



HAL
open science

Editorial: Data-driven innovations in policy-oriented freight transport models and planning methods

Jesus Gonzalez Feliu, Anne Goodchild, David Guerrero

► To cite this version:

Jesus Gonzalez Feliu, Anne Goodchild, David Guerrero. Editorial: Data-driven innovations in policy-oriented freight transport models and planning methods. *European Journal of Transport and Infrastructure Research*, 2016, 16 (1), pp 1-3. hal-01263695v1

HAL Id: hal-01263695

<https://hal.science/hal-01263695v1>

Submitted on 28 Jan 2016 (v1), last revised 29 Jan 2021 (v2)

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Editorial: Data-driven innovations in policy-oriented freight transport models and planning methods

Jesus Gonzalez-Feliu¹

EVS PIESO, UMR 5600 CNRS, Institut Henri Fayol, Ecole des Mines de Saint-Etienne, France.

Anne Goodchild²

Department of Civil and Environmental Engineering, University of Washington, United States.

David Guerrero³

AME - SPLOTT, IFSTTAR.

Freight transport is a challenging economic sector, as it is essential for the functioning of production and distribution systems but at the same time is at the origin of many nuisances such as congestion, greenhouse gas emissions, pollution and noise. When responding to these issues, planners dispose nowadays of a growing body of freight data that can be used for the implementation of policies towards achieving smart mobility. Because contrary to current practice and dominant discourse, smart mobility is not just a matter of passengers: it also largely relies on more sustainable freight plays an transport. Policy makers see in those new sources of data an opportunity to increase their knowledge on freight transport as well as to have suitable decision support tools to the choices they need to make. In developed countries this trend is illustrated by the increasing requirement of data by recent legislation on freight transport.

But these data are not always easily available, and when they are, they are not necessarily adapted to the needs of practitioners. This mismatch partly results in a lack of dialogue between researchers and practitioners, that this special issue intends to promote. We aim to recall that freight data can be of different natures and sources, and the main data production methods can be classified as follows:

- Quantitative data measurements, either made by manual counts or by automatic devices, likesensor-based counts, GPS devices, RFID data or automatically collected enterprise follow-up data, among others (Gonzalez-Feliu et al., 2013).
- Quantitative surveys (Bonnell et al., 2009), which differ from precedent category in the fact that data is not measured by declared, adding important bias related to human factors (misunderstanding of questions, memory or judgement errors, etc.)
- Qualitative surveys, interviews, focus group and case study analyses (Rodrigue et al., 2013; Limatainen et al., 2015).
- Modelling, assessment, simulation and forecasting tools, used mainly when data cannot be collected elsewhere (Ta et al., 2010; Ben Akiva et al., 2013).

¹ A: 158 cours Fauriel, 42023 Saint-Etienne cedex 2, France T: +33 4 77 49 97 84 F: +33 4 77 42 66 33 E: jesus.gonzalez-feliu@emse.fr

² A: 121E More Hall, Box 352700, University of Washington, Seattle, United States T: +01 206-543-3747 F: +01 206 543-1543 E: annegood@u.washington.edu

³ A: Bâtiment Bienvenue, Plot B, 2ème étage, 14-20 Boulevard Newton, Cité Descartes, Champs sur Marne, 77447 Marne la Vallée Cedex 2, France T : +33 1 81 66 87 90 E : david.guerrero@ifsttar.fr

Those methods, most of them used traditionally to collect and process data, can play an important role in supporting decision making. However, the aims of decision makers need to be known and the data should provide useful insight for these needs.

The aim of this special issue is to provide a collection of works dealing with the new advances in integrating such data in models and planning methods for freight transport policy decision support. The focus is not then in data collection methods but in data processing, analysis and interpretation in order to develop and/or update freight transport policy models and planning methods. This special issue proposes a collection of six papers dealing with data production by different means arising directly in policy-based decision making. As is usual in EJTIR, the presented papers give new methodological insight, propose novel results and have important contributions to the research community, but in a practice vision, so having direct impact on practical policy making questions.

In freight transport planning and management, freight trip generation (FTG) is one inevitable step. However, the practical knowledge of the context of application is crucial to provide a good estimation of FTG rates, mainly in urban context (Guerrero et al., 2014; Sanchez-Diaz et al., 2015). The paper of Aditjandra, Galatioto, Bell and Zunder presents a combination of data collection methodologies to assess the importance of a University campus in generating traffic related to freight transport. More precisely, the authors combine data from surveys, traffic counts and qualitative sources to develop a traffic forecasting model based on FTG rates and estimate the importance of the University campus of Newcastle (UK) in the city's freight traffic. Analysis of the proposed two traffic surveys highlighted that more than 5% of the local traffic is generated by goods generated or attracted by the University campus, but this represents more than 50% of the overall freight traffic of the city. The model identifies that heavy Goods Vehicles (HGVs) are the major contributors in air pollutant emissions, but LGVs make the highest contribution to the local network congestion. This paper shows how to assess the contribution of a single establishment in terms of freight traffic, which was still not addressed in-depth in the literature. Traffic microsimulation allowed for the comparison of traffic management strategies for a more rational organization of University Campus freight traffic.

Another main question in policy making is that of policy choice, i.e. the prioritization and/or final choice of the set of policies to develop and implement (Marcucci and Gatta, 2014). In this context, input data is important since it needs to be collected pertinently then analysed to provide the information needed to support choice decisions. This fact is highlighted when multiple stakeholders are concerned with one policy, each of them with particular criteria and objectives, making decision support more difficult. Muñuzuri, Cortés, Guadix and Onieva propose in their paper the development and analysis of discrete choice models to confront these multi-stakeholder multi-criteria evaluation problems. Those models need data obtained from surveys that are designed to be flexible and easy to respond to. The authors applied this methodology to the selection of urban freight solutions in the city of Seville (Spain), after they assessed the determination of the relative weights associated to different objectives. Authors carried out those analyses from the viewpoint of a group of carriers.

Focusing on hub-and-spoke networks, Combes and Tavasszy address the question of transport share between direct shipping and multi-echelon networks, in the case of freight distribution. The novelty of the approach arises in the introduction of network structure of road carriers and inventory variables in modal choice decisions. In their paper, authors present an analytical model based on inventory theory to explain, given a commodity flow, how the organization of freight transport operations is linked to the characteristics of the shipper-receiver relationship. Then authors assess empirically this model, using data from the French ECHO shippers' survey. Special emphasis is put on the number of transshipments in the transport operation, as an indication of organisation of the transport operations. Finally, the authors conclude on the validity of the model and its relevance in the basis of the empirical assessment, as well as on practice implications of its deployment.

Data can also be used to analyze policies, like regulation actions and their impact on truck trips and eventually modal shift. Perez-Martínez and Miranda focus on interurban road transport trip conversion, and more precisely on impacts of regulation policies on transport organization. Their paper analyses sensitivity of parameters used to assess the impacts (costs and externalities) of increasing maximum gross vehicle weight. A travel distance and impact estimation model is developed and assessed via scenario analyses. The authors apply the model to a large freight road transport network connected to the major ports in Spain. The findings of the paper show the relevance of the impacts of larger trucks on the Spanish road freight market. With this approach, the authors are able to quantify the productivity increase when taking into account the effects of induced truck traffic and the shift of goods from rail to road.

Last but not least, data production and analysis is one of the key issues in traffic forecasting, as for example in estimating truck travel times. A good prediction of heavy vehicles' travel times is crucial in freight project prioritization and planning. The paper of Wang, Goodchild and McCormack propose a pragmatic relationship-based approach to predict freeway truck travel time using a combination of empirical truck probe GPS and loop detector data. The authors assess their prediction model and illustrate them on two cases from the United States. The travel time estimates are compared with two main frameworks used in USA: the Bureau of Public Roads (BPR) model and the Akçelik model. After a comparison of the different approaches with real traffic data, the authors show that the proposed method estimates more accurate travel times than traditional methods. Authors also address practical implications of their model in freight prioritization and planning support, not only in USA but also in Europe.

References

- Ben Akiva, M., Meersman, H., van de Voorde, E., eds., *Freight Transport Modelling*, Emerald Group Publishing.
- Bonnell P, Lee-Gosselin M, Zmud J, Madre JL, eds. (2009), *Transport Survey Methods. Keeping up with a changing world*, Emerald, Bingley.
- Gonzalez-Feliu, J., Pluvinet, P., Serouge, M., Gardrat, M. (2013), Urban Freight Analysis Based on GPS Data. In Hsueh, Y.H. (ed.), *Global Positioning Systems: Signal Structure, Applications and Sources of Error and Biases*, Nova Science Publishers, New York, pp. 73-93.
- Guerrero, D., Proulhac, L., Nierat, P. (2014), Supplying Cities from Abroad: The Geography of Inter-Urban Freight Flows, *Supply Chain Forum: an International Journal*, vol. 15 n°4, pp. 6-14 .
- Liimatainen, H., Hovi, I. B., Arvidsson, N., & Nykänen, L. (2015). Driving forces of road freight CO2 in 2030. *International Journal of Physical Distribution & Logistics Management*, 45(3), 260-285.
- Marcucci, E., & Gatta, V. (2014). Behavioral Modeling of Urban Freight Transport. In Gonzalez-Feliu, J. Semet, F., Routhier, J.L. (eds.), *Sustainable Urban Logistics: Concepts, Methods and Information Systems*, Springer, Heidelberg, pp. 227-243.
- Rodrigue, J. P., Comtois, C., & Slack, B. (2013). *The geography of transport systems*. Routledge.
- Sánchez-Díaz, I., Holguín-Veras, J., Wang, X. (2015), An exploratory analysis of spatial effects on freight trip attraction, *Transportation*, in press.
- Ta, C., Goodchild, A., & Ivanov, B. (2010). Building Resilience into Freight Transportation Systems: Actions for State Departments of Transportation. *Transportation Research Record: Journal of the Transportation Research Board*, vol. 2168, pp. 129-135.