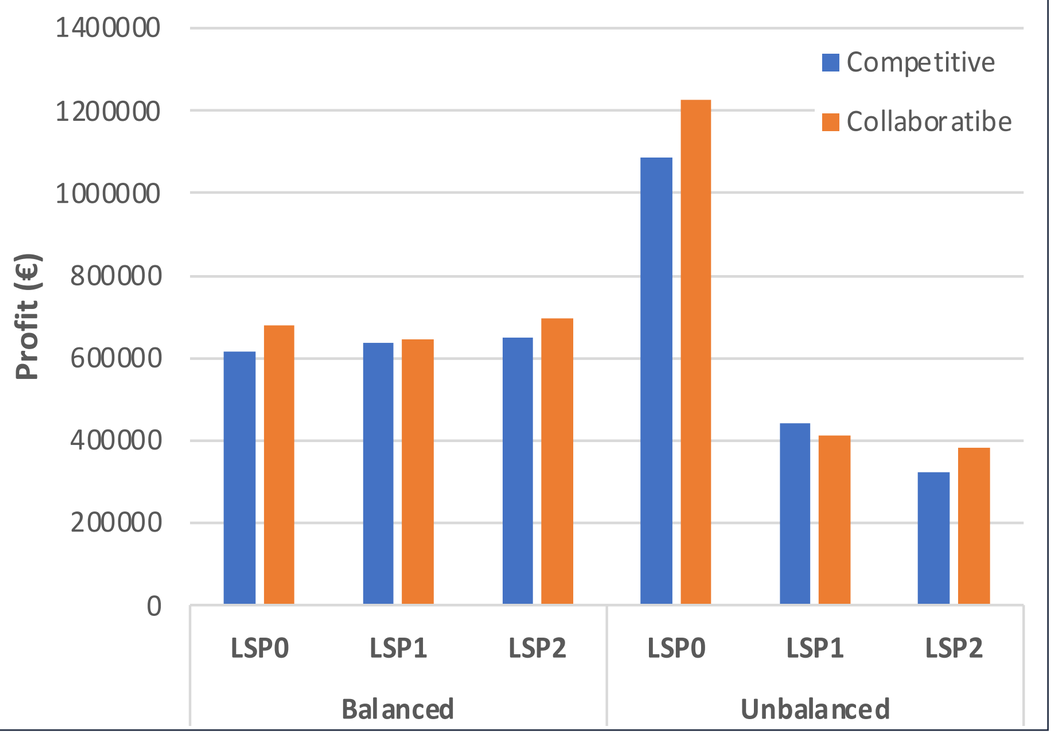
Experimental results

Two aspects are considered to define 4 scenarios:

- **Collaboration level:** Competitive (business-as-usual) or Collaborative (sharing resources).
- **LSP relative size:** Balanced or Unbalanced.

The results with 3 LSPs show:

- Collaboration generate **lower costs and emissions** for the whole system.
- In the **balanced** scenario gains are **equally distributed**, but that is not the case in the **unbalanced** scenario, where the larger player gains more and smaller players even experience losses.



Conclusions

The proposed model allows to estimate the impact of collaboration on individual players, and could be used as a tool to support the design and validation of gain distribution schemes. This is necessary to make collaboration attractive to all actors and generate efficient and fair logistic systems.

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