REFORM - RESEARCH ON FREIGHT PLATFORMS AND FREIGHT ORGANISATION

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Abstract

The main objective of REFORM is to improve the knowledge of the impact of city oriented freight platforms on urban traffic. In the framework of the project an evaluation model was developed to examine the efficiency of freight platforms and their impacts on city traffic and on the environment. Existing and planned freight platforms in Berlin, Brussels, Madrid and Rome were investigated under specific local foci. Furthermore the impact of each of the investigated freight platforms on urban traffic was calculated, applying the traffic calculation models WIVER (to calculate freight traffic both in the city and surrounding regions, its mileage per vehicle type and per branch as well as its local distribution) and CATO (to calculate the output of a freight platform in terms of truck flows). The findings of the project were generalised and a guideline for evaluating freight centres and for optimising existing and planned platforms, regarding platform efficiency and their impact on urban freight traffic was created.

INTRODUCTION

REFORM is a research project funded under the Transport Research and Technological Development programme of the European Community and deals with the impact of freight platforms on urban traffic. City - oriented freight platforms are designed to support the reduction of environmental and urban delivery problems in cities. However, their impact on urban and long distance traffic plays a dominant role in the general discussions on implementing freight platforms. This is due to the redistribution effects of freight platforms leading to an increase of freight traffic in the area surrounding the platform and on the roads linking the platform to the city centre and to the main national routes. The model CATO to calculate the output of freight platforms in terms of truck flows was developed to model these impacts. When combined with the existing model WIVER, a model designed to calculate freight and commercial traffic in urban areas, it is possible to simulate the impacts of freight platforms on urban traffic. These traffic calculation tools were applied to existing and planned freight platforms in the cities of Berlin, Rome, Madrid and Brussels.

FREIGHT PLATFORM CONCEPTS

The volume of freight traffic in Europe is permanently on the increase. Road traffic is responsible for most of this increase, leading to congestion on motorways and, in particular, urban areas. Furthermore, the urban distribution of goods is not organised efficiently, leading to the use of a large number of relatively small and often not fully loaded vehicles. To reduce urban freight traffic and to shift long distance freight transport from road to rail, the concept of freight platforms was developed.

Definition of freight platforms

Freight platforms can be defined as areas in which different transport related companies - such as forwarders, logistic service providers etc. - are established. A freight platform is a transhipment area where, ideally, at least two transport modes are connected. Usually these transport modes consist of road and rail, but waterborne and air transport can also be integrated into this concept. The main functions of a freight platform can be summarised as follows:

- long distance transport for all modes (especially combined transport),
- delivery transport (distribution and collection of goods in the region),
- storage of goods (including cold storage, hazardous goods etc.),
- goods handling (packaging, commissioning etc.).

Additional functions are also provided at a freight platform:

- provision, repair and maintenance of vehicles, containers and transhipment equipment,
- provision of infrastructure, such as rail tracks, parking etc.,
- provision of areas for internal services, such as customs, public transport, security services,
- information systems, information services, training and consulting.

These functions when realised in a freight platform facilitate the following range of activities:

- *Receiving and Distribution centre*: Co-operation between forwarders means that higher capacities and/or frequencies can be realised by offering special services according to the specific demands of different branches. Furthermore, efficient distribution and collection of goods, as well as waste disposal schemes in problematic urban areas (e.g. city logistics) can be organised via a freight platform.

- *Centre of combined transport*: In addition to the transhipment function, other services necessary to increase the quality of intermodal transport and attract new customers can be offered.

In addition to these operative activities, potential for a further rise in the productivity of transport activities can be achieved due to:
- General services, which are provided centrally, such as maintenance of equipment, security services, training of employees, courier and waste disposal services.
- Operational services, such as vehicle maintenance, operation and maintenance of facilities, joint procuring of equipment and material.
- Information, planning and consulting services, such as information and communication systems (e.g. exchange of load capacity information), statistical services (e.g. communication with local authorities), conference services (e.g. joint usage of conference rooms, including equipment) and consulting among others.

The concept of freight centres is strengthened by such possibilities of co-operation, since specific services can be offered at relatively low costs. The activities and the additional services provided at a freight platform are summarised in the figure below.

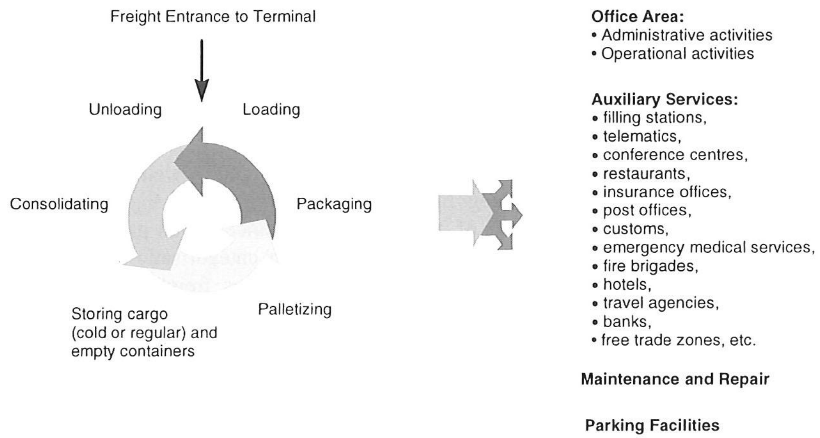

Figure 1 - Activities at a freight platform

Objectives related to the implementation of freight platforms

With the establishment of freight platforms (often based on a private-public partnership) different traffic and economic aims can be pursued:

Traffic aims
- an improvement in the efficiency of urban deliveries (i.e., a reduction in the number of trips through a corresponding increase in the load factor) can be achieved through co-operation between forwarders.
- a reduction in long distance road transport can be obtained by shifting transport from road to rail. Implementation of efficient transhipment facilities at a freight platform increases the speed of transhipments and thereby reduces the costs of intermodal transport.
- a reduction of traffic in the urban region. Trips to service stations (petrol stations, truck maintenance etc.) can be avoided when these services are provided directly on site.

Economic aims

Freight platforms can also be part of regional development programmes. The establishment of a freight platform improves the logistic infrastructure of the region and therefore helps to attract new industries to the region. The economic aims can be summarised as follows:

- stimulation of economic growth in the region,
- creation / preservation of jobs,
- establishment of new enterprises,
- improvement of the supply to industry.

Aims of operators and transport companies

The aims of private companies in establishing at a freight platform are mainly focused on increasing efficiency. This consists of:

- finding suitable spaces,
- bundling consignments,
- using intermodal transport,
- economic gains from additional services,
- participating in co-operations,
- attracting new customers.

Platform categorisation

Different types of freight platforms exist, but not all of them are equally well suited for realising each of the specified aims. The common categorisation of platform types by size and connected modes does not account for the different effects of freight platforms, since not all platform types will affect the local area or the economy in the same way. Therefore, a categorisation by function has been chosen for the REFORM project. According to their main functions, freight platforms can be categorised in four major groups:

- city terminals,
- freight villages,
- industrial and logistic parks, and
- special logistic areas.

Platform types

City terminals are very often purely road - road transhipment centres usually found close to the city or inside the city borders. Their main function is the distribution of freight from long distance trucks to smaller city delivery trucks. Due to the limited availability of urban areas, city terminals are rather small and, therefore, only a small number of service providers are located at these sites.
Freight villages, generally, focus on bi- or multimodal transport. The critical distinguishing element of these platforms is the transhipment terminal. Service providers are established on site, as well as a large number of forwarders and transport companies. These platforms are often located close to city borders, interfacing with long distance transport and city distribution services. These kind of platforms are very often found, e.g. in Germany and in Italy where they are known as GVZ or Interporti.
Locations with a high share of industrial activities are found in *industrial and logistic parks*. These platforms not only fulfil transport functions but are also used as industrial areas. The transport functions provided on-site are also used to attract new industries to the area.
In addition, *special logistic areas exist* - such as air cargo centres and sea ports - which provide an interface for additional transport modes. The main characteristics of the different types of freight platforms are summarised in the following table.

Table 1 - Freight platform types and characteristics

Category	City terminal	Freight village	Industrial and logistic park	Special logistics area
Transport modes	road-road road-rail	road-rail - (barge)	road - road road - rail	road - sea/air road-rail- sea/air
Main aims	traffic reduction in the city	modal shift and urban traffic reduction	regional economic growth and modal shift	regional economic growth
Operator	huge forwarder or retailer	operating company (public influence)	no operator	airport or harbour authorities
Company structure	huge forwarder or retailer	small companies, also large transport companies	large industrial companies and transport companies	large companies
Land use	small areas in the city	large areas in the outskirts	large areas in the outskirts or at old industrial areas	extension to existing sites in the city or in the outskirts
Land price	very high price	relatively low	relatively low	high
Quality of infrastructure	good access to the city	direct links to main infrastructure and access to the city	direct connections to main infrastructure	very good access to international infrastructure
Orientation	city	regional / international	regional / international	international / intercontinental

These various platform types make different demands on land, investments etc. A purely road-road transhipment terminal can easily be established in a city, as it requires relatively little land, whereas huge areas suitable for industrial and transport purposes are generally only available in the outskirts of a city, and often require high investments in infrastructure etc. Therefore, the definition of an optimal platform is not only constrained by specific goals but also by available spaces etc.

GENERAL MODELS FOR CALCULATING FREIGHT TRAFFIC

In the framework of the REFORM project, traffic calculation models were applied to all the case studies. This general model consists of two parts. Output in terms of truck flows generated by a freight platform is evaluated using the CATO model. The WIVER model is used to calculate freight traffic - both total traffic figures and their regional distribution, in terms of mileage per vehicle type and per branch - for the city and surrounding regions. These two models were combined to evaluate the impact of a specific freight platform on city traffic.

The CATO Model

Based on input data such as transport volume, description of the platform's functions, truck fleets used etc. this calculation model is designed to estimate the traffic effects of a freight platform. As a result, this model provides information regarding the truck trips to and from the platform divided by vehicle types and branches. This calculation method is sub-divided into a four - step analysis.

Assignment of the freight volume to the single modules of a platform

The input for the first step is the current or estimated transhipment volume of the different platform transport modes (road, rail, water). Existing or planned platform modules may be classed as further inputs. The assignment procedure will determine which goods of the single transport modes will be transhipped in each module and which transhipment facilities will be unaffected by the transport modes. In large metropolitan areas, imports of goods (to supply residents and visitors) are significantly higher than exports. The freight volume of a city-oriented freight platform will therefore be unequal. This fact must be considered in further calculations. In order to model these conditions on the platform, the ratio of regional imports and exports is used. Based on this ratio, the transport volumes of the single transport modes, which supply the platform will be subdivided. The interim result of the first step is the subdivision of the transhipment volume of the freight platform by the transport mode, import and export and the share of road transport on local traffic. Furthermore, a rough distribution of freight volume to the existing modules of the freight platform must be carried out. For the purposes of further calculations, the freight flows must be transferred into truck load units. Average capacity utilisation of heavy trucks can be used for this purpose

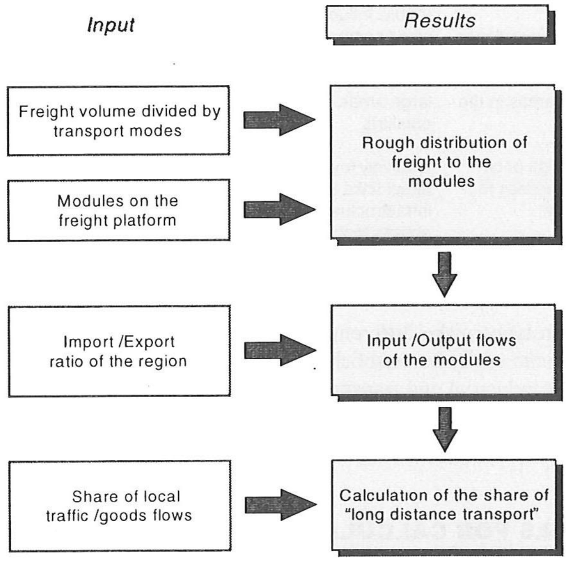

Figure 2 - Assignment of the transport volume to the modules

Distribution of the transhipment volume to the modules

This step examines whether or not the single modules can handle the transhipment volume allocated to them in the first step. Two characteristics must first be defined for each module in order to begin this analysis:

- The first characteristic is the transhipment capacity of each module, constrained by its size; and
- The second characteristic is the constraints of the transhipment facilities for each module.

The area size, number of floors of the buildings of the module, number of employees and the used or planned transhipment facilities can be used as input for calculating these constraints.

Knowing the module size and the sizes of the buildings enables one to calculate the size of the actual transhipment areas. Average parameters, regarding transport volume generation, may then be assigned to these transhipment areas. This can also be done for the average transhipment volume per employee in the single modules. These calculated transport volumes must also be transferred into truck load units. In addition, the capacity of the existing or planned transhipment equipment to handle the estimated transhipment volume must be calculated.

If, according to the findings of the second step, a module should not be capable of handling the volume calculated in the first step, the additional volume must be distributed to other modules. If the total volume calculated in the first step is higher than the capacity of all modules, one would have to assume that the modules would work at capacity and then reduce the total transhipment volume according to this capacity level.

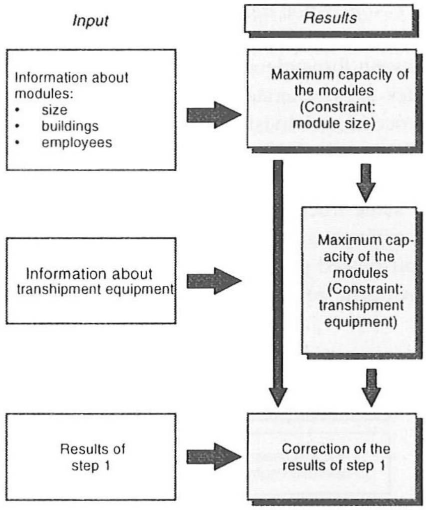

Figure 3 - Capacity restraint analysis

Evaluation of truck trips

The goods transhipped at freight platforms are usually distributed or collected by trucks in the urban area. Load capacity of the on-site vehicles must be calculated in order to determine if the truck load capacity is sufficient for the distribution and collection of goods. The input for determining load capacity is the number of vehicles located in each module. If the load capacity, the average load factor and the number of trucks are known, the number of trips needed for distributing (collecting) the freight volume of the platform can be calculated. It must be taken into consideration that each vehicle can undertake several trips per day. If the calculated total trips for distributing the goods transhipped at the platform are not sufficient to handle the total freight volume, it can be assumed that other trucks located at other locations in the region will take over these jobs. Using the remaining transport volume and the average load capacity of the trucks located in the region, the required number of additional truck trips can be estimated.

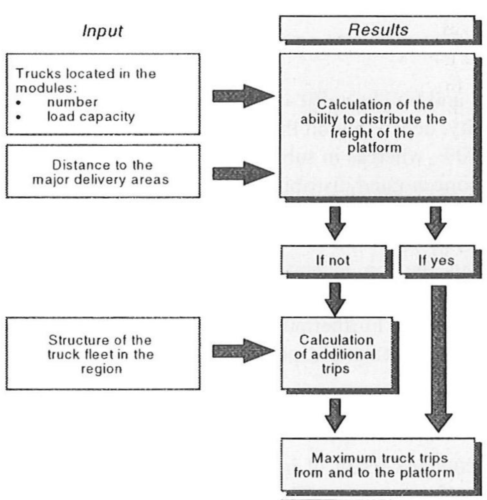

Figure 4 - Calculation of truck trips

Impact of other modules and co-operation agreements on the number of truck trips

Co-operation agreements between forwarders established at a freight platform can have a significant impact on the number of truck trips generated by the platform. The spectrum of such co-operation agreements reaches from the occasional division of freight to a complete disposition of the total fleet. Due to the wide range of co-operation agreement types, the effects cannot be formalised here. In order to evaluate these effects, empirical experiences should be considered. If transport-related services are established on-site, some truck trips for repairing, getting petrol etc. may be avoided. In order to calculated these trip savings, average figures regarding the frequency of service use must be estimated. Other non-transport-related platform services are likely to affect only commuter traffic as opposed to freight traffic. The traffic generation of such services can be taken from existing studies.

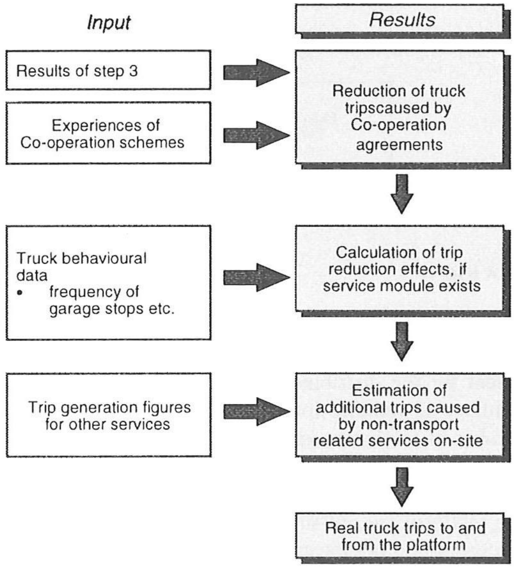

Figure 5 - Estimation of additional effects

The WIVER model

The share of commercial and freight traffic of the total urban road traffic is approximately 30%. This share varies within the city, depending on the type of urban districts. In the city centre, the commercial traffic can be up to 70%, whereas in suburban residential areas, its share drops to only 10%. Due to its high share and its concentrated distribution in terms of geography and time, it is not possible to realistically calculate commercial traffic by a flat-rate addition to the individual traffic. The WIVER model has been developed to deal with this problem. Using regional economic, structural and traffic behaviour data as an input, the trip generation and the interaction of commercial and freight traffic streams can be modeled. The results may be further divided into regional distribution, traffic per branch and type of vehicle used. Furthermore, in the framework of a sensitivity analysis, the inputs may be varied and effects of, for example, political planning measures can be evaluated.

The Basis of WIVER

Commercial traffic is a complex result of interactions between different economic sectors and individual traffic behaviour of companies. Therefore, in order to model commercial traffic, a huge amount of data regarding the economic structure and individual traffic behaviour is required. For the purposes of simplification, not every single company in the region is investigated but clusters are created representing branches with similar traffic behaviour. A similar simplification is necessary for the regional distribution of traffic. As not every street can be subject to investigation, the region is divided into research zones. For each zone, the number of companies and employees by branch must be identified. This structural information and additional information on traffic behaviour allows the calculation of commercial traffic per zone - as a traffic source as well as destination. The data requirements consist of the following.

Behavioural Data (per Branch)
- number of tours and destination distribution per vehicle and day
- purpose of trips
- distance and structural parameters for modelling source-destination interactions
- degree of efficiency of tours per branch and vehicle type
- distribution of trips over time

Structural Data (per Zone)
- distances in the research area
- calculation of the potential of each zone as a source (data: number of employees and number of traffic related employees per branch)
- calculation of the potential of each zone as a destination

Traffic Simulation

WIVER is suited to model urban freight traffic, providing information regarding total mileage, number of trips, number of tours, traffic distribution over time, subdivided by vehicle type and branch. Furthermore source/destination relations and transport- or trip chains can be modelled. For modelling these complex interactions, the WIVER model consists of different parts:
1. Calculation of the total commercial traffic volume on the basis of traffic sources;
2. Calculation of the distribution of commercial traffic per single destination;
3. Connection of sources with the destinations;
4. Creation of tours by connecting single trips; and
5. Calculation of the distribution over time,

These parts can be seen in a step by step approach to calculate commercial traffic. This simulation consists of a four step analysis.

1st. step: calculation and/or description of:
- number of tours;
- number of stops per tour; and
- tour purposes per branch, vehicle type, and zone.

In the first step, therefore, the total traffic volume will be calculated. This volume will be further divided by traffic volume per zone (source and destination). Furthermore, the structural interactions between branches will be investigated.

2nd. step: determination of the destinations and the modelling of source-destination interactions and single trips.

3rd. step: simulation of transport chains by combining single trips into tours. A matrix of traffic interactions is therefore created for calculating traffic distribution.

4th. step: The amount of commercial traffic varies throughout the day. The calculated traffic volume, and its geographical distribution, are further divided into time zones to illustrate the concentration of urban freight traffic over time.

The following chart illustrates these different steps and the results each of them provides.

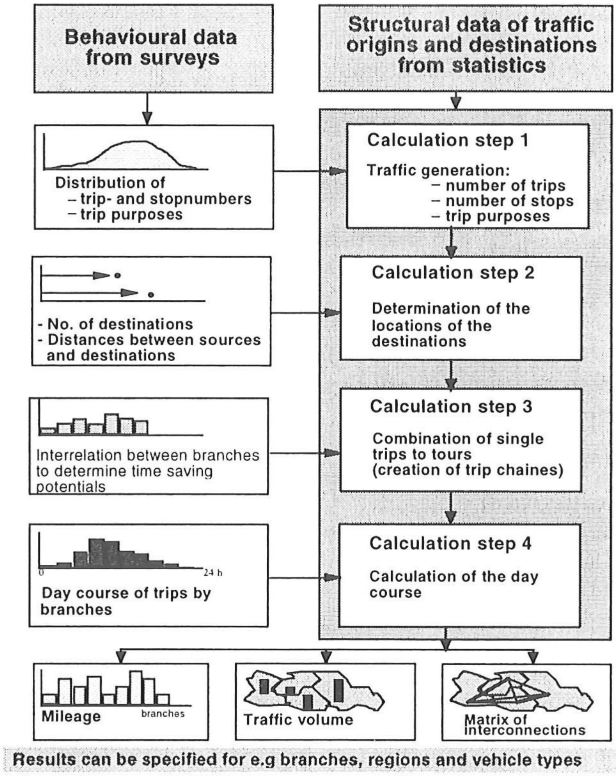

Figure 6 - Traffic calculation model WIVER

ANALYSIS OF FREIGHT PLATFORMS IN EUROPEAN CAPITALS

With the two models the truck traffic in the whole region and the local effects of a freight platform can be calculated. However, the impact of freight platforms on urban traffic can not be calculated by simply connecting the two models. This is due to redistribution effects. The establishment of a freight platform does not lead to an increase of the total transport volume in the area when all forwarders etc. located at the platform were formerly established in the region. In this case, the local distribution of freight traffic will change. Furthermore, the load factor as well as the number and sizes of trucks - and, therefore, the traffic behaviour - might be affected when a freight platform is established. However, the implementation of a freight platform leads to an increase of traffic in the surroundings of the platform and to a decrease in the areas, where the forwarders were located formerly. When combining the two models WIVER and CATO, the sources and destinations of truck traffic have to be changed according to the new regional distribution of commercial activities.

The effects of freight platforms can even be more complex than described above. Freight platforms are often planned to attract further industries or other commercial activities to the area. These industries will be a source and destination of additional traffic. The complexities only increase with the establishment of an intermodal terminal, which can lead to a modal shift from road to rail, leading to a reduction of the regional truck traffic.

The presented model WIVER is suitable for calculating freight and commercial traffic in the region. The complex effects of freight platforms have to have been previously calculated with the model

CATO, before freight platforms can be integrated as a traffic source and destination into the WIVER model. However, the induced redistribution effects (changes of locations of forwarders, modal shift, attraction of additional industries etc.) and changes in traffic behaviour (vehicle size, number of trips per tour etc.), have to be estimated for calculating freight traffic and for determining the impact of freight platforms in an ex-ante analysis. Due to the fact that the investigated freight platforms are at the beginning of the planning process, empirical input data for the CATO model was rarely available. Therefore, the accuracy of the results is somewhat limited.

Case study descriptions

In the framework of the REFORM project, existing and planned freight platforms in the cities of Berlin, Brussels, Madrid and Rome were investigated under specific local foci.

Berlin: A freight transport concept has been developed for Berlin consisting of two large intermodal freight platforms on the outskirts of the city and of six light bimodal platforms in the inner city. The Ostgüterbahnhof, an old transhipment point in the city is planned to become one of these centres. The platform is currently not in operation, due to a drastic rise in prices demanded for the area. A cost/benefit analysis proved that it was profitable for a forwarder to base himself at the Ostgüterbahnhof, since supplying the city from an urban location reduces the mileage, the number of trips and tours and thereby the costs incurred by the forwarder significantly. However, these cost savings will only justify a land price of approx. 350 DM/m^2, which is much lower than the price currently demanded.

Brussels: In Brussels, different transport policies and their impact on urban truck traffic were evaluated. One of these policies is the establishment of a road-road freight platform in the Brussels harbour area combined with a ban on heavy trucks in the city centre. This policy would lead to an increase in the number of trucks in the urban area, since the load of large trucks has to be distributed to smaller trucks. Possible counter policies, which could lead to traffic improvements, include bans on heavy vehicles in residential areas, tax variation regarding the pollution characteristics of vehicles and the improvement of parking conditions for deliveries.

Madrid: The Coslada Transport Centre is Madrid's main freight platform, located in the north-east of the city at the airport. It is planned to extend the platform to a multimodal freight centre. Next to the development of an optimal design, regarding platform functions, modules to be established, size of single modules, access and internal road system etc., the main focus lay on calculating the traffic effects of the extended platform. A fully operating freight platform would increase road traffic on the main roads leading to the platform.

Rome: No co-operations between operators currently exist for making deliveries to the centre of Rome, despite extreme congestion. The combined impact of congestion and the current freight regulations has caused the proliferation of low load factors, as the time allowed to make deliveries becomes the constraining parameter for operators. This situation has meant that Rome is ripe for the evaluation of freight distribution systems, in the eyes of both the public and private sectors. To deal with current problems, a freight distribution system was developed consisting of large intermodal freight platforms in the outskirts and 23 urban light freight platforms. In the proposed system, all general cargo has to be transhipped via these freight centres from which co-operated deliveries will be carried out. A cost/benefit analysis proved that this system is profitable for forwarders, due to less labour intensive transhipments at the terminals and co-operations. The implementation of this system would lead to a reduction of 28,000 trips daily, which corresponds to a decrease of the mileage in the city by 16%. However, due to the high investments necessary for implementing the system, significant public subsidies will be necessary. Furthermore, the forwarders are frequently unwilling to deliver in co-operations, making the implementation of the proposed system rather unlikely.

Results of the calculation - comparative analysis

The effects of freight platforms on urban traffic varied for the different cities. In Berlin, and especially in Rome, the establishment of bimodal city terminals connected to freight villages in the outskirts, led to a decrease in the total mileage driven by trucks. In Brussels and Madrid, the effect on the mileage of purely road orientated platforms was negative. In Madrid this increase of the mileage was due to the location of the freight village in the outskirts of the city, leading to longer delivery tours. However, the number of trips and tours would be reduced in Madrid, due to a more efficient organisation of the logistic processes in the freight platform. Nonetheless, the calculated impact of a single freight platform on the total urban truck traffic is generally not significant and often accounts for only a small share of the total mileage driven by trucks. The local effects of city terminals, however, can be quite significant, leading to a reduction in truck traffic, especially in the central areas. The situation in Rome was somewhat particular in that the case study did not investigate a single particular platform but, rather analysed a whole urban delivery system, which was based on a network of different freight platforms. The implementation of such a system - with its impact on the size and the load factor of city delivery trucks - reduces the number of truck tours and trips.

Table 2 - Impacts of freight platforms on truck traffic per workday

	Total mileage of trucks (WIVER)		Impact of freight platforms on traffic (CATO)	
	City	**Region**	**Mileage**	**Trips**
Berlin	2.55 Mio. km	4.0 Mio. km	- 2,976 km	no change in traffic behaviour
Rome	2.74 Mio. km	3.5 Mio. km	- 367,071 km	-28,533 trips
Madrid	2.38 Mio. km	6.2 Mio. km	+ 32,247 km	-97 trips
Brussels	2.30 Mio. km	3.4 Mio. km	+ 5,435 km	-314 trips

Even though the total impact of freight platforms on city traffic may not be significant, their establishment can lead to productivity gains for the companies established on site. Furthermore, general political and economic aims - such as establishing new industries, shifting transport from road to rail etc. - can be fulfilled by establishing freight platforms. However, the implementation of urban delivery systems is more likely when a network of freight platforms in the urban region exists.

GENERALISATION - IMPACTS OF FREIGHT PLATFORMS

Based on the findings of the REFORM project some general conclusions can be drawn. Total mileage driven by trucks in the urban area is lower under the following conditions:

- larger trucks are used,
- higher load factors are obtained, and
- higher than average numbers of goods are shifted from road to rail and are transhipped in urban freight platforms.

Bimodal (or multimodal) freight platforms are generally designed to have an impact on the above factors and are, therefore, generally able to reduce urban truck traffic.

Impact on the load factor and the size of trucks

In most European metropolitan areas, urban deliveries are carried out by a large number of forwarders dispersed around the city. The variety of each forwarder's clients, combined with congestion and freight regulations (e.g. restrictions on delivery times), lead to the use of a large number of smaller trucks and, consequently, low load factors. Co-operation between forwarders - in terms of joint deliveries to single clients or districts - will lead to larger freight volumes per delivery and, therefore, to the use of larger trucks and, consequently, to an increase in load factors. The total number of tours, as well as truck mileage, can be reduced by implementing such delivery systems. Since a number of forwarders are usually established at any single freight platform, the implementation of co-operation schemes between these forwarders is more likely when such platforms are established.

Change in the model split

Even though freight volume is permanently increasing, the transport volume by rail and barge remains constant, whereas freight volume by road is rapidly increasing. One of the main reasons for the relative decrease in rail and barge transport is the inefficiency of transhipments, which are time and, therefore, cost intensive. Freight platforms and combined terminals provide modern and efficient transhipment facilities, which can reduce the cost of intermodal transport significantly and, therefor, increase its competitiveness. Furthermore, the implementation of a European net of freight platforms - linking Europe's largest cities and industrial centres, allowing through trains to be used - increases the speed and competitiveness of rail transport.

Impact on urban traffic

The REFORM project calculated the impacts of freight platforms and urban delivery schemes on city traffic. It was proved that, in all cases, the number of tours and trips was reduced by the implementation of a freight platform (with the exception of Brussels, because the establishment of a freight platform was connected to a ban on heavy trucks). However, the impact of a freight platform on the total urban freight traffic is rather marginal, since only a few forwarders are involved. Significant traffic reductions can nevertheless be expected in certain areas, such as city centres. The impact of the implementation of an urban delivery system, involving all general cargo, is much greater, as has been proved for the city of. The impact of freight platforms on urban traffic depends highly on the platform type. In the following figure, the main differences of the different platform types regarding their impact on city traffic and their freight volume are illustrated. City terminals can have a huge impact on urban traffic, when city deliveries are organised more efficiently from these terminals. Freight villages as well as logistic and industrial parks, with their main impact on long distance traffic, can only have a positive impact on city traffic when co-operation agreements are taking place to organise city deliveries more efficiently. However, the freight volume of these parks is higher than freight villages, since large industries, with their high transport volume, are also established on site.

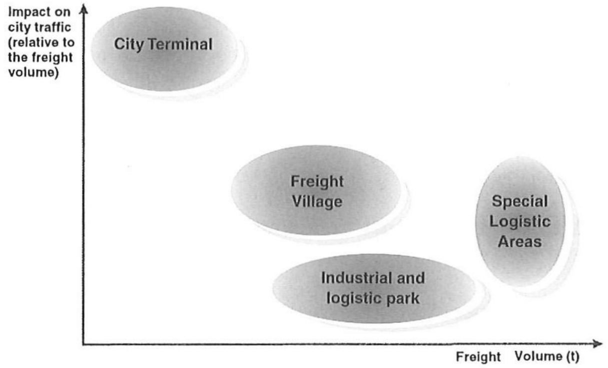

Figure 6 - Freight volume and traffic effects of different platform types

Impact on transport companies

The increase in the load factor - coupled with a decrease in the mileage and the use of larger trucks - leads to a reduction in vehicle use and, thereby, to a reduction in the costs for forwarders participating in delivery co-operation agreements. However, the implementation of co-operation mechanisms is critical, since transport companies often do not wish to relinquish control over merchandise, especially when one company's freight would be mixed with that of a competitor.

Impact on consignees
Co-operation mechanisms - such as group deliveries for transport companies - lead to a higher freight volume per delivery. One would expect that this efficiency increase in deliveries is appreciated by the consignees, since their business would be disrupted less when receiving more packages at one time instead of having them dispersed throughout the day.

CONCLUSIONS

As an interface between different transport modes, freight platforms are generally suited to increase the competitiveness of the railways and of combined transport. Furthermore, the establishment of freight platforms increases the likelihood of implementing urban delivery schemes. These schemes are able to increase the load factor of trucks and, therefore, lead to the use of larger trucks and a reduction in truck tours and mileage. These effects also reduce the costs for participating forwarders, making establishment on a freight platform profitable. The total traffic and economic effects can be summarised as follows:

Traffic Effects
- Reduction of long distance road transport (modal shift), due to the
  - Provision of efficient transhipment facilities at the platform;
  - European network of freight platforms; and
- Reduction of urban traffic, due to
  - Co-operation agreements - more likely at sites with a high density of transport companies - which lead to higher load factors and to a reduction in truck trips
  - Services provided directly on-site
  - Reduction in the distances between industries and transport companies when industries are established on site.

Economic Effects
- Regional economics: logistics centres increase the region's competitiveness;
- Impact on transport companies: benefits from co-operation agreements and the availability of on-site services; and
- Impact on consignees (recipients): benefits from co-operation agreements regarding deliveries (reduction of the number of deliveries).

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