

# City Logistics Policy Evaluation with System Dynamics

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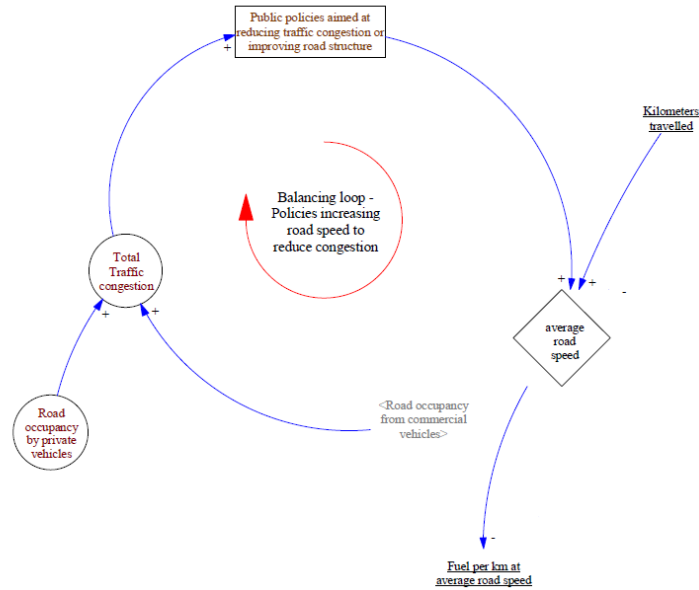
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## **ABSTRACT**

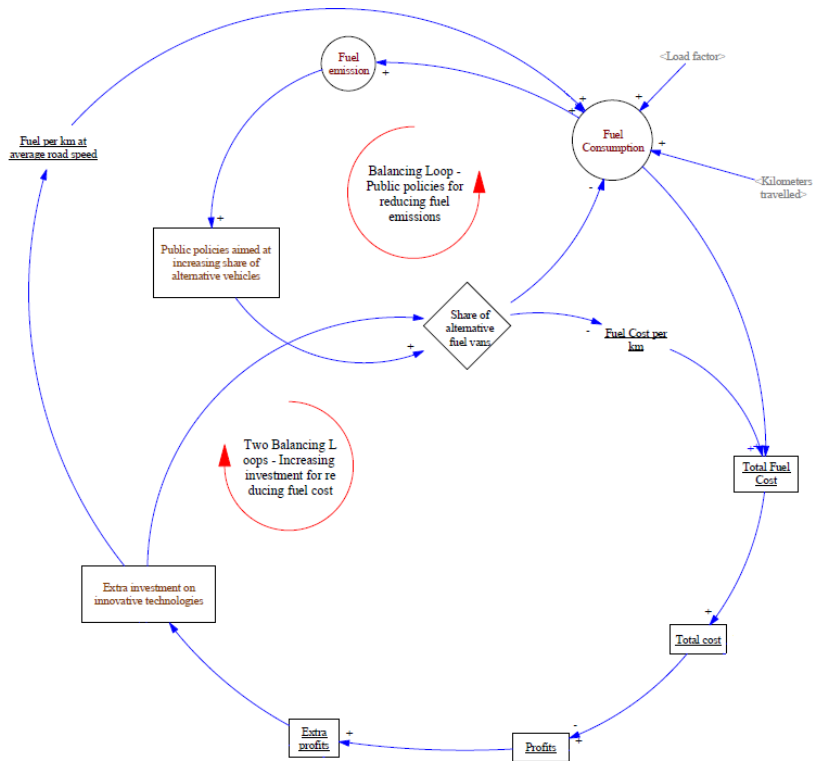
Increasing demand for goods in urban areas has turned into a surge in freight traffic, with negative consequences on traffic congestion and pollution. These trends have led researchers, practitioners and public administrations to shift their efforts toward solving these problems and City Logistics (CL) has emerged as a concept for coordinating all stakeholders into optimizing urban freight activities and reducing the negative impact of urban freight distribution on the citizens. Several initiatives in CL have been devised and implemented over recent years. However, the results achieved by these initiatives in terms of efficiency and environmental benefits are not always promising and were abandoned after the experimental phases. Hence, more research is needed to explore both operational and economic aspects of a CL system in order to fully grasp the interconnections between actors and variables that shape the system.

To this end, a System Dynamics (SD) model is proposed to model a CL System, taking into account its major actors, together with operational and economic variables (Figure 1 and 2). In particular, we focus on local administrations and freight transport operators. Local administrations can implement and enforce freight traffic regulations, but can also grant public subsidies to virtuous private operators, who in turn strive for operational efficiency and profitability. The objective of the model is therefore to evaluate the outcome of public and private policies on the city logistics system as a whole. We hope that the results of the SD model simulation would provide a background work for a deeper exploration on the topic of long-term operational and economic sustainability of CL systems, which is highly needed in light of the afore mentioned issues with their large scale diffusion.

**Keywords:** City Logistics, Urban Systems, Evaluation, Simulation, long-term sustainability.



**Figure 1** Balancing loop generated by public policies aimed at reducing traffic congestion



**Figure 2** Balancing loop generated by public policies and private investments to reduce emission and fuel costs