EUROPEAN TRENDS AND INNOVATIONS IN URBAN FREIGHT TRANSPORT

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ABSTRACT

There is growing interest in the logistics of collection and delivery services in town and city centres in particular. The main driving forces that helped to rise awareness and to make freight transport a topic on the agenda of urban planners are first, sustainability as a priority topic on the agenda of cities, second, the changes in the economy and the society and third, European initiatives for exchanging experiences and good practices in urban freight transport. Cities start to initiate combinations of urban freight transport related measures and two practical examples are given for the cities Utrecht in The Netherlands and Barcelona in Spain. It is important to consider that there is no top-innovation suitable for all the cities but that each city needs to implement those measures which match its structural and societal situation best.

1. STARTING WITH GOOD NEWS

Until the mid-1990s, researchers and policymakers paid relatively little attention to the increasingly severe freight transport problems facing urban areas. More recently this has changed, and there is growing interest in the logistics of collection and delivery services in town and city centres in particular. Several projects in Europe and elsewhere have attempted to pinpoint the key urban freight transport problems and to identify potential solutions. As a result, experimentations have been started in several European cities and due to networking activities on a European level, cities become interested in other cities experiments including specific information about the impacts of measures/solutions.

One important development can be seen in the set up of (freight) transport master plans which look in detail at the transport situation and which foresee different kinds of measures for an improvement of the situation at short to medium term. The European legislation (e.g. related to particulates or noise) provides the framework conditions for city authorities to set up these master plans but also to initiate single measures. Obviously, the transfer of European legislation into national, regional and local legislation has started. In addition some cities organize round tables which are dedicated to freight transport and help to better consider the needs of all parties involved (i.e. transport companies, citizens, chamber of industry and commerce, local shop owners).

Last but not least the logistics companies are recognizing more and more that their own contribution in a clean environment leads to an advantage in competition and improves the (transport) companies' image.

2. REASONS FOR INNOVATION

But what are the main driving forces that helped to rise awareness and to make freight transport a topic on the agenda of urban planners?

2.1. Sustainability on the European agenda

Sustainability is a first priority theme on the European agenda and following the current developments, e.g. within the energy sector, the need for action is bigger than ever.

Existing freight transport activities in urban areas contribute to a variety of negative impacts. These include economic impacts like congestion, inefficiency, and resource waste, environmental impacts, i.e. pollutant emissions including the primary greenhouse gas carbon dioxide, the use of non-renewable fossil-fuel, land and aggregates, and waste products such as tyres, oil and other materials and also social impacts in terms of the physical consequences of pollutant emissions on public health (death, illness, hazards etc), the injuries and death resulting from traffic accidents, noise, visual intrusion, and other quality of life issues (including the loss of greenfield sites and open spaces in urban areas as a result of transport infrastructure developments).

First steps are the European directives for noise and for particulates which are under implementation on a national level at the moment. Bigger cities are obliged to set up e.g. noise action plans and to measure particulate levels at main roads. This leads to better knowledge about urban freight transport but also the need for information, e.g. about effects of measures, increases.

2.2. European initiatives for exchanging knowledge in urban freight transport

EU-wide initiatives like CIVITAS, BESTUFS and NICHES help to exchange knowledge amongst cities but also to find the right solution(s) for the own specific situation.

CIVITAS initiative

CIVITAS - cleaner and better transport in cities - stands for CIty-VITAlity-Sustainability [1]. With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizens. The objectives of CIVITAS are to promote and implement sustainable, clean and (energy) efficient urban transport measures, to implement integrated packages of technology and policy measures in the field of energy and transport in eight categories of measures and to build up a critical mass and markets for innovation.

The urban freight transport sector is covered within all CIVITAS projects. New concepts for the distribution of goods by means of introducing innovative freight logistics services using clean and energy efficient vehicle fleets, dedicated infrastructure and information services are initiated within the following thematic areas:

- Clean vehicles / clean fleet
- Distribution schemes
- Fleet management & route planning
- Loading and uploading
- Loading Zones
- Public private co-operation
- Urban distribution centers

Examples covering often several of these thematic areas are priority access for clean goods vehicles, freight consolidation schemes, incentives for improving the load rate in inner-city freight distribution, satellite based traffic management for SME’s, truck driver support or environmental zones.

BESTUFS thematic network

The main objective of the BESTUFS (BEST Urban Freight Solutions) thematic network [2, 3] is to identify, describe and disseminate best practices, success criteria and bottlenecks of urban freight transport solutions. Furthermore, BESTUFS aims to maintain and expand an open European network between urban freight experts, user groups/associations, ongoing projects, the relevant European Commission Directorates and representatives of national, regional and local transport administrations and transport operators. The project team organises regular workshops and conferences all over Europe and reports about interesting urban commercial transport related developments, demonstrations and events on European, national, regional and local level. Experience has shown that the most active cities implementing freight transport innovations tend to be the country capitals or the largest metropolis. These conurbations have the resources to access support for innovative transport solutions, to participate in city networks and to exchange knowledge and experiences with each other. An important objective of BESTUFS is therefore, to reach also small and medium sized cities since they are comparatively isolated from a European perspective.

NICHES project

The mission of NICHES (New and Innovative Concepts for Helping European transport Sustainability) [4, 5, 6] is to stimulate a wide debate on innovative urban transport and mobility between relevant stakeholders from different sectors and disciplines across Europe. Over the last few years a wide range of innovative concepts for making urban transport more efficient, competitive and sustainable have been developed in Europe. However, the full deployment and mainstreaming of those innovative concepts has not taken place.

NICHES will promote the most promising new concepts, initiatives and projects, moving them from their current ‘niche’ position to a ‘mainstream’ urban transport policy application. Within the city logistics area the following three concepts have been regarded in detail:

- Space management for urban delivery
- Inner-city night delivery
- Home delivery using locker boxes

2.3. Changes in economy and society

Within the last decades the European countries saw severe changes in economy and social life and for the future further changes are pre-assigned. Changes on a rather local level are e.g. the restructuring of retailing in terms of more shopping malls and less small retailers, whereas eCommerce and home shopping represent changes that have European or even world wide effects. The growing exchange in an enlarged Europe is accompanied by a rapidly increasing transport demand. The increasing energy and personnel cost as well as increasing competition all over Europe lead to big efforts towards better efficiency and cost reduction. New technology plays an important role in achieving improvements and as they are more and more available at reasonable cost. The service life of HGVs decreases leading to cleaner and more efficient vehicles on European roads. Last but not least the requirements of the citizens related to their living conditions are changing rapidly.

The cities usually try to solve the problems and challenges of today under the given structures, i.e. short term urban planning under consideration of e.g. the transport network, logistics network and actors, but it is needed that they start also to prepare sustainable urban commercial transport plans with medium to long-term objectives. These plans have to include e.g. a combination of several urban (freight) transport measures.

3. TWO PRACTICAL EXAMPLES

Combinations of measures are implemented e.g. in Utrecht and Barcelona. They are described in the following.

3.1. Utrecht's approach to freight transport

Utrecht's approach towards an improvement of urban freight transport includes both short term and long term subjects [2]. Short term priority have e.g. physical measures in city centre distribution and long term priority have e.g. the knowledge collection about freight transport, stimulating organisational changes and considering a regional and national perspective. An important aspect is seen in a better organisation. First, private partners should do their share. Second, more budget and benefits should be gained through co-operation in G4 and Randstad and third, a higher awareness should be built within the municipal organisation.

At the moment the following measures exist in the inner city which base the starting point for the future work: Loading / unloading zones, one way traffic in small streets, a time window in the main shopping area, the "Bierboot" (engl. Beer boat = water bound city distribution), urban distribution centres (UDC's) and the CABU (advising committee on city distribution).

A very peculiar measure is the "Bierboot" which has been in use for some years to provide restaurants and bars with beer and soft drinks via the canals. On 27th May 2005 a loading/unloading platform was opened. This platform was provided by the municipality of Utrecht. From this date Utrecht's "Bierboot" carries also fresh, conditioned and frozen food to the restaurants and bars. By transporting the goods over the waterways, congested roads can be avoided and traffic problems are alleviated. If this way of transporting fresh and frozen goods by boat is a success, the municipality will provide a permanent platform for transhipment. The impact of the modal shift with respect to the road safety in the inner city is an important factor for the municipality which hopes that more companies will start using the boat instead of trucks.

"Bierboot"

Based on these basic measures further initiatives were initiated: An inner city distribution plan ("Bevoorradingsplan"), an information and awareness campaign, a regional co-ordination ("Samen Goed Geregeld") and an integral approach.

The Inner city distribution plan ("Bevoorradingsplan") resulted in a total investment of €265.000. Six new (un)loading locations were implemented leading to now more than 60 (un)loading locations in total. Furthermore, new road signs were introduced and a check list for the design of (un)loading zones as well as a check list for city distribution were developed.
The information and awareness campaign covers the measures from the "Bevoorradingsplan". Furthermore, maps, explanations about UDC (incl. tariffs) and the "Bierboot" as well as tips for a durable distribution (co-operation with neighbours, earlier deliveries, etc) are provided.
The regional co-ordination ("Samen Goed Geregeld") is a Public Private Partnership with 10 parties involved and a financial contribution comes also from the private parties. The regional co-ordination ("Samen Goed Geregeld") is an integral approach in terms of a national example project which aims at filling in the loose ends of, and strengthening the role of the "Bevoorradingsplan" like logistic routes and co-ordination with neighbouring municipalities. It was finalised in December 2005.
Finally, the integral approach involves a quality network for freight transport, regional tuning of regulations (time windows, vehicle constraints, and environmental regulations) and "Streetmanagement" in terms of improving local organisation and co-operation.

3.2. Barcelona's approach to freight transport

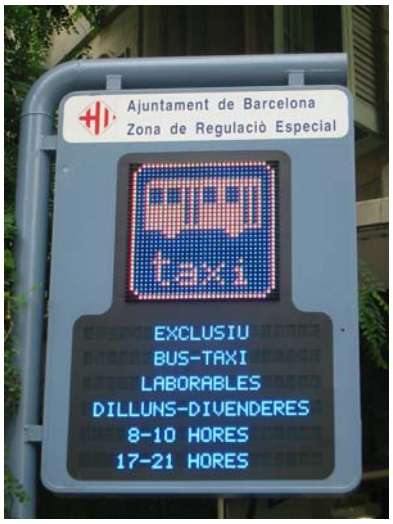
Goods traffic continues to grow in Barcelona, and the Municipality has been active in finding solutions to manage on-street deliveries (the majority of premises have only limited stock-holding capability, and no off-street loading facilities, etc.) in ways that minimise congestion [4, 5, 6]. Barcelona Municipality's Mobility Pact (initially signed in 1998) includes the following objective for goods management: "Achieve an agile, orderly distribution of goods and products throughout the city" (Goal Num.10, Pacte per la Mobilitat).
In order to develop measures against the uncontrolled growth of private vehicles operating in the City of Barcelona – making goods deliveries more and more difficult – the municipality initiated a project analysing the effects of urban commercial transport on the traffic situation. The results of this survey showed:

- That about 25,000 vehicles realise approx. 100,000 loading/unloading operations each day in Barcelona;
- 4,000 kerbside spaces are required to accommodate the needs of goods delivery vehicles;
- Different measures need to be applied according to different typologies (area, street - in hierarchical design);
- Urban development planning norms should be modified;
- Pilot regulatory measures require efficient, automated enforcement;
- Telematics techniques should be employed to optimise operations.

Due to the survey results several different measures were implemented within the city centre of Barcelona such as: Surveillance of loading time with parking (loading) disks, Multi-use lanes, a zone access control scheme for the inner city area, and night delivery.

One of these measures is the installation of so called multi-use lanes. Several multi-lane roads in the Barcelona inner city area are equipped with variable message signs (VMS).

During the day time one lane of the street is reserved for activities of different user groups (parking, loading unloading, traffic flow). The variable message signs show the actual access rights per user group to use the lane. Technically, the approach is realised in such a way that a first VMS shows whether the lane can be used for floating traffic or whether it is dedicated to parking and loading activities. In case that the lane is dedicated to parking and loading activities, a second VMS shows the actual allowance for a particular user group. If the lane is dedicated to loading and unloading this does not exclude the parking of passenger cars. Also private passenger cars are allowed to stay on the lane if the owner wants to do e.g. shopping. The actual use of the lanes is not controlled by the police.



Variable message sign

Up to now, 44 on-street car parking spaces were replaced by the multi-use lane regulations, such that the capacity for unloading was significantly increased (approximately 30 spaces allowing 30 minutes per operation gives a capacity of over 400 slots between 10.00 and 17.00).
In the case of the Travesera de Gracia during the peak hours, the lane is used as a priority bus lane with a frequency of 25 buses per hour, loading and unloading is allowed between the peak hours and on-street parking is possible overnight.
In contrast to the Travesera de Gracia for the other lanes peak-hour clear-ways are installed and no bus priority lanes.
The Municipality observed improved circulation speeds following the multi-use lane installation, and continues to extend this type of measure along primary roads.

It can be concluded that space management concepts like multi use lanes

- Can bring a reduction in travel time;
- Reduces congestion and delays because of a better management of the available road space;
- Can reduce energy consumption (more fluent traffic, reduced search for parking space for deliveries);
- Causes a fairer sharing of valuable space/resources.

Another measure successfully trialled in Barcelona concerns night-time deliveries using large trucks adapted to minimise noise nuisance. The trials have subsequently been extended to another 4 locations in the city, and up to 15 across Metropolitan Barcelona. 18 months after the first trial, the operator has extended this system to 137 outlets throughout Spain.

The initial night delivery trials were realised between 23:00 and 24:00 in the night. 30 t trucks were used to deliver to grocery (supermarket) stores directly during the night instead of realising out-of-town transhipment to 12T lorries followed by next-day delivery, using reserved spaces some 30m from the store. The equipment used was noise adapted, both for the truck as well as the loading and unloading utilities (fork lift, lifting ramp etc.). Furthermore, the whole staff was asked not to speak loud and to turn off the radio and other noise making devices. As a result the trial was successful in terms of noise intrusion and from the commercial point of view. Noise measurements done by the police stated that the noise level for the loading and unloading was in line with regulations (differing very little from ambient conditions - increase of 0.3 dBA). In Valencia Street, operator Mercadona demonstrated that quiet night-time deliveries of supermarkets could be made using adapted trucks and unloading methods (less than 3dBA increase measured). Furthermore, about 7 light trucks could be replaced during day time allowing 2 large trucks to enter the city during the night time. The trial took place during the closing hour of the shops. However, besides the driver, staff from the retailer was also present to accept the delivery.
To do this trial, the Municipality had to introduce experimental traffic regulations. It is e.g. possible for trucks to park on the multi-use lane in the wrong driving direction in order to improve the delivery process. In the beginning this solution was observed and accompanied by the police but no problems occurred.

Barcelona night delivery

It can be concluded that the implementation of inner city night delivery:

- Reduces delays for the logistics service providers by using the free road capacities at night;
- Reduces emissions and energy consumption (less congestion during night time, direct access to the shops);
- Increases logistics efficiencies in terms of the deployment of HGVs and manpower;
- Enhances road safety.

4. ENGAGEMENT ON VARIOUS LEVELS

When cities are aiming to introduce city logistics or to influence the freight vehicle traffic it is important to keep in mind that there is no top-innovation for all the cities but that each citiy needs to implement measures which match its structural and societal situation best, e.g. addressing the integration of a river or canal if it is available or coping with historical city centres. If isolated applications without coordination are implemented even a negative influence on freight transport can be the result.

There are many domains where improvements can be achieved. One important starting point are the vehicles. Measures related to access (weight/size), charging, emissions, noise and energy consumption can be initiated. Technology can support and accompany these measures like e.g. access technology or traffic management integration. This includes also improved equipment e.g. with lower noise emissions. Within the logistics networks interfaces between long haul transport and urban distribution, consolidation but also the integration of other modes are important domains. Also within this area technology like RFID and tracking and tracing can improve processes.
Within all domains standards play an important role and have to be considered carefully.

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