LOGISTICS IN FREIGHT MODELLING
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Introduction

- 4 year NWO (Dutch NSF) programme: Sustainable Accessibility for the Randstad

- Randstad  [ˈrɑntstɑt]
  - Amsterdam, The Hague, Utrecht, Rotterdam
  - 7 mln. inhabitants
  - Rotterdam port, Schiphol airport
  - Gateway towards EU industrial mainland

- Freight modelling focus:
  - Disentangling freight data
  - Distribution centers: why, how?
  - Moving freight to rail, waterways
  - Easing city logistics problems
Distribution centres & logistics sprawl

- Warehousing and cross-docking are intermediate functions, in between trade and delivery
- Why is insight relevant for transport policy?
  - Land use effects (sprawl)
  - Share of HGV trips (NL: 14%)
  - Impacts spatial flow patterns
  - Affects road vkm elasticity
- Can we predict the use of regions for DC’s?
  - Statistical vs. explanatory
  - Disaggregate & aggregate
Model of distribution center use (Igor Davydenko)

- Logit models, based on total logistic costs, i.e.
  \[ \text{TC} = W + H + T \]
- Data
  - NL: transport & trade stats
  - D: retail chains (firm level)
  - Jap: transport & trade survey
  - EU: transport & trade stats
- Calibration on O/D flows or on regional warehouse throughput
- Decent fit, model analyses underway
Intermodality.nl

- Dense multimodal Hinterland terminal network: optimization?
- Competition or co-operation?
- Statistical estimation, optimization and gaming, combined
- Positive effects of
  - Closing terminals
  - CO2 pricing schemes
Intermodal network optimization & CO2 prices (Mo Zhang)

- Waterways
- Rail
- Road

-- 20% CO₂ @ 150 €/t
City logistics – a multi-stakeholder problem

- City logistics practice knows few real successes, multi-agent problem
- Shippers and carriers can also be a: shopkeeper, forwarder, service provider, manufacturer, retailer
- Government influences public transport, infrastructure, traffic management, pricing, subsidization, access, S+W regulation, etc
- Objectives, business models, perceptions, processes, have to match → models need to be multi-colored
- Validity of normative & descriptive models critical (Donnelly & Wigan)
Development approach for situated MAS (Nilesh Anand)

Key innovations:

- Perceptions and perspectives
- All parties affected
- Multi-actor models & metrics
- Connected business models
- Process validation
- Real data driven
- Focus on learning objective
- Impact of individual on group
Ongoing work

- Multimodal networks: much depends on tactical and operational details → move towards dynamic service models

- Perception of user & process validation: strengthen efforts into calibration of simulation models, add gaming facilities

- Better formalization and extensive testing of ontology based multi-stakeholder ABM development (the negotiating agent)

- Distribution centres: bridge micro-macro gap with disaggregate behavioural research, distinguish cross-docking from storage

- Link to big data: towards new model architectures
The ETC 2013 freight modelling papers* (1)

- Integrated modelling of the trade and transport network: with application to the development of European Transport Policy Information System (ETIS); 
  O Ivanova, J Hu, TNO, NL

- Development of an improved decision support tool for freight transport planning in Norway; I B Hovi, Institute of Transport Economics; S E Grønland, BI Norwegian Business School; A Madslien, Inst. of Transport Economics, NO

- A bottom up approach to estimate production-consumption matrices from a synthetic firm population generated by iterative proportional updating; O Abed, T Bellemans, Transportation Research Institute (IMOB), Hasselt University; G Janssens, Group Logistics, Hasselt University, BE

- Measuring freight transport elasticities with a multimodal network model; M Beuthe, B Jourquin, N Urbain, UC Louvain-Mons, BE

*in the track “freight modelling”
The ETC 2013 freight modelling papers (2)

- Predicting intermodal transport changes through a flow game framework; *A Roumboutsos, University of the Aegean, GR*
- Improving urban transport thanks to semantic interoperability; *J Gato Luis, G Herrero Carcel, ATOS, ES; W Hoffman, TNO, NL*
- The bootstrapping approach for inferring confident freight transport matrices; *F G Benitez, L M Romero, N Caceres, University of Sevilla, ES*
- Freight vehicle (truck) model as part of the federal traffic model for Bavaria; *S Schrempp, TCI Röhling - Transport Consulting International, DE*