Modelling logistics for freight transport policy analysis

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Editorial

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This issue brings together a set of selected papers that were presented at the 2019 WCTR in Mumbai as a result of a call for presentations on freight policy relevant quantitative modelling work. It starts from the simple premise that both descriptive freight transport models and logistics optimization models are needed to provide the necessary support to transport policy analysis and decision making. Continuous innovation in these models is needed to address new topics such as changes in logistics systems underlying freight movements, or new and compelling sustainability targets for freight transport (see Meersman and Van De Voorde, 2019 and Tavasszy, 2020). Whereas descriptive models have mostly worked at the macro scale, at continental, national or regional level, the optimization models traditionally considered micro, or firm level decisions. The cross-fertilization between these perspectives has fuelled several decades of research (McKinnon, 2021). Freight transport modelling researchers have increasingly recognized logistics mechanisms, be it in trade, mode choice, distribution structures, routing, or other areas of decision making (Tavasszy et al., 2012; De Jong et al., 2021). At the same time, logistics optimization models have evolved to address areas of societal concern such as overall network utilization or sustainability (see e.g. Kim et al., 2021). This special issue of Transport Policy provides a snapshot of recently completed work across this spectrum, from macro to micro scale. The common thread in innovativeness of these papers is that each individual paper, while still recognizably from a macro or micro origin, also addresses issues at the other end of the scale. We argue that this combined viewpoint is still rare and needs more attention in the literature.

The first two papers take a macro level perspective, looking at Europe and South Africa. Both base their analysis on aggregate transport flows but consider the impact of the underlying logistics systems. **Jourquin and Beuthe** use available origin-destination transport matrices and a detailed intermodal network specification in the NODUS model to calculate cost and time elasticities for various modes of transport at the European level. **Havenga et al.** use the term "macro-logistics" explicitly to denote how generalized logistics costs measurements contribute to the estimation of national transport flows for South Africa. Doing this they want to close the "logistics' analytical gap" in national level freight policy analysis.

The next two papers also address questions on a macro level, but consider flows at a firm level within their analysis, using micro simulation or company activity surveys. **De Bok et al.** assess the impact of urban zero-emission zones with a detailed freight microsimulation model. Based on a very rich empirical basis they are able to carve out the heterogeneity of logistics behaviour of individual firms in their model. **Pani et al.** take on the challenge of creating a statistically representative picture of freight generation, where surveys have to be designed with strong sectoral heterogeneity in mind, not just of the logistics activities of the firms involved, but also of their survey response behaviour.

The last two papers take a firm level perspective, but include macro-system considerations and describe positive impacts for the macro-system. **Carrese et al.** formulate a routing optimization model for a firm distributing fuels, and emphasise the social constraints that these routes have to comply with, concerning safety risks and infrastructure conditions. **Ghorpade and Rangaraj** focus on a detailed rail network routing problem, which is of significance for the national rail transport system. By pre-scheduling full routing cycles of series of wagons (rakes) for normal use and maintenance, the planning of services over the entire network can improve. As this leads to higher efficiency and service levels, all rail freight customers as well as passenger rail services can potentially benefit.

Together these papers support the direction of evolution in thinking and knowledge, that bridges the perspectives of logistics management and freight transport policy, as marked by McKinnon (2021). We invite readers to contribute with their future work in this direction.

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