An urban consolidation center in the city of Copenhagen: A simulation study

Urban consolidation centers (UCCs) have a key role in many initiatives in urban logistics, yet few of them are successful in the long run. The high costs often prevent attracting a sufficient number of UCC users. In this paper, we study sustainable business models and the supporting role of administrative policies. We perform an agent-based simulation applied to the city of Copenhagen and collect data from a variety of sources to model the agents. Both the data and case setup are validated by means of expert interviews. We test 1,458 schemes that combine several administrative measures and cost settings. Most schemes yield significant environmental benefits; many of them reduce the truck kilometers driven by about 65% and emissions by about 70%. The key challenge is to identify schemes that are also financially sustainable. We show the importance of committing carriers to the UCC as soon as possible, as carriers potentially generate the bulk of the revenue. Subsequent revenues may be generated by offering value-adding services to receivers. Based on the numerical experiments, we pose various propositions that aid in providing favorable conditions for a UCC, improving its chances of long-term success.

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