Institute of Transport Economics
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Summary

Indicators for urban logistics

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Today urban logistics face many challenges. One of them is land use and areas for urban freight and logistics. The number of goods deliveries to the city centres increases, and with that the number of vans and lorries. There is a need for measures that free up land, reduce climate emissions, streamline logistics and improve the environment. In order to implement the best measures, one needs analyzes and calculations which show the effects of various solutions.

For analyzes and calculations, indicators that make it possible to compare effects between places and over time are needed. This study shows that urban planners see the greatest need for indicators that describe the area to be analyzed. The most important indicators are related to which industries are in the area, the degree of cooperation between different actors, the organization of logistics and transport activities, and which additional services are performed. Indicators that describe activities for logistics service providers and transporters, consignee/customer, service and craft services are less important.

Introduction

The number of goods deliveries and vans and trucks in city centers rise. This provides an increased focus on greenhouse gas emissions, phasing in of electric vans and other zero-emission vehicles, deliveries with cargo bikes and other adapted vehicles. Urban logistics also face a challenge characterized by increased competition on land use in cities New and improved logistics solutions are thus needed for last mile deliveries in cities.

When last-mile freight distribution changes, there is a need for analyzes and data to calculate and assess effects of various measures. Several frameworks used in analyzes of urban logistics conclude that there is a need for indicators that are exclusive to activities related to urban logistics. What are good indicators for analyzes, and where to find data for the indicators to be used in analyses?

Several cities have now started work on developing urban logistics plans where knowledge from monitoring and evaluation of effects from implemented or ongoing measures and demonstrations are key elements. The indicators presented in this report are a contribution to establish knowledge as input to such plans.

Experience from use of indicators in analyses of urban logistics show that the methods for obtaining data are not systematic. This may be due to the lack of well-defined and accepted indicators to describe urban logistics. Data describing urban freight deliveries are often incompatible, which makes it difficult to compare observations between cities and identical activity at different times. The need for common well-defined indicators is therefore huge.

Objectives

The aim of the study has been to establish and document a set of indicators, both quantitative (performance-based) and qualitative, that can be used in evaluating and assessing logistics activities, freight transport and services in cities. The indicators focus on

logistics activity in cities. Main emphasis is on establishing quantitative indicators, i.e. indicators for measuring performance. Another aim is to establish indicators which are important for developing urban and municipality plans, regulations, activities and services related to urban logistics and urban freight transport.

Indicators will be a useful tool for anyone working with urban logistics and who wants to obtain data to gain increased knowledge about services, potentials for efficiency and to facilitate living cities. The target group is primarily planners, but the indicators must also be useful in policy development and for private businesses.

In analyzes for the introduction of measures and preparation of municipal plans, the indicators have two important functions:

- Raise awareness of the content and quality of an activity or performance
- Help find points and activities that can be improved

In our sample, indicators related to national policy are less considered.

Method

The selection of indicators is based on findings from a literature study among national and international literature dealing with urban logistics and where indicators have been used.

In addition, experience from analyzes where city logistic indicators have been used is included. From these sources, we have extracted the indicators we believe are most relevant for planners of urban logistics in urban municipalities. The selected indicators have been sent to a selection of urban planners who have given priority to which indicators they believe are most important for their work with municipal plans and urban logistics. In addition, they provided input for additional indicators that should be included. Such indicators are included in the report.

Grouping of indicators

Our indicators have been developed for urban logistics, especially last-mile distribution and craft services. When grouping the indicators, we used main activities in last-mile distribution as a criterion. The indicators are grouped according to main activities: Area of the study, logistics service provider and transporter, goods recipient and a group which a focuses on service trips and craft services.

Analysis area. Delimits the area to be studied regarding the market, which actors cooperate and how the cooperation is organized. In addition, we have indicators that show plans and regulations, traffic and infrastructure for the area being studied.

Logistics service provider and transporter. This group of indicators includes activities on how logistics suppliers and carriers organize and carry out their services and activities during distribution trips in urban areas. Efficiency, environment and climate and economy are included in this category of actors.

Goods recipient. For indicators that describe activities for the consignee, we place emphasis on obtaining information about the consignee / customer and what infrastructure, land use, goods receipt, parking options, handling equipment and quality of delivery when delivering goods. This main category may also apply to several consignees who use the same consignment facilities.

Service and craft services. Indicators for this activity describe different types of craft services, place of execution of assignments, type of vehicle and parking time. The focus in this

group is actors who perform service and craft services that do not have goods delivery as their main function. Several of the indicators in this group are identical to indicators in the other main activities' groups.

Establishing indicators

Development of indicators will be a continuous process because the challenges associated with urban logistics change over time, the expertise and requirements for analyzes and documentation increase. A main rule for our selection of indicators has been that they must be quantifiable, but some qualitative indicators are also among the selected indicators. Due to limited data access for activities related to urban logistics, several of the indicators require separate data collection.

Competitive considerations mean that the private actors often refuse to provide data or information about their activity. But, in recent years, new technology and methods have emerged that make data collection more cost-effective, which means that indicators that were previously challenging because of missing data, can be used.

The indicators will also cover the private actors' need for information and knowledge about urban logistics. Their needs are often different from the needs of public administration planners. From the contact with municipal planners, we see that the indicators adapted to private actors are in many cases ranked somewhat lower than indicators adapted to planners.

For municipality planners the group of indicators that deals with the analysis area is considered as most important. The other three analysis areas (logistics supplier and carrier, consignee/customer and service and craft services) are assessed similarly, but with significant differences in ranking between respondents.

Several of the indicators presented have not previously been used in analyzes and planning in Norwegian cities, so several municipal planners are calling for studies to test usability and data access when preparing logistics plans, preferably in smaller cities.

Important indicators

A characteristic of analyzes and studies of urban logistics is the lack of publicly available data. One must therefore often choose indicators for which primary data can be obtained relatively easily through own surveys. Information on particularly important indicators where either data is available, or data can be obtained without excessive costs or the indicators can give signals as to which data is most needed to be collected.

Answers and priorities are characterized by which tasks the questioned planners are currently concerned with or working on. Indicators beyond that have been difficult to prioritize. The choice of particularly important indicators is therefore to a certain extent situational. This is also an experience from the literature study, what is prioritized as particularly important indicators is determined on the basis of which plans, or activities are to be analyzed and studied.

One consequence of this is that we cannot deliver a set of priority indicators for urban logistics for which data can be obtained on a general basis. But the report provides a set of indicators that describe a cross-section of activities and services related to last-resort distribution in cities.

What are the most important indicators changes over time. There is now significant development related to new technology and services such as the use of drones,

autonomous vehicles, goods bicycles, delivery solutions for e-commerce, charging infrastructure for electric cars, plans and regulations for goods bicycles. Good indicators for analyses related to these technologies require customized indicators. The indicators will therefore require continuous updating and adaptation to the development of urban logistics.

The indicators can be used individually, or one can put together groups of indicators that are adapted to the analysis or evaluation to be carried out. In the same way, a combination of indicators can be used to develop new indicators adapted to the individual case.

The survey among urban planners shows that among the categories into which we have chosen to divide the final stage distribution, the group that deals with the analysis area is particularly important. The three other main activities (logistics supplier and transporter, consignee/customer and service and craft services) are assessed similarly, but with significant differences in ranking between different planners and municipalities.

Important indicators for the main activity **analysis area** are related to the delimitation of the study area regarding which industries are located in the area, organization of logistics and transport activities and which additional services are performed. Other priority indicators are related to traffic, infrastructure and the types of vehicles used in the last-minute distribution. Indicators that describe the degree of cooperation between municipal and private actors such as farm owners and city center associations are also considered important. Cooperation in supply chains and the extent to which logistics hubs or terminals for transhipment of goods have been established or planned are indicators about which information is desired.

Main indicators **logistics service providers and transporter**, indicators describing environment and climate challenges are especially important for planners. The indicators for greenhouse gas emissions are often combined with indicators that describe activities that are carried out, e.g. energy consumption, number of deliveries, quantity of goods and types of vehicles used.

Main indicators for **goods recipient and customer**, are related to the delivery of goods, who receives the goods and where the recipient is located. It is important to have good indicators that describe how the transport from vehicle to goods recipient is organized. When the place for delivery of goods is located, indicators related to deliveries, parking, area occupancy, land use, handling equipment and time use are central.

Distance between vehicle and customer is considered an important indicator for providing information related to the time spent on deliveries. In the same way, the indicator for the type of vehicle used for deliveries is important to provide knowledge about the area occupied during parking and deliveries.

For the activity **service and craft services**, the most important indicators are related to the location of service or craft services, area occupancy, parking time and parking facility. Other indicators that are considered important during this main activity are industry for the service or craft assignment, type of vehicle and transport distance and number of trips.

Today municipalities are developing urban logistics plans. In this process further needs for indicators and data on urban logistics will then be identified. Our proposal for indicators on urban logistics must be seen as part of such a process towards particularly important indicators or core indicators. Before deciding what should be the most important indicators for urban logistics planners, the indicators should be tested in specific planning tasks.