Did commercial transport models already reach adulthood?

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What is a model?

Properties of Models (Stachowiak 1973)

Mapping, Reduction, Pragmatics

A model is the mapping of some object, in our case the commercial traffic. It identifies and focuses on relevant properties (reduction) by leaving out some real-life properties, by using properties that have no equivalent in real-life, or by emphasizing specific properties (contrast). Every model serves a purpose (pragmatics).

Challenges of maturation

• complexity of goods-flows between actors (interlinkage/networks)
• diversity of commodities handled per organisation
• dynamics of behavior and decisions
• increasing complexity of advanced modeling levels (scope vs. detail)
• identification of relevant external factors
• interface between supply chain management and transportation modeling
• availability of business data

“Reality check” (selected examples)

1. VISEVA-W
   (TU Dresden, Theorie der Verkehrspplanung)
   • model for small scale areas (urban freight)
   • based on tour-pattern
   • Allows any combination of actors and vehicles
   • covers trip generation and trip distribution

2. InterLOG
   (KIT, Dissertation Gernot Liedtke)
   • model for large scale areas (Germany)
   • rule-based freight transport simulation system
   • covers trip generation and trip distribution

3. GootSila
   (DLR-Institut für Verkehrsforschung)
   • model for large scale areas (Europe)
   • commodity-flow based approached
   • covers trip generation, trip distribution, modal split

Status quo

• Currently no existing model provides comprehensive coverage of the complex dynamics and interconnections of the entire goods transportation system.
• Data for calibration and validation is scarce and the identification of relevant parameters is still under discussion.
• The reduction of properties is still discussed within the research community.
• Commercial transport models still need further maturing before reaching adulthood.

Towards a “grown-up” model – Opportunities & Risks

• The European Union follows a path towards standardization of statistical data which will improve comparability and support data fusion RISK: loss of detail.
• Gaps in available data have to be filled by empirical research which is expensive and time intensive; RISK: “short cuts” are taken by relying on small samples or by neglecting high complexity and diversity of structures, where huge differences can occur even within countries or industries.
• Commercially available data can fill many gaps RISK: it is not always easily available, not standardised, often specific to business sectors or areas.
• Research on specific industries contributes to improvement of models. RISK: dynamics of economic developments with rapidly changing structures neglected.

Current empirical research topics at DLR to fill knowledge gaps

• Research on Logistics Hubs (DFG funded project in cooperation with TU Dortmund on structures of logistics hubs in Germany and their impact on transport demand)
• Research on retail (extensive surveys with retail experts and actors with comparison of structures in France and Germany) in cooperation with IFSTTAR