

Impact case  
**City Logistics**

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## 1 Description of Impact case

At LiU and VTI, the City Logistics group has practically been working as a center and worked directly with many cities and logistics providers to solve their last-mile delivery problems. The project started with TRENoP in 2010 and is ongoing, including multiple international and regional cooperation's with academic as well as business and societal actors. Over the years a large number of publications has been made, including journal articles, popular science articles, reports and books.

The initial aim of the project was to investigate the possibilities for making city logistic systems more efficient regarding freight transports, in this way decreasing the environmental impact, making the city more attractive, and promoting a positive development for business and shops in the city. Even if freight transport only makes up 10-18 percent of the number of vehicles in the cities, they account for 40% of the emissions and noise. In addition, Sweden is one of the countries in Europe with the fastest levels of urbanization.

We were very active in the national "City Logistics Roadmap" presented in 2014, concluded that city logistics is a developing area and important for many cities in Sweden to deal with future ambitions to reduce CO2-emissions. Further, it was concluded that many stakeholders and interested parties are affecting or being affected by "city logistics" in one way or another.

## 2 Significance of Impact case

The environmental goal, i.e. that emissions from freight transport in the city are to be reduced, is often an overall and governing goal for coordinated goods distribution and city logistics. To achieve that goal, three actions can be applied:

- Optimization of the number of terminals for the city distribution and their location
- Route Optimization
- Use of environmentally friendly and city-adapted vehicles in a green logistics set-up.

The purpose of the first two is to minimize the number of trucks and thus the traffic of distribution cars in the cities. By designing the logistics system optimally in this way, one also builds a platform to be able to invest in more environmentally friendly vehicles, which are often more expensive than traditional diesel-powered distribution cars.

Early in the project we identified major cultural problems and lack of knowledge about goods transports and logistics within the municipalities. Freight transport was not on the agenda for urban planning or development and responsible persons were often missing despite the fact that the municipality's own deliveries make up a large part of the city's total deliveries.

An important part of the project has therefore been to create an insight and understanding of city logistics in the municipalities, which has consisted of several meetings and seminars with the various actors. Partly personal meetings of a planning nature and partly seminars to raise the issue in a broader group of actors. This part has been necessary, not least in the municipality, as freight transport is not on the agenda of politicians and officials at present. The ambition has been for city logistics to be seen as part of urban planning. Another important part has been to meet representatives of the various actors, i.e. the municipality, the property owners and the transport companies, which has taken place in the form of seminars and in the form of think tanks.

One important conclusion was that many cities planned for city logistics initiatives, but they were lacking business models describing how to design city logistics and how to determine different aspects of their initiatives, including viable collaborators, potential customers, preferred value offerings that can generate revenue, essential resources, and organisational arrangements and roles therein.

This demand from Swedish municipalities on business models, generated a Vinnova-project with focus on developing a handbook in how to design business models for city logistics and urban consolidation centers. During

the project, several European and Swedish cases was studied, and the business model theories was developed to match the context of city logistics in Swedish mid-size cities.

During the time from 2010 to today, a large number of cities have been implementing “samordnad varudistribution” as a part of their environmental targets. Many of these initiatives are inspired by our applied city logistics research, with success factors and descriptions of the role for the city to take in such initiative:

Critical success factors linked to business models for city logistics:

1. The ability to design a city logistics solution that considers the high complexity of such systems
2. A high degree of entrepreneurship among promoters
3. Ability to scale up the solution to obtain volume benefits
4. Dynamic ability and adaptation to new conditions and regulatory conditions in the market
5. Ability to develop the concept over time so that it is attractive for both existing and new customers and so that new revenue streams are created that cover the operational costs
6. To actively work with the relevant municipality and authorities and familiarize themselves with their social requirements on a city logistics system
7. High competence in logistics and supply chain management and actively working both upstream and downstream in the supply chain (Supply Chain)
8. Actively utilize digitization and IT systems to streamline and develop the city logistics system
9. The ability to form suitable forms for sharing costs and benefits between involved stakeholders

In consequence, the municipality has an important role in building coordinated goods distribution and city logistics - whether or not they run the system on their own or outsource it to a logistics service provider:

- The municipality needs to understand and promote both the business and social economic potentials of a city logistics system
- The municipalities need to familiarize themselves with three different roles in parallel
  - a. The role of initiator (Possible together with private actors)
  - b. The role as facilitator, eg. through regulatory conditions or support measures based on a valuation of the socio-economic benefits
  - c. The role of customer to the system, e.g. that transports to municipal establishments take place in the city logistics system and be a guarantor of freight volumes over time

### 3 Reach of Impact case

During the years, we have continued with several parallel projects under the umbrella of TRENoP, financed by Energimyndigheten, Kampradstiftelsen, Vinnova and of course TRENoP, with empirical data from several Swedish and European cases as a platform for how to apply city logistics in Swedish mid-size cities e.g. Eskilstuna, Linköping, Norrköping. We have been working close to several stakeholders including, CLOSER, SKL (Sveriges Kommuner och Landsting), Stadsmissionen, forwarding companies like PostNord and Bring, etc.

Sveriges kommuner och Landsting – Swedish municipalities in general, e.g.:

- City of Eskilstuna
- City of Norrköping
- City of Linköping

Stockholms stadsmission applying our models on supplying left over food for people in need.

Logistics companies providing city logistics, e.g.:

- PostNord
- Bring
- Alfredssons Transport

Closer and Forum för innovation inom transportsektorn in developing av road map for City logistics in Sweden (Färdplan Citylogistik)

## 4 Evidence of Impact case

There have been a large number of academic journal articles, but also several popular science articles based on these projects, e.g. two in the Swedish magazine Supply Chain Effect by Henrik Johansson.

- Johansson, H., Stora möjligheter med samordnade stadsleveranser, Supply Chain Effect, No. 1, 2018.
- Johansson, H., Mot hållbara konsolideringsterminaler, Supply Chain Effect, No. 2, 2020

*"In our work redistributing surplus food for people in need, our project together with Linköping university helped us better understand how the logistics works and how a business model can be designed. The purpose was to develop concepts and business models for a national logistics system for redistribution of surplus food, that would otherwise become food waste. The development has taken place with users of the system, social organizations, the food industry and transport sector. A business model is a prerequisite for enabling long-term sustainability a large-scale and efficient solution for surplus food in Sweden. We would like to thank researchers and master students at Linköping University who supported us with knowledge about building business models and helped in the production of various forms of information."*

*Anne Lunde Denisen, Project Manager, Sveriges Stadsmissioner*

*"During the last decade, we at the municipality of Eskilstuna has been working together with Linköping University in developing our city logistics solutions. It has been a give-and-take cooperation over the years, where we have got inspiration and ideas from the researchers and their models and at the same time has had the opportunity to be a case study in their research. We have been on-site in Eskilstuna, as well as in seminars and workshops arranged by the researchers. It has been a good and valuable cooperation for Eskilstuna."*

*Kirsi Dogan, Serviceförvaltningen, The municipality of Eskilstuna.*

## 5 Impact creation activities

In developing the handbook for city logistics business models, a workshop with several municipalities in Sweden was arranged by SKL (Sveriges Kommuner och Landsting), with the purpose to get input direct from project leaders in different Swedish cities to the handbook. A part of this was to present a first draft of the handbook and to increase the applicability of the handbook. We have participated several times in similar workshops and seminars on sustainable city logistics for companies and municipalities in e.g. Linköping, Norrköping, Växjö, Tranås, Stockholm.

Another interesting application of this research was to apply the city logistics concept on the aid activities supplying left over food for people in need. Stockholm City Mission (Stockholms Stadsmission), together with Linköping University and Bring, formed a Vinnova-project with the aim of developing a business model where the food industry is linked to non-profit organizations in a national logistics system for the distribution of surplus food. Within the project, we were working with players in the food and logistics industry to develop a model for a resource-efficient information and distribution solution for surplus food for non-profit organizations. The goal was a solution that was easily integrated into existing systems in the food industry, with the result that food waste is reduced while larger volumes of surplus food reach people living in vulnerability.

In the city of Norrköping, we have been working with the actors both in the design phase and over time with the assigned forwarder Alfredsson Transport. The cooperation with Alfredssons Transport is a long-term action research on green logistics, with the purpose of working with the companies process management in greening their logistics operations.

The cooperation with the city of Eskilstuna has also been long term, including several projects. The researchers have studied Eskilstuna and their urban consolidation center, and the city of Eskilstuna has used the different models, guidelines, and other result in the development of their city logistics over the years.

## 6 Underlying research/education activities

The underlying research have been done in several different projects over the years, financed by Energimyndigheten (3 projects), Vinnova (3 projects), Kampradstiftelsen and TrenoP and spans från design of city logistics, business models and value creation in urban consolidation centers – all within the frame of sustainable logistics.

In our master course on Sustainable logistics, we have education cases on city logistics based on the city of Eskilstuna and on the case with Stadsmissionen. Over the years there have been several master theses on city logistics. In addition, licentiate theses and doctoral thesis have been presented as a part of the City logistics programme.