

Optimising Logistics to Lower Carbon Emissions and Enhance Operational Efficiency – The Case of Food Hubs

Problem encountered and objective

Food hubs serve as platforms that aggregate products from small-scale food producers and facilitate their delivery to final consumers, which can enhance their profit margins and foster local economic development. However, the logistics involved in operating food hubs can be particularly costly and often involves small volume journeys. This research aimed to address the 'producer-to-hub-to-customer' transport problem and optimise efficiency in operational logistics while considering economic (costs) and environmental aspects (carbon emissions).

Main results / outcomes

We developed a novel mathematical model and performed computational experiments using real-world data from a regional food hub featuring products from over 150 producers across North East England. The research empirically shows that **enhancing (horizontal) cooperation among producers when delivering goods** to the hub can improve vehicle utilisation and the **efficiency** of their supply chain network and **lead to a reduction in both logistics costs and carbon emissions** by 12-16%. The study also indicates that **switching from conventional to electric vehicles can reduce transport costs** by nearly one-third and **diminish carbon emissions** by as much as 70%. Importantly, data visualisation software and tools can play an important role in better understanding performance metrics and optimising logistics solutions.

Practical recommendations

The research demonstrates the possibilities of improving the environmental and operational efficiency in food hubs' logistics. Specifically, it provides practical insights for food hub operators and their suppliers (inc. small-scale food producers), as well as third party logistics providers to short food supply chain operators. The analysis is also of relevance to local and regional economic development bodies, which often seek to promote short food supply chains to improve returns to small-scale food producers and benefit rural communities.



Further information

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About this abstract

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EU4ADVICE aims to lay the ground for effective capacity building of Short Food Supply Chain (SFSC) actors, by supporting advisors as catalysers of the knowledge flow from research to practice within an EU network of SFSC advisors, and by promoting the integration of SFSC advisors into national AKIS.