

Final Report for Publication

Project Acronym: **LEAN**
Contract No.: PL97-2113

Introduction of LEAN LOGISTICS into urban multimodal transport management in order to reduce space requirements and optimise the use of transport modes

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1. Partnership

The LEAN project involved eight project partners with specific fields of experience. The project structure consists of seven work packages (WP 100 to WP 700) and for each work package a responsible partner was assigned.

1.1. *ALCATEL Austria*

Responsibility: WP700 - Project Management

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1.2. *ECONSULT*

Responsibility: WP400 - Analysis of Feasibility

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1.3. *BLSG - Business and Logistic Systems G.m.b.H.*

Responsibility: WP200 - Development of a City Logistics Concept

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1.4. *AST - A. Steigenberger Consultancy and Consortium*

Responsibility: WP500 - Elaboration of Recommendations

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1.5. PROINCA

Responsibility: WP300 - Applications to specific Urban Arias

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1.6. AICIA

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1.7. WRDL - Wickham Rail Development Ltd.

Responsibility: WP100 - User Requirement Analysis

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1.8. ARRC - Advanced Railway Research Centre

Responsibility: WP600 - Dissemination and Exploitation

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2. Executive Summary

2.1. Objectives of the project

It was the aim of the LEAN project to evaluate within a feasibility study proposed concepts at different levels addressing multimodal urban goods transport in order:

- ?? to reduce space requirements for road transport in sensitive urban areas;
- ?? to investigate the optimisation of the use of transport means via intensive application of telematics and 'LEAN' logistics operation;
- ?? to design City-Terminal operation in view of LEAN logistics concepts;
- ?? to provide recommendations for alternative transport modes in order to promote a shift of road transport to rail;
- ?? to improve the logistic transport chain system by the use of telematics;
- ?? to integrate city port facilities for City-Logistics applications.

The project programme approaches the problems of City-Logistics in major segments and considers them against the background of the specific requests of eight cities from Austria, Germany, Spain and the UK. The main thematic segments of applications were required to be analysed and proven against their feasibility in the nominated cities, as well as the development of the required control modules, to focus on a new approach to information networks in goods transportation.

2.2. Technical Description

A work breakdown structure was applied in order to ensure an efficient project progress with the following seven work-packages:

- WP100 User Requirement Analysis
- WP200 Development of City-Logistic Concept
- WP300 Application to Specific Urban Areas
- WP400 Analysis of Feasibility
- WP500 Elaboration of Recommendations
- WP600 Dissemination and Exploitation
- WP700 Project Management Activities

2.3. Results and Conclusions

User Requirement Analysis (WP100)

The LEAN partners defined different approaches to the methodology to establish User Requirements for the three defined User Groups. The following methods were used:

- ?? Interview (free or structured interviews with guidelines/semi-structured questionnaire) with key players of the user groups;
- ?? Workshops with key players of the user groups;
- ?? Existing research;
- ?? Conclusions of the general knowledge of the LEAN partners.

In order to find the right interview approach to the defined three main user groups, namely Freight Providers, Freight Receivers, Community, common interview guidelines were created. The requirements to emerge from the data collection and analysis were put into a concept matrix form in WP100. The results of this matrix information was then formatted into an ACCESS database to enable WP200 to produce the concepts required for each of the demonstration cities. WP100 formed the basis for the deliverable D1.

Development of City-Logistic Concept (WP200)

Work Package 200 of the LEAN project provides an integrated generic “construction kit” of concept elements for the improvement of urban freight transport. In the areas “Logistics”, “Telematics”, “Public Administration” and “Commercial & Marketing” altogether 102 elements are defined by a describing text, important factors for application, effects on corresponding user groups, cost parameters as well as relationships to other elements and links to the user requirements of WP100. Combined with guidelines for modelling and application this concept catalogue enables the development of specific urban solutions based on a wide and innovative variety of possibilities. WP200 was summarised in the deliverable D4/part1.

Application to Specific Urban Areas (WP300) & Analysis of Feasibility (WP400)

The objective of WP 400 is to analyse and evaluate the feasibility of the proposed city logistic concepts of WP 300 as well as various conceptual elements related to the chosen areas of research.

The difficulties caused by the different and specific preconditions, requirements and objectives related to the logistic concepts and demonstration cities lead to the use of the utility value analysis (UVA) as an applicable general method. After defining a general system of objectives this evaluation method allows a customising to be used in all concepts and by all partners of the consortium. Only in the case of the telematics concept of Linz, where a more business oriented approach was needed, another method is chosen.

First the basic system of objectives is defined. This system refers to three defined target groups of city logistic applications: Freight providers, freight receivers and the community. After definition of the generic weights the relationship between objectives and concepts and a calculation algorithm are worked out. These steps require a commitment between the Partners. This allows the different applied concepts in the cities Cordoba, Halle, Norwich, Regensburg, Sevilla, Wien and Wr. Neustadt to be compared within the UVA by the partners.

In the case of logistic concepts, the results show a dependence of high utility value on the use of innovative logistic tools as well as add on services. This means a general recommendation for proposing sophisticated city logistic concepts including city logistic service providers formed by co-operating freight providers, add-on services for the retail sector and the consumer, use of freight villages and city

terminals, use of computer-aided networking, telematics and other edp-tools. Positive environmental effects depend on the participation of the community: use of alternative vehicles, city terminals and load zone management type initiatives.

The telematics concept is evaluated by a business plan showing seven different scenarios of introducing load zone management into a city and demonstrates feasibility. The public administration concept elements are evaluated by adapting the UVA. Using the calculation algorithm the utility values of Cordoba and Sevilla are calculated and show the advantages of the proposed concepts. In a similar way the commercial and marketing concept is evaluated in WA450 and shows the relative importance of marketing in the chosen cities.

The UVA is a useful instrument for decision making which is demonstrated in the case study Halle, where an overall feasibility (including all types of concepts and different scenarios) is still being developed.

Despite the different views and results of the concepts and cities there are several key common aspects: the ongoing developments in the cities including the traffic and the transport of goods which lead to problems which are very similar. This project shows the different approaches: marketing oriented in Norwich, public administration minded in Sevilla and Cordoba and the more functional (logistical) view of the Austrian and German cities. Deliverable D4/part2 was the result of WP300, and WP400 formed the basis of deliverable D4/part3.

Elaboration of Recommendations (WP500)

Public Administration at all national and European levels should play the key role in moving public opinion towards more conscious use of still free resources, either by active opinion-leadership or possibly by means of taxation and restrictions, based upon a consolidated calculation of externalities on an industrial city, country and European level. Further support for co-operation in establishing logistic chains, changed modal split and multi-modal hubs is recommended. The results of WP500 were summarised in deliverable D5 with a very extensive annex comprising all the local recommendations on an individual city level.

Dissemination and Exploitation (WP600)

The main task of this Work Package was to create and then use the methodology for successful dissemination of the research activity and LEAN concepts. This meant developing a dissemination strategy to ensure continuous dissemination of information throughout the project, leading to exploitation and further research. This Work Package identified the important milestones where dissemination should be planned and implemented and the most appropriate forms of dissemination activity identified.

A strategy for the dissemination of the LEAN concepts was set up, including the following activities of dissemination:

- ?? Brochure inserts for each single demonstration city in the project;
- ?? Publication of papers and reports in specialised journals and magazines;
- ?? Conference presentations at international conferences;
- ?? Seminars at universities;
- ?? National workshops in the demonstration cities;

- ?? Presentations to National and European politicians and decision makers to use LEAN concepts for urban freight transport;
- ?? Presentation of LEAN concepts at trade exhibitions.

Load Zone Management (D2)

In order to reduce traffic jams in urban shopping streets e.g. due to delivery vehicles unloading their goods and blocking other traffic, a Load Zone Management System was designed and investigated.

The reason for the delivery vehicle drivers double-parking are that the loading zones reserved for loading and unloading are often used by private cars, or by other delivery vehicles. Since looking for a legal parking place takes a lot of time, and the driver might not find an empty parking space at all, most drivers chose to double-park, risking a parking ticket.

The problem of occupied loading zones therefore does not only effect the delivering drivers, but also private cars (customers of the shops in the street), because they cannot get past the blocking vehicles. The result is that potential customers decide to do their shopping in suburban shopping malls, where they readily find much more free parking space.

The problem of occupied loading zones can be solved via the achievement of two main points:

- ?? Two delivery vehicles should be prevented from arriving at a loading zone at the same time. It is necessary to co-ordinate the delivery of goods by different delivering companies.
- ?? Enforcement activity to prevent private cars to use loading zones reserved for parking.

In order to really solve the problem, a system was designed, allowing to reserve loading zones. The system was designed around a time- and slot management basis.

In a following analysis of feasibility (WP400) it was then shown, that this type of system can be managed on a fully commercially oriented basis.

Logistic Management System (D3)

The prototype system description for the Logistic Management System of BLSG provides a basic structure for the electronic data processing of logistic information chains from source to destination. It enables the integrated planning, processing, monitoring and controlling of transport flows from the source of the goods to their final destination - described in D3 as a prototype for single use of one logistic service provider; in ongoing developments enlarged for the use of co-operating partners as well as in terms of a core tool for logistic service centres. In addition, it provides the possibility to handle a variety of logistic services and add-on services. The level of monitoring of each logistic task / order processed in the Logistic Management System is the single position of a distribution order - defined by the individual item / material identification.

The availability of a Logistic Management System enables the possibility for consolidation of goods at their source, considering the efficiency for long haulage as well as already considering the specific requirements of goods distribution in urban areas - as a typical bottleneck comprising the efficiency of the complete chain.

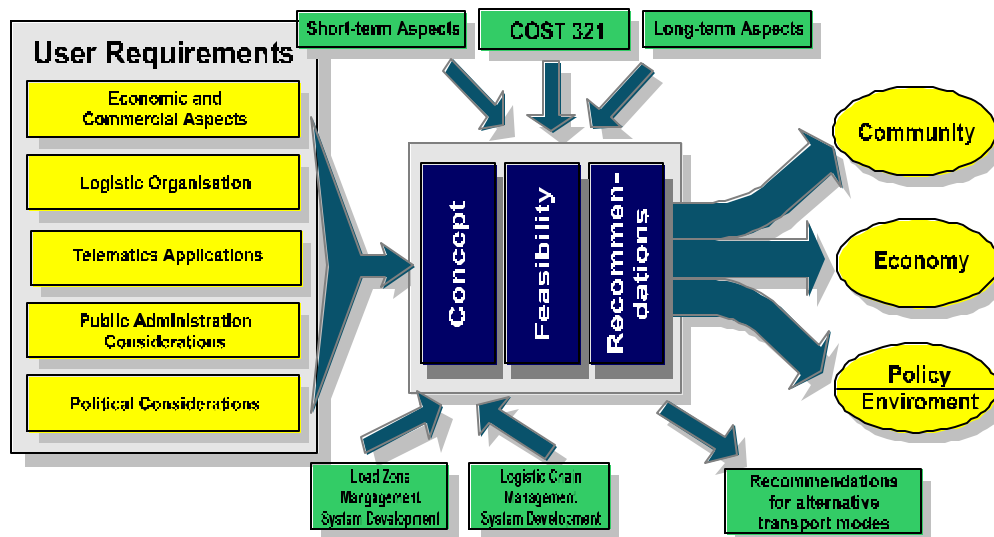
Greater efficiency concerning total economics as well as ecological can be achieved by the use of the system.

2.4. Collaboration sought

Most of the partners are already very active in ongoing national- and EC-projects dealing with all related fields of freight and logistics. Please contact the partners individually via the responsible project members for further collaboration.

3. Objectives of the project

The objective of the LEAN project was the elaboration of different City-Logistic concepts in order to improve efficiency and flexibility of goods distribution in urban areas. This would be achieved by the application of these innovative City-Logistic concepts, including telematic aspects (in terms of control systems, tracking & tracing, transport information) to reduce overall space demand for goods distribution (storage facilities and space requirements for transport facilities specifically on road). The concepts were evaluated from an economic perspective, the public administration viewpoint, political acceptance and environmental impacts. The geographic scope of the project included several partner cities in Austria, Germany, Great Britain and Spain.



3.1. Major Inputs:

Aspects from various points of view had to be considered.

Economic and Commercial Aspects

Economic and commercial aspects are related to functionality, ease of use, best operation and efficiency in operation. Inputs from logistic service companies, freight forwarders, freight operators, fleet operators and retailers were considered.

Public Administration Considerations

Public administration aspects were focused on achieving sustainable freight transport in urban areas, where space on the road network is limited and most urban areas are sensitive to transport operations. Efficient use of the urban area in view of distributing and recollecting of goods is required.

Political Considerations

Environmental conditions and improvement of quality of life in terms of noise, pollution, car-emissions etc. are of vital influence to political decisions. Contributions of innovative control applications in urban goods distribution have to be weighted in balance to the political targets in environment and sustainable traffic.

Logistic Organisation

Implementation of telematic supported freight transport operation is a basic influence on logistic concepts. All aspects in the complete logistics operation on the different actors in the logistics chain in freight transport in view of highly automated data management and distribution have to be carefully considered.

Telematics Applications

Technological implications have to consider cost, efficiency of operation and ease of use either on the user interface or on maintenance levels.

3.2 Project Steps: Concept, Feasibility, Recommendations

In order to reach the defined aims of the project, a flexible methodology for the project was developed. To achieve the project's aims, various factors were considered which defined priorities. Simultaneously recognising the complexity of the various tasks to be performed.

The core activities of the project were:

?? to define generic concepts for city logistics;

?? to study feasibility;

?? to identify and prioritise recommendations for further actions or implementation.

Concept

If complex City-Logistics concepts are to achieve acceptable results in the improvement of the actual situation of an urban area at all, especially concerning the urban freight transport, these can and will only work efficiently and effectively, if the full range of different aspects is analysed and considered in relation to the concept. It is unlikely that the individual concept elements will realise the given aim to reduce the impacts of freight urban traffic with all the consequences and problems for the environment. This implies that only by the use of an integrated concept view (considering the interactive relations between the addressed areas of research) and individual requirements of specific urban areas and local applicable policy aspects can progress be achieved.

In this sense alternative solutions for optimisation of urban freight transport will be developed at concept level based on different views and areas of research and the application of research results to the specific urban areas identified in the project.

A major strength within this project were the integration of a series of already developed generic modules. Development of load zone management systems with an extensive telematics application concept, the development of software based control of logistic information chain management and the application scenarios such as city terminals or city port facilities are prime examples. The result was that the

overall LEAN city logistic concept can be brought to a high level of fast applicability, acceptance and economic operation.

Feasibility

The main tasks of feasibility analysis are:

- ?? Evaluation of the feasibility with respect to the alternative basic concepts for City-Logistic as well as to the key detailed research areas;
- ?? Extract of results and experiences of the user requirements analysis, concept design and applications to specific areas as basis for the elaboration.

In addition to these activities, the results were evaluated against the parameters defined in the COST 321 programme and their possible transferability to the identified urban areas as a follow up process.

Short term aspects have to be specifically considered in view of fast implementation of the focused concepts. Economical and operational views and benefits to the user were a key focus. Long term aspects have been analysed by accompanying studies in relation to the environment, the quality of life and with respect to long term changes in the economic development of respective work areas.

Recommendations

The LEAN project provides:

1. Identification and elaboration of recommendations for implementation in general and detail, based on international experience and best practice.
2. Strategies for dissemination and exploitation are developed and activities carried out as required on a selective basis.
3. Development of requirements for alternative transport modes for the distribution of freight in urban areas, taking into account the necessary user requirements.

3.3 Major Outputs: Economic, Social and Environmental Impact

For any of the research results to have economic and social impacts they must be applied. LEAN facilitates this process by ensuring the dissemination of the results to the appropriate target audiences to enable their application. This activity increases the potential of an individual project as projects to be implemented and therefore increases their potential for social, environmental and economic impacts and acceptance.

Community

A major aspect in the view of the wider community is to release urban areas from negative freight transportation impacts without massive negative influence to their economical constitution and development. Co-ordination of load/unload operation within a very limited urban space is of vital interest for the administration of the communities.

Economy

From an economical point of view cost reduction, improvement of productivity and an increased level of service in the logistic transport chain is necessary. From the development of the concepts and with the results of the feasibility, proven recommendations and respective cost benefits can be generated and applied.

Environment

The efficient operation of road vehicles, fast transshipment of goods and avoidance of traffic congestion due to urban freight transport will have massive impacts on environmental conditions in cities. The LEAN project did not perform a detailed study in this area, general recommendations and estimations on this were identified.

4. Means used to achieve the objectives

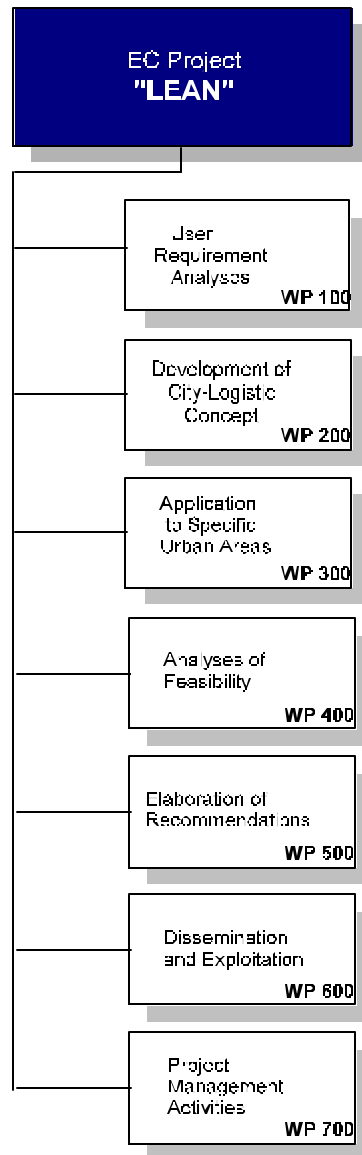
A work breakdown structure was applied in order to ensure an efficient project progress, and the output of the following work packages were summarised in deliverables:

WP100 in D1

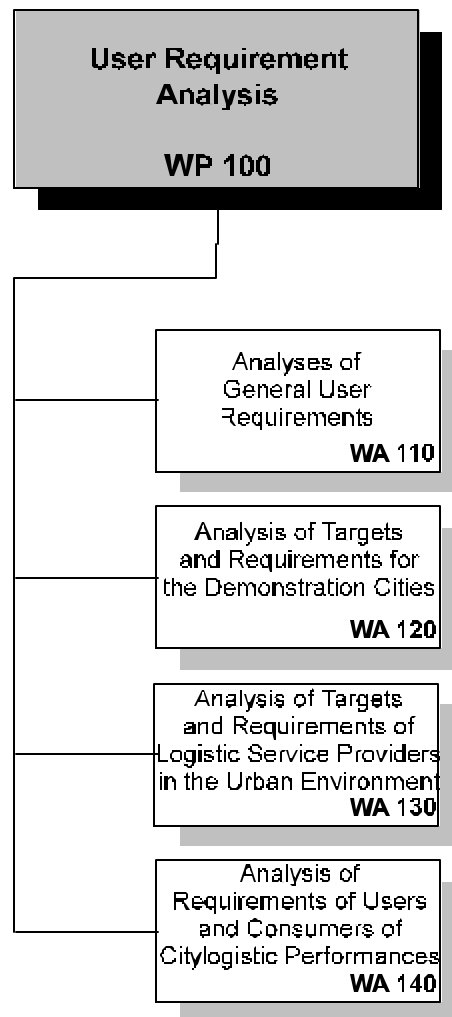
WP200,300,400 in D4

WP500 in D5

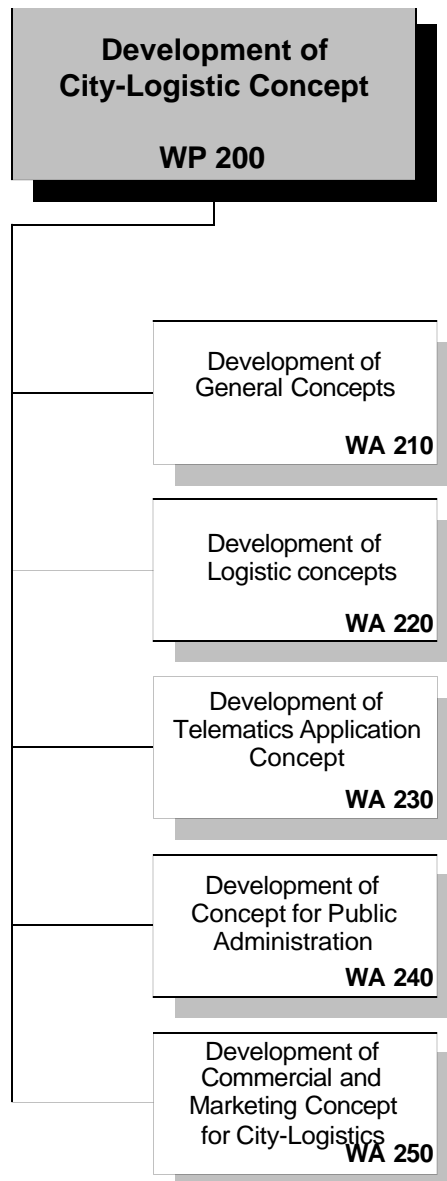
4.1. Overall Work Breakdown Structure



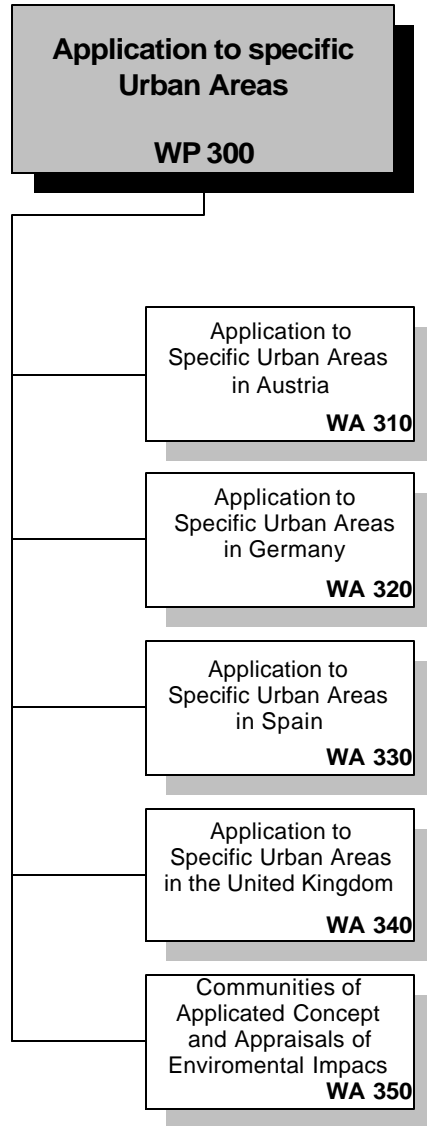
4.2. WP100 User Requirement Analysis



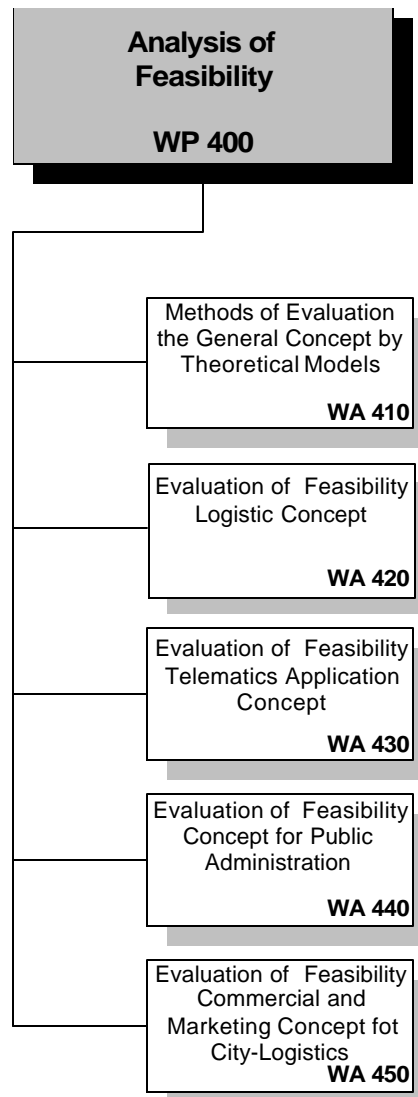
4.3. WP200 Development of City-Logistic Concept



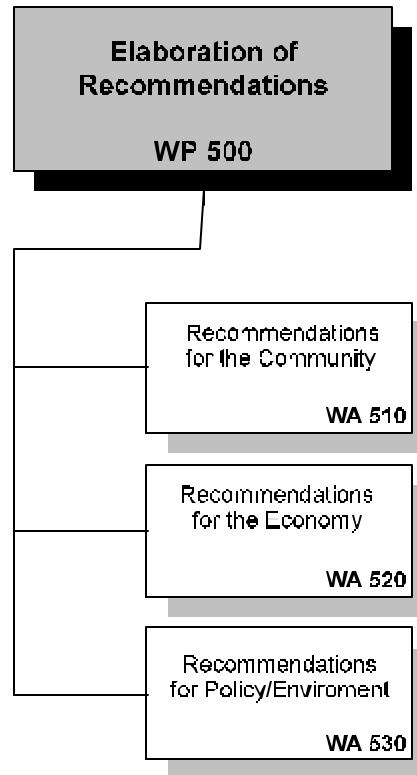
4.4. WP300 Application to specific Urban Areas



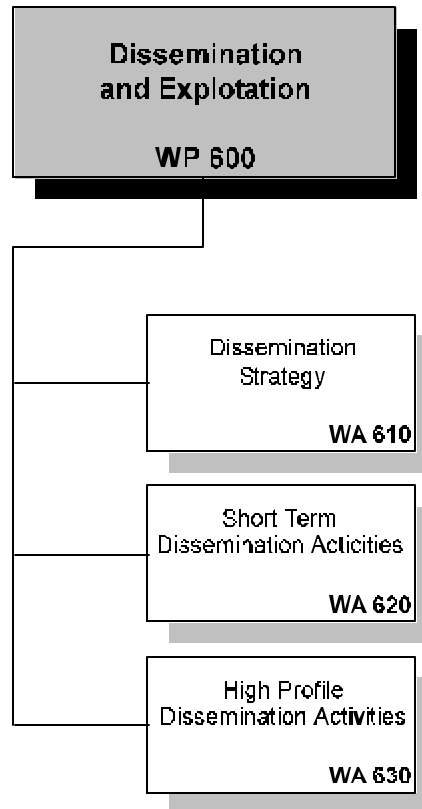
4.5. WP400 Analysis of Feasibility



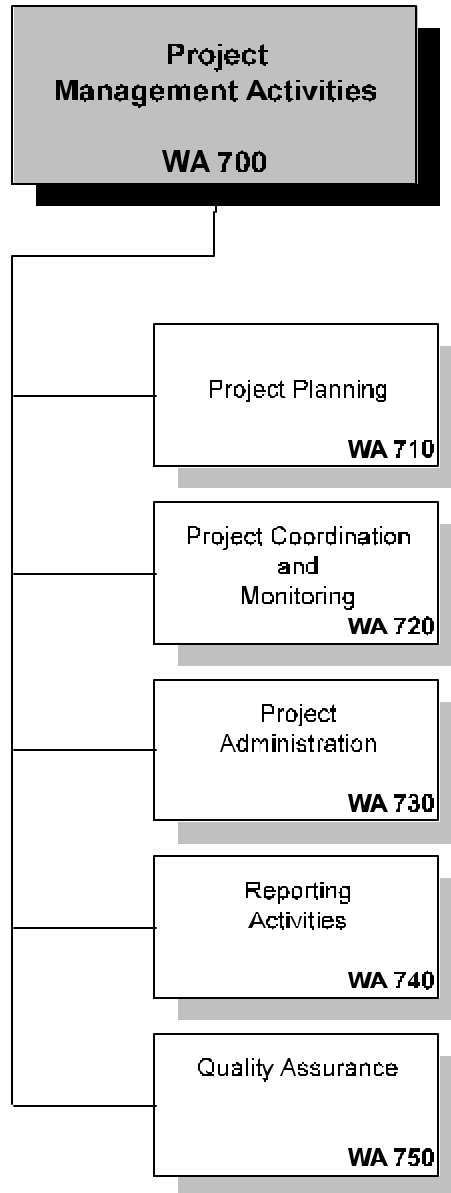
4.6. WP500 Elaboration of Recommendations



4.7. WP600 Dissemination and Exploitation



4.8. WP700 Project Management Activities



5. Scientific and technical description of the project

5.1. D1: User Requirement Analysis

5.1.1. Method used to access user requirements

The LEAN partners established different approaches as a means to establishing the User Requirements for the three defined User Groups. The following methods were used:

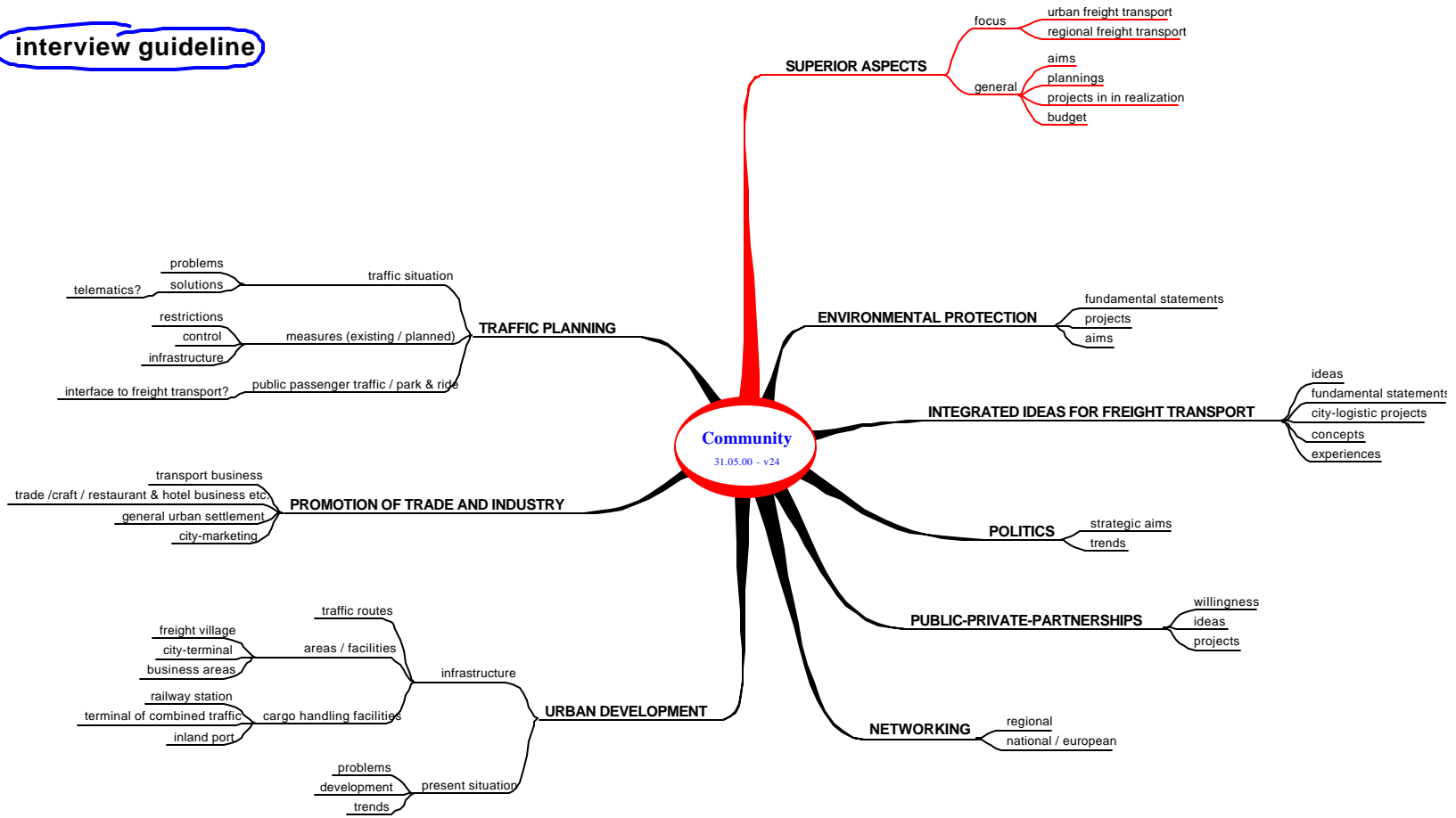
- ?? Interview (free or structured interviews with guidelines/semi-structured questionnaire) with key players of the user groups;
- ?? Workshops with key players of the user groups;
- ?? Existing research;
- ?? Experience and knowledge of the LEAN partners.

In order to find the most effective interview approach to the defined three main user groups, namely:

- ?? Freight Operators (companies providing freight and / or logistic services, especially parcel delivery service, forwarder / carrier, haulier plant operating transport companies / company owned transport, warehouse keeper, handling business, logistic service provider etc.);
- ?? Freight Shippers and Receivers (each company or organisation which produces or receives goods by freight operators);
- ?? Community (in terms of the ultimate consumer, the population in general, local government / municipal administrations as well as promoters such as local associations, public companies, non profit organisation that may influence the economy & business situation of the city).

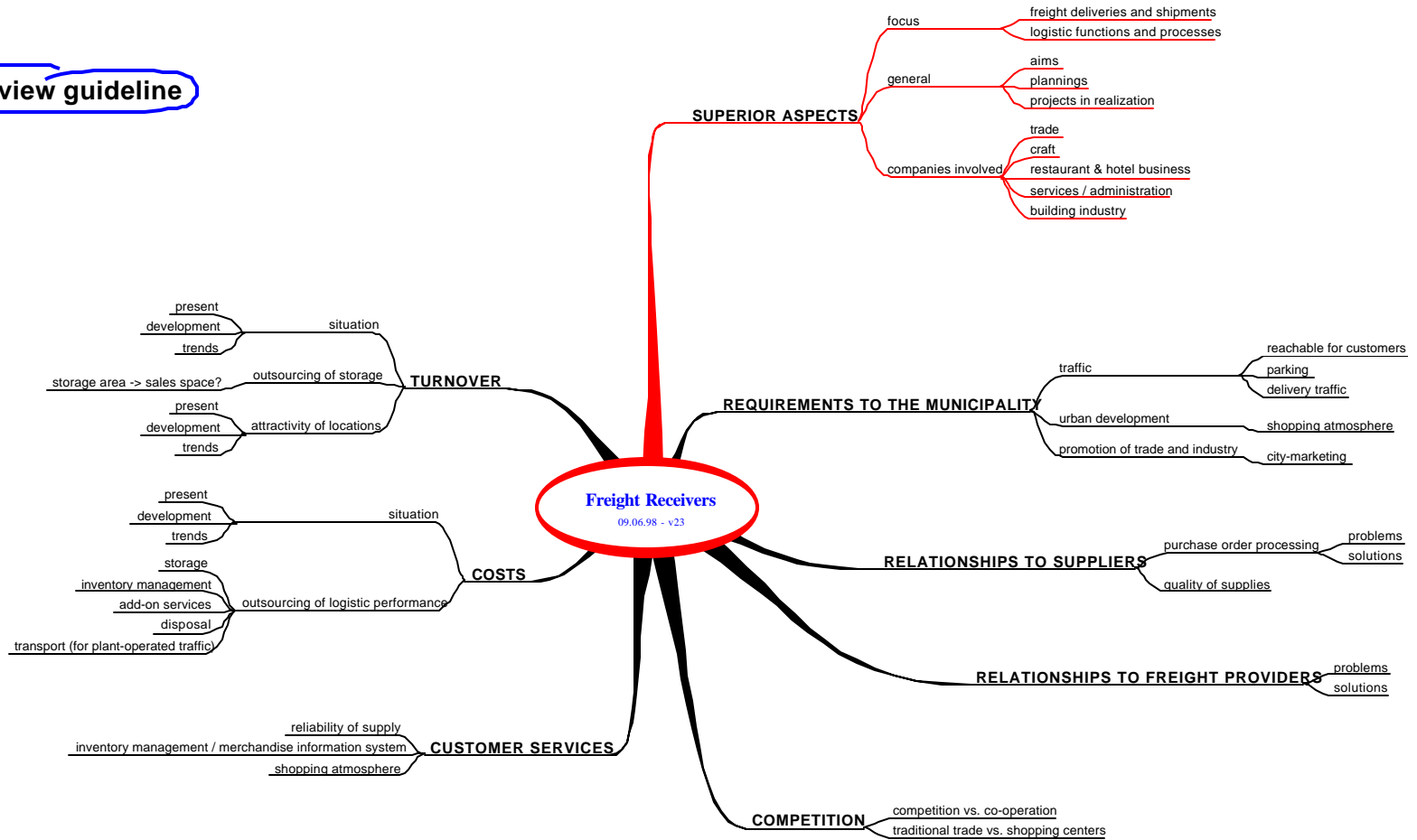
5.1.1.1 Interview Guideline – Community

interview guideline



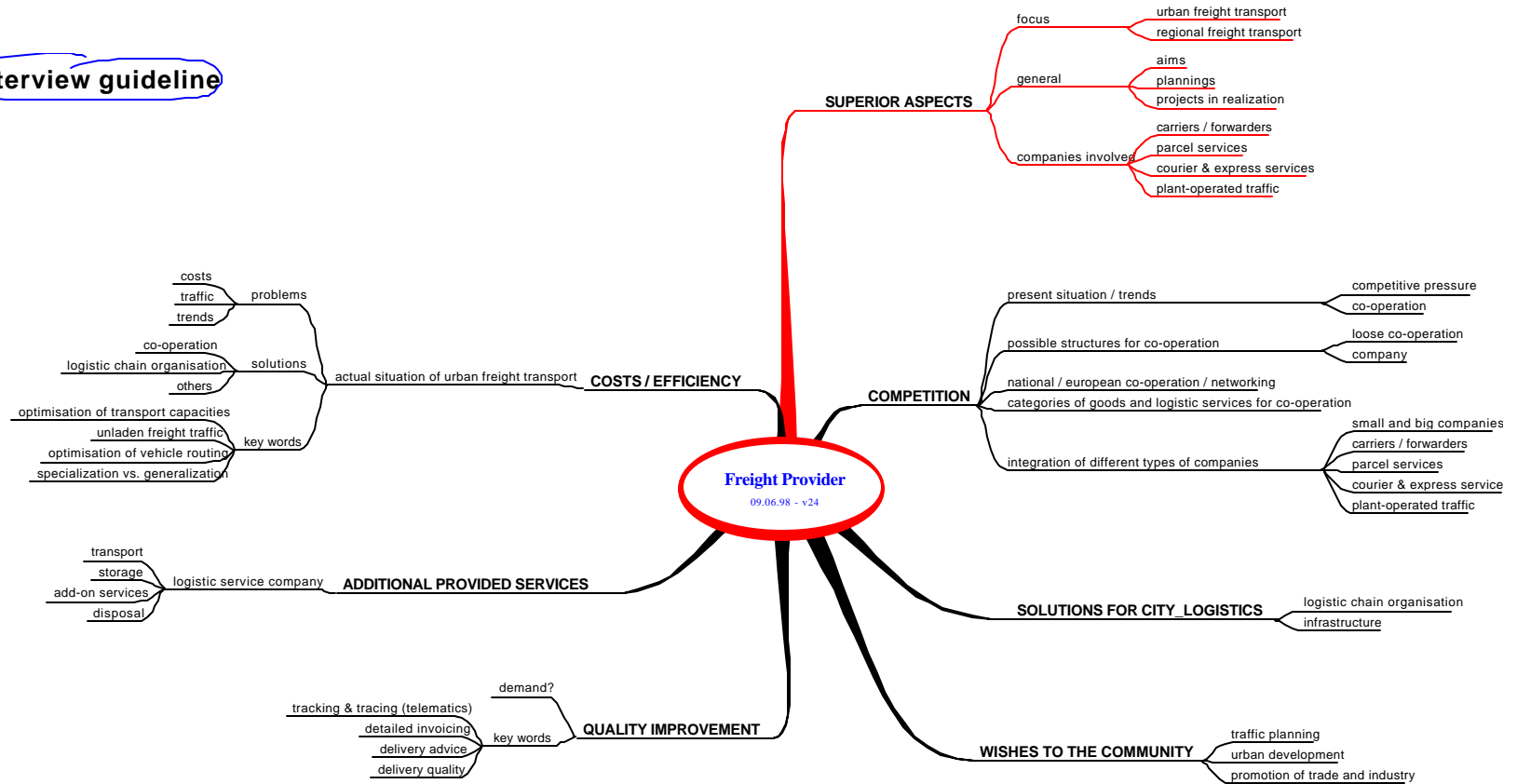
5.1.1.2. Interview Guideline – Freight Receivers

interview guideline



5.1.1.3 Interview Guideline – Freight Providers

interview guideline



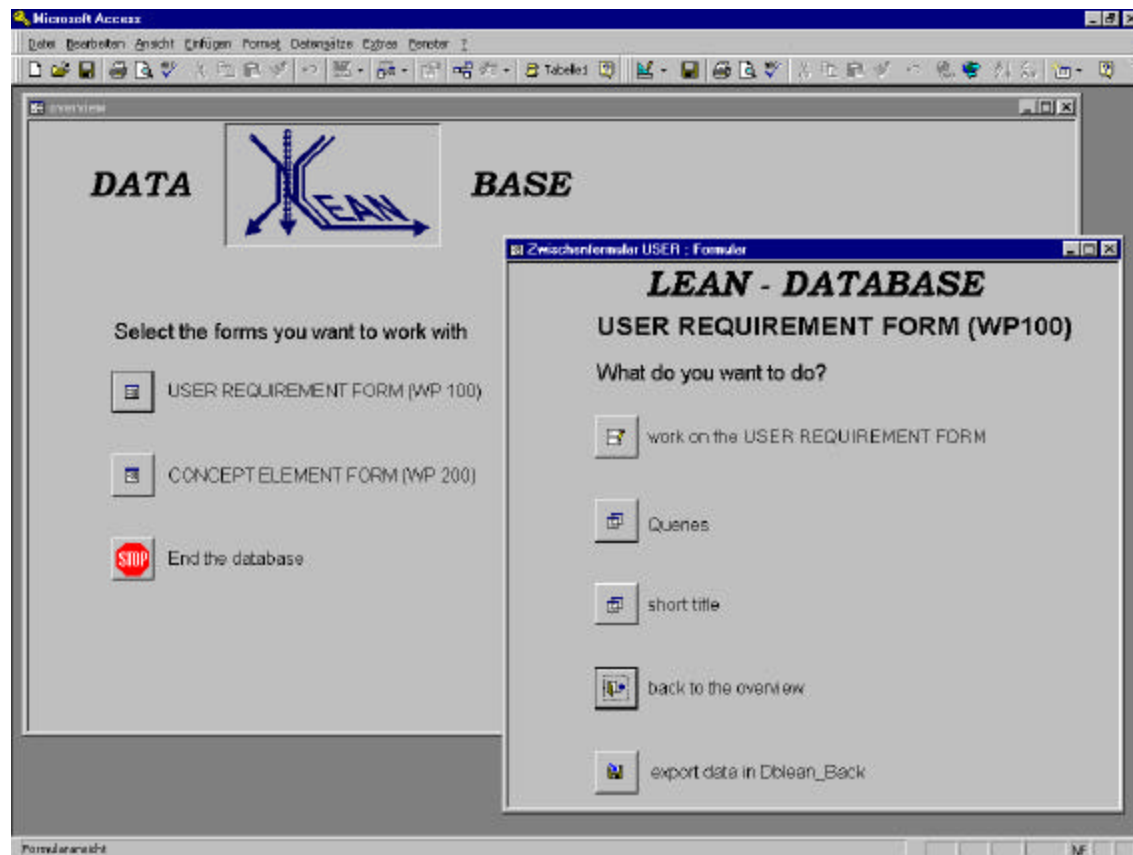
5.1.2. User Group Matrix

The requirements to emerge from the data collection and analysis were put into a concept matrix form as part of WP100. The results of this matrix information was then formatted into an ACCESS database.

5.1.3. Development of the Access Database

5.1.3.1 User Requirements Form in the LEAN-Database - Description

For the structured collection of user requirements by all partners a WP100-table was created in the LEAN-database.



Source: DBLean - Overview and WP100-menu, BLSG 1998 (Tool: Microsoft © Access 97)

Basic functions of the WP100-application are:

- ?? insert form;
- ?? complex queries;
- ?? listing for short titles;
- ?? data exchange between the LEAN-partners.

Microsoft Access - [USER REQUIREMENT FORM]

date: 17.02.98 Reference Number: E / Sevilla / COMM / 0004

county: town: User Group: number:

Use Requirement: Guidelines for improvement of the traffic situation in historical centre, Nervion and Los Remedios
 Look of an overall view to allow for the shared use of the reduced traffic capacity of local streets at the city centre
 between private cars, public transit and freight carried

source of Use Requirement: Interview short title: Traffic Congestion

locally determined problem area: Historical centres, Nervion and Los Remedios

remarks:

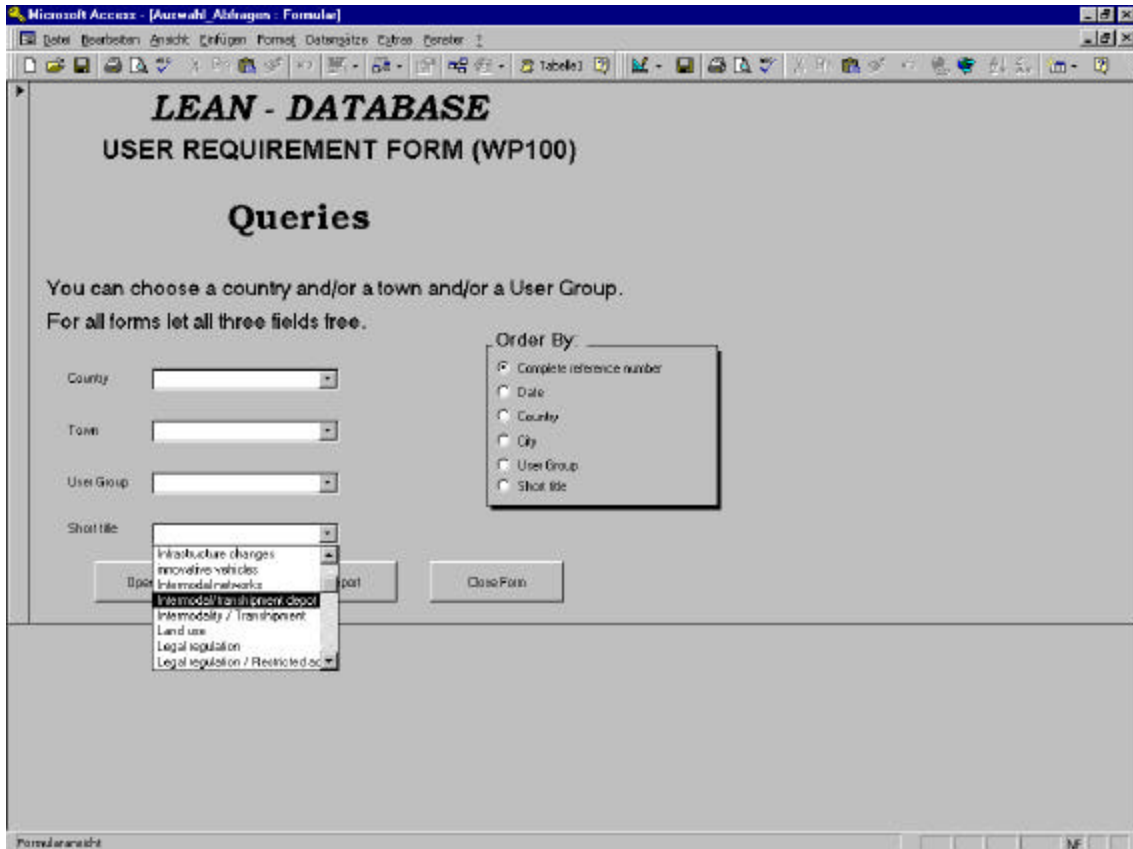
Same Requirement as	related to	related Concept Element
1: E /Londoba /COMM/01003	1: E /Sevilla/COMM/0003	1:
2: E /Londoba /COMM/0007	2:	2:
3: E /Sevilla /COMM/01006	3:	3:
4: E /Sevilla /PRD/0004	4:	4:
5:	5:	5:

Datensatz: 14 von 238

Formularansicht

Source: DBLean - WP100-insert-form, BLSG 1998 (Tool: Microsoft® Access 97)

The complex query-structure allows combined queries concerning COUNTRY, TOWN, USER GROUP and SHORT TITLE, listed in different possible orders.



Source: DBLean - WP100-query-form, BLSG 1998 (Tool: Microsoft © Access 97)

5.1.4 European User Requirements

It was agreed by the project Partners that between 20 and 30 User Requirements would be identified which were common across all the European countries. It was agreed that some of the requirements could only be city specific and the individual partners would identify these when the application to cities is performed later in the project.

5.1.4.1 Approach to the European User Requirements

Firstly, a set of common user requirements were identified and given a key word to enable clusters of common themes to be identified. From these lists emerged a list of common themes.

This list of common themes was then discussed further by the Consortium. It had to be established, due to the variety of languages, that all understood and had the same meaning for the terms being used. The group then brainstormed around the chosen themes, audit trailing their requirements back to those on the database requirement forms. From the lists compiled for each country there were twenty-six global User Requirements agreed upon.

5.1.4.2. Definition of European User Requirements

The following user requirements evolve from those formulated by the different user groups in all the cities participating in the project. They can be considered global user requirements on a European level.

ENFORCEMENT & LEGISLATION

~~∞∞~~ Discipline issues

Ensure through control and sanctions that all the implemented regulations are fulfilled by the user groups.

~~∞∞~~ Load zone management

Development of rules for the use of load/unload zones, in order to ensure adequate vehicle rotation and full employment of the zones available.

~~∞∞~~ Delivery time

Regulations concerning: time windows for access to restricted areas (i.e. inner city centre), time slots for the use of load/unload zones, etc.

~~∞∞~~ Legal regulations/access

Introduction or readjustment of regulations concerning access and delivery operations for freight companies.

CONSULTATION/CO-OPERATION

~~∞∞~~ Extension and new construction of road infrastructure

Commercial development of certain areas of the city with the aim of reducing congestion in others due to freight operations.

~~∞∞~~ Freight companies co-ordination

Establish grounds for economies of scale in delivery operations, commensurate with commercial priorities, with the aim of reducing the number of trucks in the city.

~~∞∞~~ Co-operation between different user groups

Involvement of all user groups, not only freight forwarders, in the problems related to urban freight operations, as part of the overall traffic situation. The suggested solutions should evolve from consensus among all user groups.

INTERMODAL TRANSHIPMENT NETWORK

~~∞∞~~ Commercially driven intra-modal freight transfer

Use of an adequate size of truck for each stage of the freight operation, with the objective of increasing truck loads and reducing the size of trucks carrying out the final delivery.

~~∞∞~~ Promotion of nation-wide intermodal networks (freight villages)

Interconnection of all the intermodal and freight terminals both on a national and European level, facilitating modal shift, increased resource sharing and better logistic chain management.

- ⌘ Commercial reinforcement of modal split
Establishment of incentive policies in order to transfer a higher percentage of the freight entering the city via road to other modes. Only small road vehicles (vans) would be used for the final delivery stage.

LOGISTIC SITES & FACILITIES

- ⌘ City terminals
Medium-sized facilities located within the boundaries of the city (or in certain areas inside the city with enough ground available) used for intermodal and intra-modal shifts, warehousing, consolidation and as an operations' centre for the final delivery.
- ⌘ Integration of existing infrastructure and new logistic networks
Use of information systems and logistic chain management for introducing the existing logistic infrastructure into wider scope scenarios.
- ⌘ Freight village centre/freight village networks
Interconnected regional freight centres, with important intermodal facilities, with the objective of outbound load consolidation and inbound load breaking. These centres could be connected at an international and national level.

TRAFFIC MANAGEMENT & OPERATIONAL PLANNING

- ⌘ Information systems
This kind of system tries to inform citizens and, especially drivers, about data that could be valuable to them, e.g. current traffic situation, speed recommendations, congestion problems, etc.
- ⌘ Narrow street usage
There are narrow streets, usually in historical city centres (as in the cities in the LEAN project), which limit vehicle flow. In this case, with a slow traffic rate, van stops for cargo activities could be allowed during short periods of time.
- ⌘ Parking space
- ⌘ Pedestrian streets/areas
Pedestrian areas imply constrictions for traffic planning, but develop it commercially and make it more attractive.
- ⌘ Disposal of waste materials
Operational planning should include not only the supply and distribution chains, but also the systems of waste collection and disposal. Waste generation is usually directly proportional to the level of development in an area and its business activity levels.
- ⌘ Time required for delivery
Any kind of urban planning ought to consider periods for access and distribute freight into the areas under pressure.
- ⌘ Home delivery service

Home delivery is even more frequent, and some times more city-logistically acceptable for the community, particularly as a consequence of e-commerce and e-tailing.

- ✂✂ Less environmental impacts
General recognition of traffic related impact in urban areas.
- ✂✂ Better consideration of freight in city planning
Freight traffic is the hidden agenda in urban planning, and the freight providers' interests are not recognised at the same level as the other user groups.

LAND USE & TRAFFIC PLANNING

- ✂✂ Urban freight construction
Consideration of freight delivery requirements in the regulations of urban development, building design, traffic reorganisation, etc.
- ✂✂ Promotion of retail in inner city centre
Despite the logistic difficulties involved, commercial activity in the city centre should be considered as a vital way of keeping the city alive, and therefore promoted at all levels.
- ✂✂ Shuttle train/tram
Introduction of intermodal philosophies inside the city, for carrying loads on rail up to the inner city centre where this is feasible and economic.
- ✂✂ Efficient goods traffic
Improve the efficiency of freight movement inside the city, beyond issues like congestion or lack of parking spaces.

As can be seen, the global requirements are concentrated around the issues of 1) Traffic Management and Operational Planning 2) Land Use and Traffic Planning 3) Enforcement and Legislation Planning. These areas are linked in the provision of freight services to all three user groups. The twenty-six requirements were used as the baseline for Work Package 300 when concepts from Work Package 200 were applied to specific areas.

5.2. D2: Load Zone Management – Prototype Description

5.2.1 Introduction

Traffic jams in urban shopping streets are very common. There are many reasons for them. One being the delivery vehicles unloading their goods whilst double-parked, blocking the traffic.

The reason for the drivers to double-park are that the loading zones reserved for loading and unloading are often used by private cars, or by other delivery vehicles. Since looking for a legal parking place takes a lot of time, and the delivery driver might not find an empty parking space at all, most drivers choose to double park, risking a parking ticket or other penalty.

The problem of an occupied loading zone therefore does not only affect the delivery drivers, but also private cars (customers of the shops in the street), because they are constrained by the blocking vehicles. The result is that potential customers decide to do their shopping in sub-urban shopping malls, where they find free parking more readily available.

In order for the urban shopping streets to survive, the traffic problem needs to be resolved. Part of the traffic problem are the occupied loading zones. This problem can be solved by the following means:

- 1) Delivery vehicles do not arrive simultaneously at a loading zone at the same time! It is necessary to co-ordinate the delivery of goods by different delivering companies.
- 2) It is important to prevent private cars from using loading zones reserved for parking by more effective sanctions.

In order to really solve the problem, a system must be designed, to allow forward reservation of loading zones. The system would have to work on a time- and slot management basis.

5.2.2. System requirements

There are a number of things that have to be considered, in order for such a system to be accepted by the customers:

Main points:

- ?? It has to be ensured, that the vehicle using a reserved loading zone, is authorised to use it. Since a reservation costs money it has to be guaranteed, that the reserved loading zone is empty when the booked vehicle arrives;
- ?? It has to be ensured, that no unauthorised reservations can be made to invalidate genuine bookings.

Further requirements:

Automatic reservations should be possible and should also be the preferred way of reserving. Only in exceptions should it be possible to reserve via an operator. It is intended, that these automatic reservations can be made from any PC on the internet, using a standard HTML-browser.

The main advantage of this is, that there is no special program needed in order to use the System. The internet is accessible for almost anyone and using standard HTML-browsers makes the System platform-independent and, furthermore, it eliminates the need for support. (If the user has problems setting up a connection, he has to contact his internet-provider and not the loading-zone system provider!)

The following System-requirements are all met by the chosen internet solution:

- ?? The system is accessible to the largest group of potential genuine users;
- ?? The user doesn't need any extra programs to use the system, therefore he has no extra costs and no trouble setting up his system in order to be able to place reservations;
- ?? The system is safe – this of course requires the system provider to take all necessary measures to prevent misuse of the system.

Reservation process

As previously mentioned, the customer who wants to reserve a loading zone has to fill out a form on a web page. First he has to contact the web server via an Internet browser on a PC. When he clicks on the button for the reservation process a form appears on the screen. He must then insert the necessary information for identifying the required loading zone as well as the time of the loading activity and the time. The following pictures show the reservation form the user sees on the screen after choosing the reservation process from the main menu.

Loading Zone Management ALCATEL

Please insert the required information for your reservation:

Address of the loading zone: Place: Street:

Nr. of the Loading Zone:

Reservation Data: Date:

Time: :

Time span:

Length of the vehicle: ?

Weight of the vehicle: ?

First the customer must choose the address of the desired loading zone. Therefore he has to click on the button on the right in each textbox. Now he can choose one of the predefined possibilities. This method prevents possible typing errors by the customer. If the user doesn't know the number of the loading zone he can click on the button <Available Loading Zones>. Then he gets a list of all loading zones he can choose. The next block handles the time information of the reservation. Here the customer has to insert the date, time and time span of the desired loading activity. In the last block he has to choose one of the predefined possibilities for the length and weight of the delivery van.

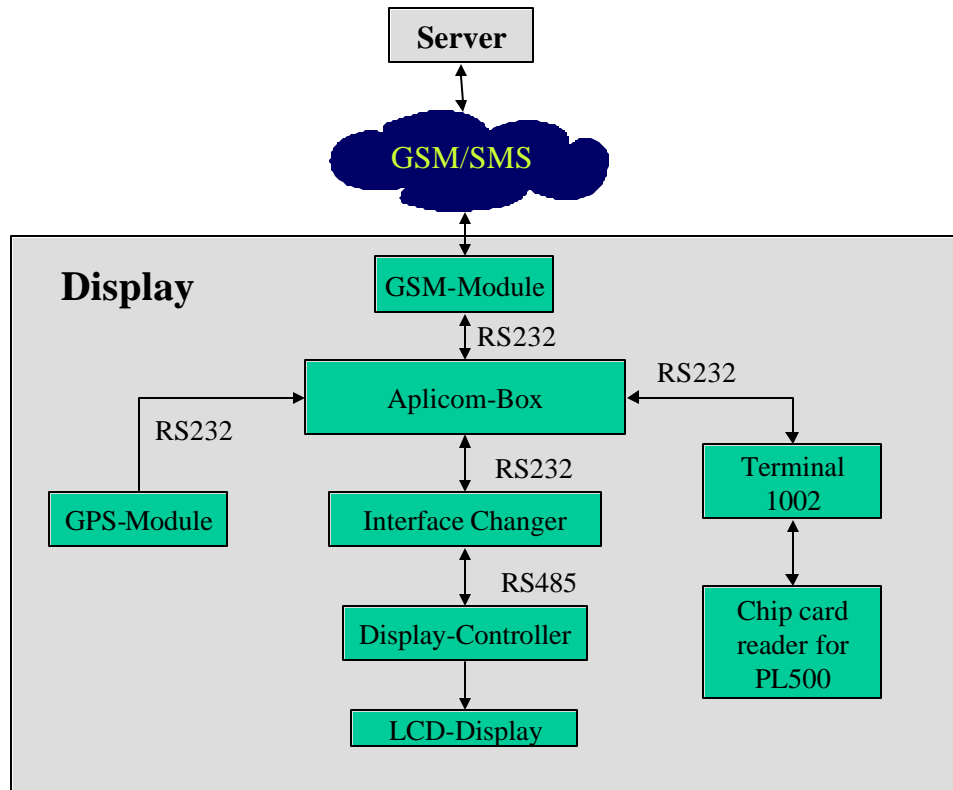
If the customer has problems with the form there is the possibility to click on the shadowed question marks to get a detailed Online-Help. The web pages designed for data acquisition are available in German as well as in English.

When the customer clicks on the button <Transmit> the data will be transmitted to the LEAN-Server which processes the information. Then the customer will receive a message on the screen to confirm if the reservation was successful or not. When the loading zone is engaged by another customer then the system proposes alternative reservations.

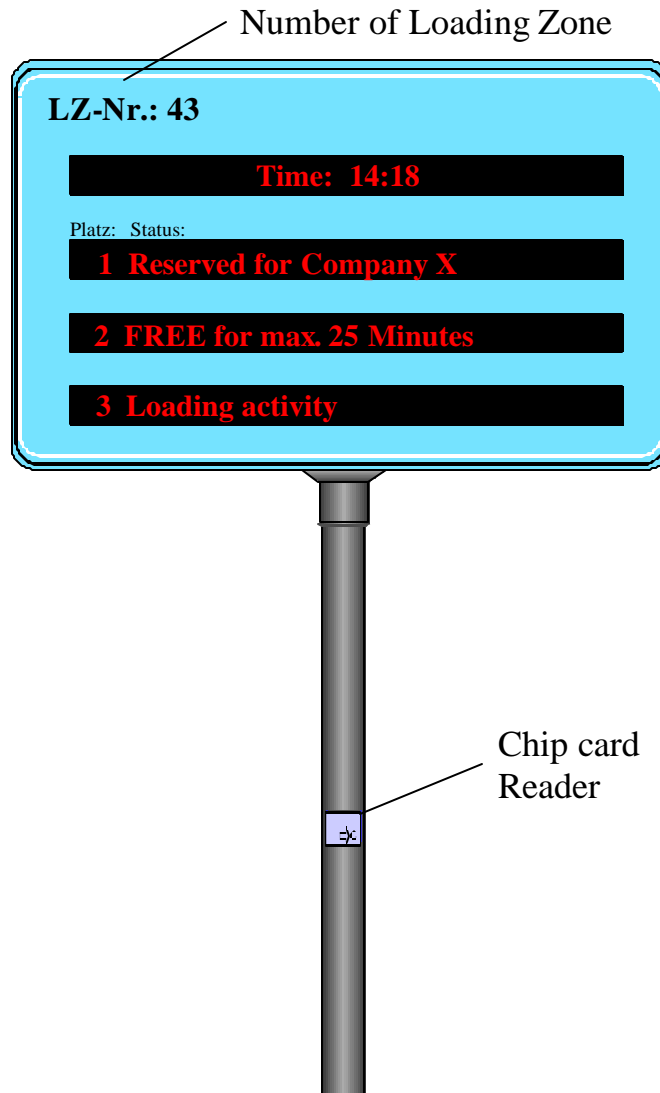
If the loading zone is free then the reservation will be stored in the database. There is a structured list of the reservation for each customer. The reservations will be transmitted over the GSM net by using the Short Message Service (SMS). A special program converts the reservation data into the SMS format and transmits it to the display's receiver in the loading zones.

The Loading zone entity

The loading zone consists of a couple of devices which process the transmitted reservation data. The following schematic shows the parts within the display.



The GSM module receives the reservation data which will be stored in the Aplicom-Box. This box is the central logic of the display which decides on further activities. If there is a reservation then the customer has to identify his authority by an ID card. Each customer has such a chip card with an individual ID number of 11 digits. The incoming data from the server will be processed in the Aplicom-Box and displayed on the front side of the display. The following pictures show a schematic of the display which is used. On the display there are four lines. On each line you can display 24 characters. The first line is reserved for the time ("Time: 14:18"). This is a precise time coming from an internal GPS-Receiver.



The other three lines handle the reservation process of the system. If there is a reservation by a customer the field "Reserved for Company X" is activated. On a loading activity, the customer has to identify himself with an ID-card he has received from the system provider. Therefore a chip card reader is positioned beneath the display lines. If he has the right card then the display field shows "Loading activity". Now the customer is authorised to park in the loading zone for the reserved time. If no reservation is in progress then the message "FREE for max. xx Minutes" appears on the display. So it could also be possible for private cars to park in the loading area. As the display has three lines, it is able to manage three time slots in a loading area.

The memory inside the display stores every trial of access. This data will be transmitted to the LEAN-Server to control each loading zone. But there are also system checks to ensure that the loading zone entities are working correctly.

The big advantage of this system is that it works in a fully automatic way, so that only services for maintenance have to be done. There is also no need for underground cabling because the data transfer is done over the GSM-network.

5.2.3 General description of the system

SW-Architecture at the System Provider

For the development of the software architecture, the following aspects had to be considered:

- ?? Using a standardised database;
- ?? Open interfaces;
- ?? Standardised system platform (operating system);
- ?? Standardised environment for development.

The system is based on a client/server architecture:

- ?? The Server being the main program, managing all the different processes and data;
- ?? The Server is running 24 hours a day and waiting for user requests.

The clients are started, whenever a user is requesting information from the Lean-Server. Basically a client is started, when an internet-user fills out the necessary information on a form on the loading zone web page and clicks on the submit button. There can be a lot of clients running at the same time (there is always only one server running!).

This is very important in order to be able to handle small cities with just a few loading zones, but also major cities with hundreds of loading zones.

A major advantage of the client/server architecture is, that it is relatively easy to change to a different media than the internet for communication, without having to change the whole program. The server remains unchanged, only the client has to be rewritten.

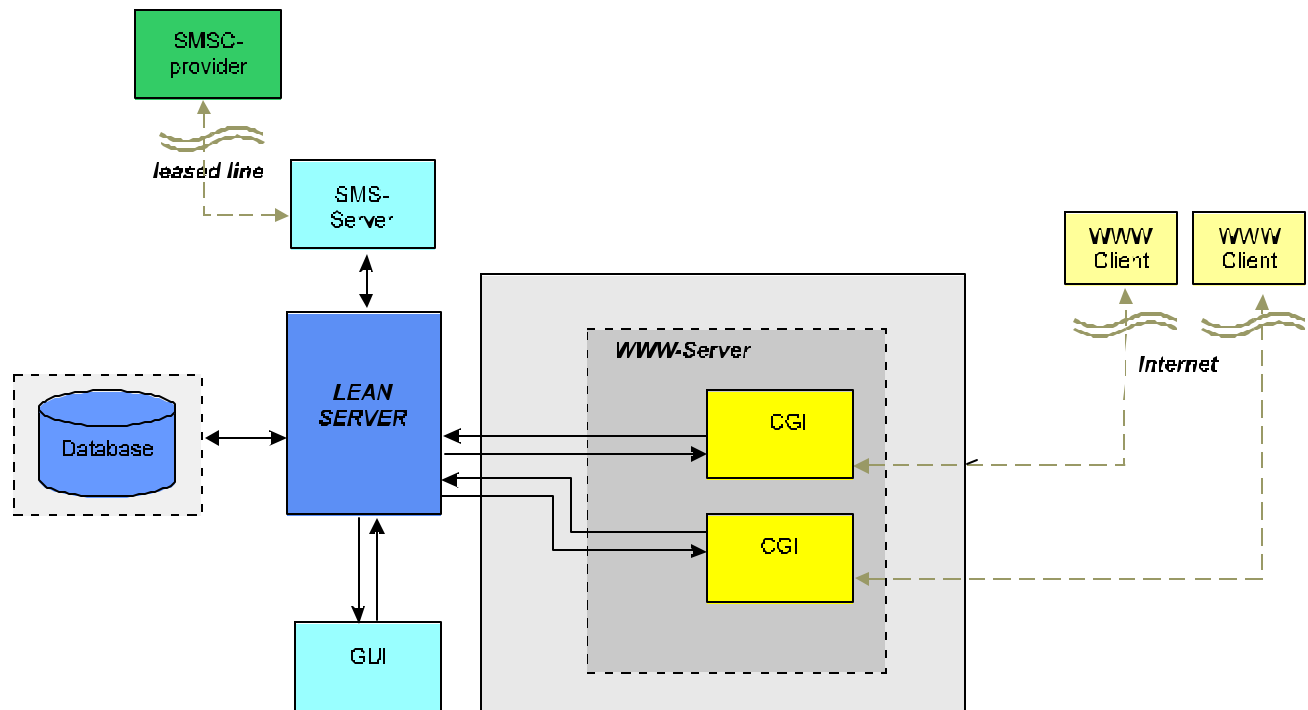
Another advantage of the architecture is, that even if there are a lot of clients running parallel, they do not need to many resources, because they are relatively small programs.

The system is generally optimised for short response times on user requests. Basically this is achieved by:

- ?? a smart web-page design (as little memory as possible);
- ?? a stable running server, optimised for short response times;
- ?? a fast connection to the internet.

The chosen system platform is Unix, because it is known to be very stable and therefore ensures a very high availability of the server. If the server happens to have problems it is intended to implement an SMS pager informing a system operator about the error via his own mobile phone. This reduces the necessary personnel and increases response times outside of normal office hours.

Server Structure



Regarding feasibility and pricing strategies see 5.4.3.4 WA430.

5.3. D3: Logistic Chain Management – Prototype Description

5.3.1. Introduction

The optimisation of logistic tasks requires integrated management and monitoring from source to destination.

Traditionally, the whole logistic chain has not been considered in terms of planning, monitoring and management. Instead of an integrated logistic chain planning, the various sub process chains (such as individual tasks assigned to the consignor, shipping and transport, spliced in some cases, as well as processes of the consignee) are more or less individual components and objectives for planning and optimisation.

Isolated optimization of processes will not cause a full scope of enhanced effectiveness in terms of costs, processing time, quality and the use of technical and human resources. An integrated logistic chain management is required in order to enhance the efficiency of logistic tasks.

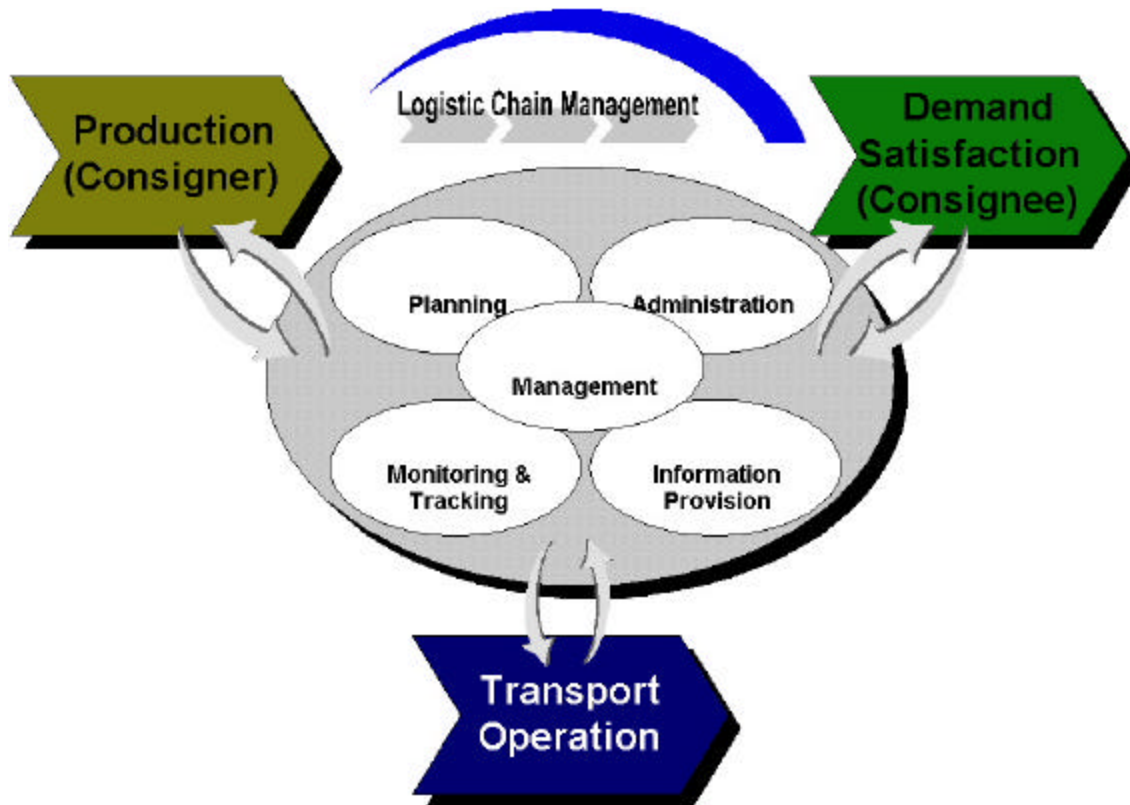


Diagram 1 Functional Main Focus of Logistic Chain Management (Source: BLSG, 1998)

The range of services of an advanced logistic management and service-centre and / or of a logistic service provider has to be focussed on planning, managing, monitoring and executing a wide range of logistic tasks, oriented to the needs of their clients as well as to providing transparent and demand oriented cost structures.

The basic policy of a logistic service provider is based on the fact that he will not just be acting as an executive organ for operative tasks, such as a simple transportation from "A" to "B" or to let some warehouse space. A logistic service provider will increasingly take over defined responsibilities and tasks in terms of a qualified outsourcing partner for industry and trade.

This implies that a logistic service provider starts his job, e.g. by taking over stocks after production or from supplier and guarantees a demand oriented just in time / just in sequence delivery to final consignees including the full scope of tasks in the areas of supply / re-supply, material management, stock management, shipping preparation and handling, status monitoring and control, execution of administrative processes as well as clearing of data and logistic performances.

Another business segment of logistic service providers which has to be considered is the area of an optimised use of logistic resources, which also can be achieved only by planning and consolidation of processes and transport tasks.

In consequence, this requires that logistic service providers need (besides respective experience, know how and resources) advanced application software and tools in order to manage logistic chains and to provide respective services of the required quality, also under reasonable economical conditions and with market oriented cost structures for the users.

Based on the business scenario for logistic service providers a prototype for a logistic management system has been developed by BLSG GmbH and will be described and presented in the following chapters.

5.3.2. Concept Baseline for the Logistic Management System (LMS)

The basic objective for the functional design of the LMS is to create an advanced application software in order to automate and support the processes for planning, management, monitoring, tracking & tracing, demand oriented billing of services and administration which are important and relevant to the execution of logistic tasks from source to final destination. Diagram 2 displays this in a graphical way.

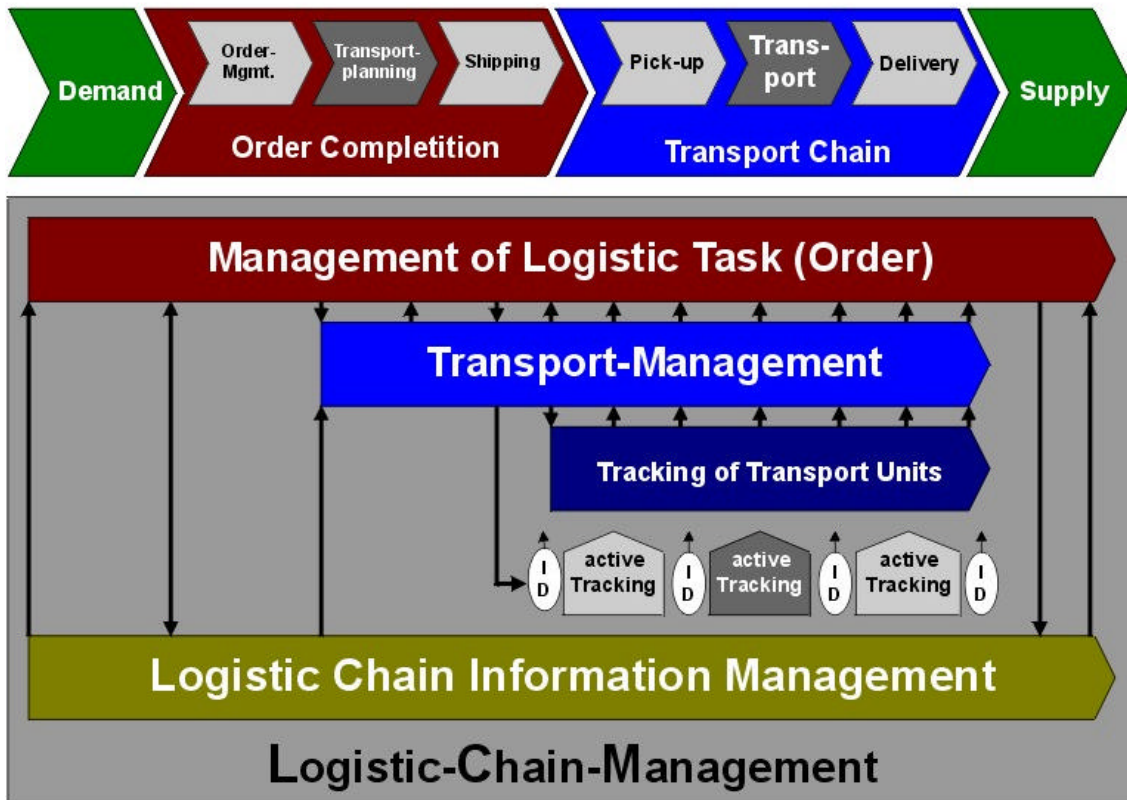


Diagram 2 Graphical Overview of the Logistic Chain Management (Source: BLSG, 1998)

In order to manage logistic tasks in response to given demand requirements, the levels of monitoring have to be the single positions of a demand request / distribution order, which is defined by the individual goods / material identification in combination with the identifier of the demand request as well as related data.

Therefore, the key to logistic tasks is the so called “logistic order management”, which has to be administrated along the following functional groups of processes:

- ?? supply / re-supply from production area and/or supplier to the area of responsibility of the logistic service provider;
- ?? automated exchange or advanced data capturing of distribution orders (logistic tasks) including respective checks concerning the feasibility of execution due to the given demand data;

- ?? advanced stock- and material management at the highest level of detail (warehouse location / material / condition / lot-n°. or serial-n°./ condition of the material);
- ?? transport planning including consolidation and distribution to the final destination;
- ?? automated ordering of transport capacities and other related services;
- ?? shipping preparation and trans-shipment operation;
- ?? process monitoring and status tracking;
- ?? billing and factoring;
- ?? interactive EDI interfaces to related systems in order to ensure an effective logistic chain information management.

Based on this general functionality, it is a further essential aspect of the LMS data base to record a full scope of basic data for goods as well as related logistic factors. This includes advanced material- and stock management as well as flexible warehouse structures and process related cost factors (standard cost factors as well as individual for a demand oriented billing to the clients and for purchasing of logistic services from external parties).

Therefore, the LMS application software provides the user (enterprises of industry, trading as well as logistic service providers, operating organisations of logistic management centres) due to the given functionality the possibility to provide their clients advanced logistic services in terms of an integrated logistic chain management.

The following chart displays the functional breakdown structure of the presented prototype for a logistic management application system.

Logistic-Chain-Management – Functional Structure

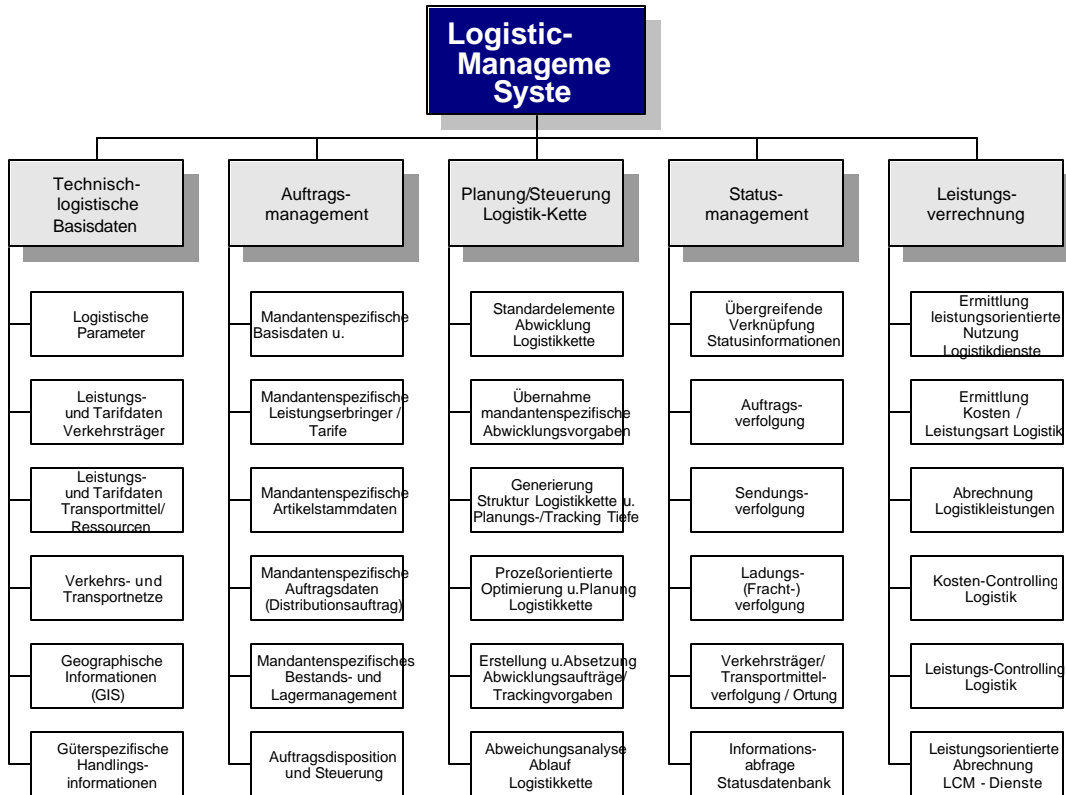


Diagram 3 Functional Breakdown Structure of the Logistic Chain Management

(due to the specific terminology the FBS-diagram is only in German language available)

5.3.3. Scope of the Prototype

The developed prototype for a logistic management application system is based on a business scenario of a logistic service provider, providing the following services in terms of an outsourcing partner for industry and trade:

- ?? stock and material management;
- ?? logistic order management (planning, administration and monitoring) for supply and re-supply tasks;
- ?? warehouse management;
- ?? transport planning and disposition / consolidation;
- ?? resource allocation and purchasing;
- ?? shipping and transport monitoring;
- ?? status monitoring and process control;
- ?? demand oriented billing of all types of logistic services;
- ?? EDI based exchange of data and information to internal and external application systems.

Diagram 4 summarises this scope in a graphical way.

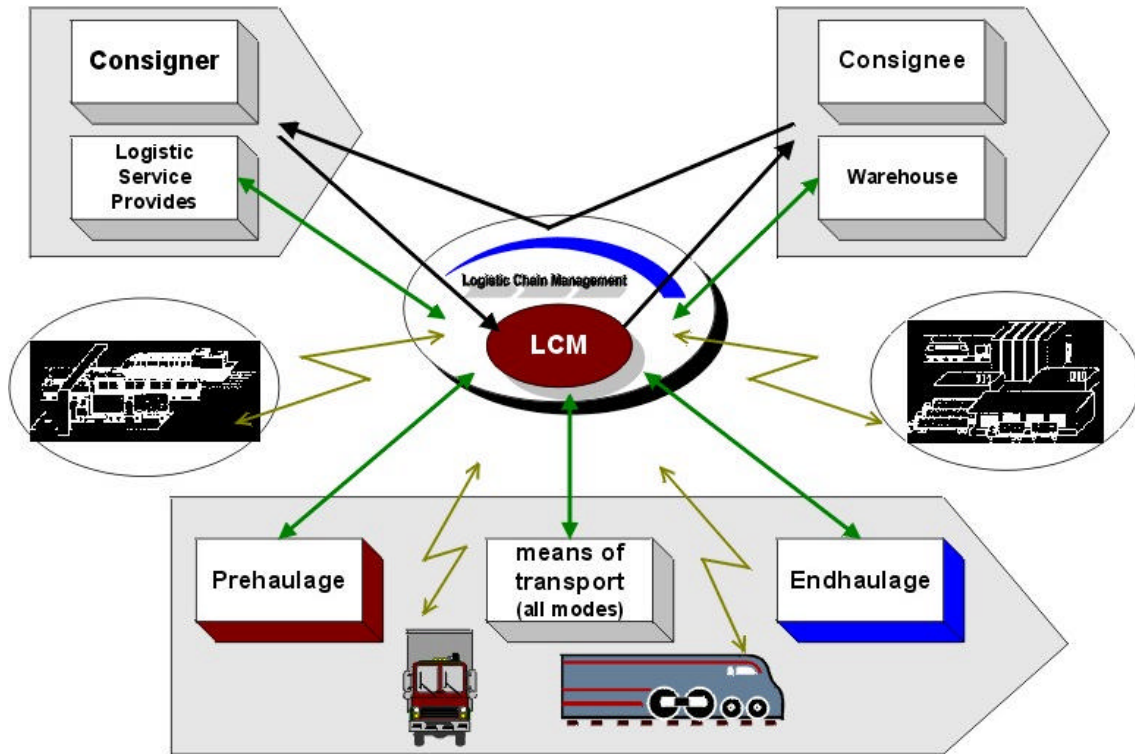


Diagram 4 Control of the Logistic Chain Management (Source: BLSG, 1998)

The prototype system has been developed as a multi user PC application system based on a client-server architecture. The prototype was developed on Microsoft ACCESS and is using the Microsoft ACCESS database. A prerequisite for running the prototype application is the operating system "WINDOWS".

A major target of the prototype has been the demonstration of the basic functionality of such a system, as well as showing the advantages in terms of effects on rationalisation and improvement of service quality, which can be achieved by application of a modern designed logistic management system.

The prototype system itself is able to manage and operate the stated logistic tasks for the defined scenario with the full scope of functionality as required.

For test and demonstrative purposes, full scope of practice oriented basic data and examples of logistic orders had been captured.

Limitations within the prototype system are given within the following areas:

- ?? the integration of an interactive interface to an automated route planning and optimisation system is theoretically designed, but not realised, due to the fact that much of the standard software already offers such a feature and is available today. Therefore the integration of such a customer oriented module should not be considered as a major research area;
- ?? the integration of an interactive interface to an automated warehouse picking system is theoretically designed but not realised due to the fact that several items of standard software already have implemented such a feature and are available today. Therefore the integration of such a customer oriented module should not be considered as a major research area;

- ?? the view for the distribution areas is limited to one (1) geographical location (logistic site) on which the transport planning is based;
- ?? some algorithms for billing of logistic services, such as warehouse space services are implemented to fix practice oriented rules for calculation. A full scope parameter oriented application will be adapted at a later stage of development;
- ?? the software as well as the MMI (Man Machine Interfaces) had been performed in the German language; multi-lingual functionality is only realised for major printouts in order to show the basic design principles;
- ?? multi-currency functionality had not been realised;
- ?? EDI interfaces to other systems had been realised only for limited areas, such as to a standard financial system (standard application) as well as to a merchandise information system (standard application) by an application to application interconnectivity due to the fact that existing data clearing software products can be used and adapted at a later stage of development;
- ?? the quantity of data storage, as well as given processing times, are limited to the used software platform as well as the data base system (Microsoft "ACCESS").

5.4. D4: Report on City Logistic Concept

5.4.1. Development of City Logistic Concept (WP200)

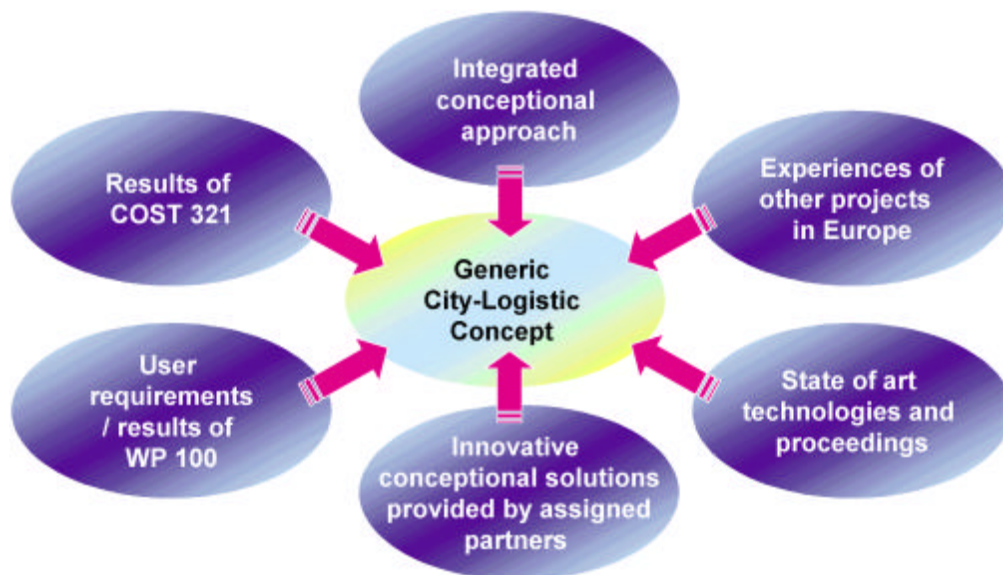
5.4.1.1. Objectives & Approach

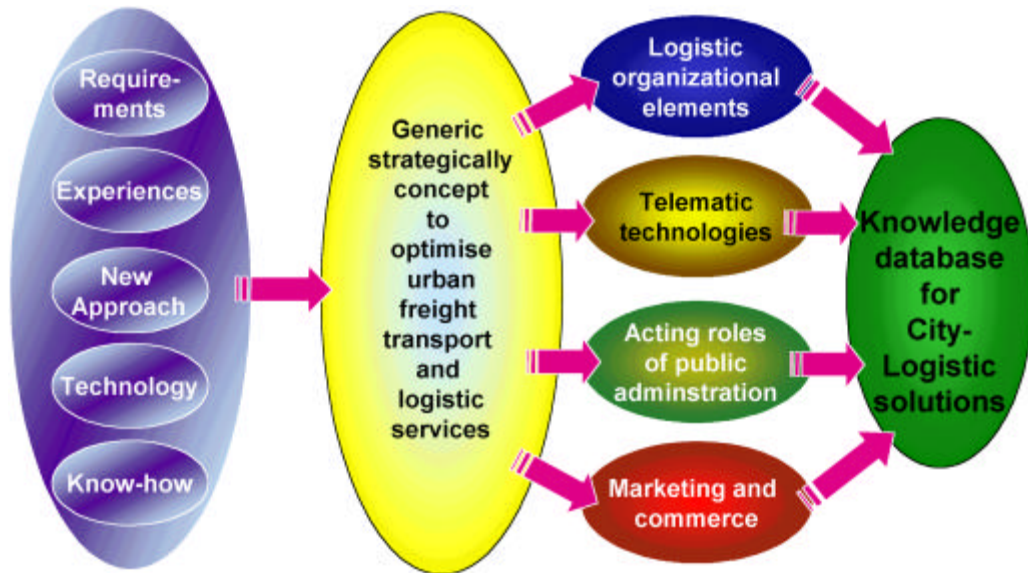
The objectives of WP 200 were to develop:

- ?? strategic concepts to optimise urban logistic systems;
- ?? and to identify generic concept and technical elements to be applied and integrated in urban areas relating to the following subjects:
 - organisation of logistic systems, proceedings and processes;
 - application of telematic technologies and integrated traffic management;
 - improvement of the acting role of public administration authorities;
 - marketing and commercial orientation of new city logistic services.

These were based on extracted requirements and under consideration of an integrated concept approach.

The approach of work activities in WP200 is described in the following diagrams:

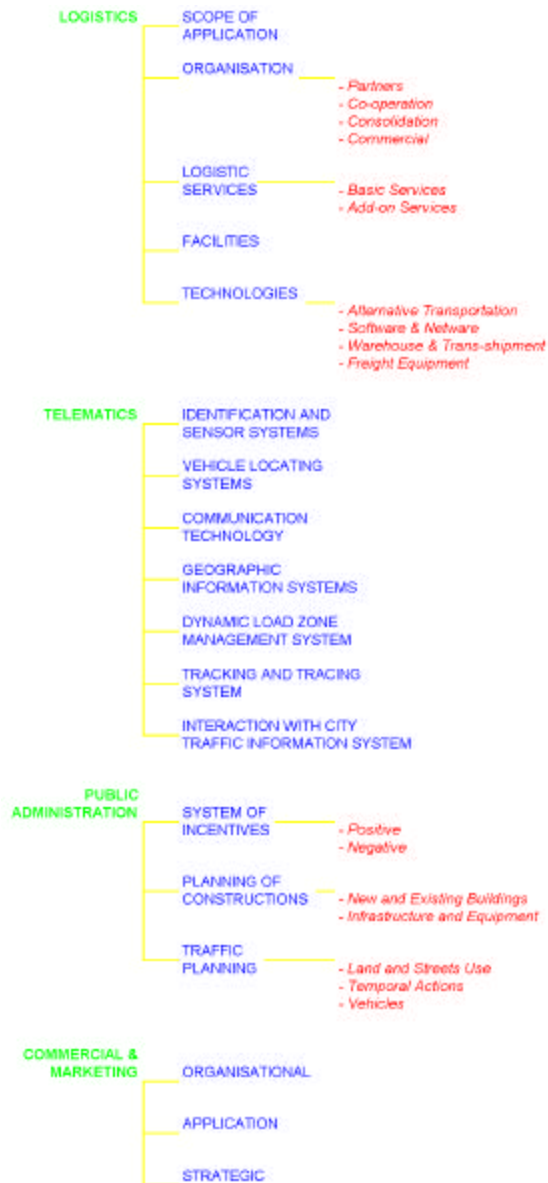




5.4.1.2 Results

A major output of the work package was an integrated generic construction kit of concept elements for the optimisation of urban freight transport. The diagram below describes the structure of the construction kit. Each concept area includes several corresponding concept bricks. Altogether 102 elements are defined by a short description, the application factors, effects on community, freight providers and freight receivers, cost parameters as well as links to other concept elements and related user requirements.

The key objective for the development of this construction kit for city logistic concepts was the creation of an integrated and detailed overview of possibilities for innovative solutions in urban freight transport. Combined with according guidelines for modelling the construction kit enables its user to examine the development of city specific concepts based on the complete variety of possibilities.



Listing of the elements:

LOGISTICS / SCOPE OF APPLICATION :

- regional scope of co-operation;
- scope of application on specific companies;
- scope of application on specific branches of business / industry;
- scope of application on specific products;
- scope of application on time factors;
- scope of application on specific weight.

LOGISTICS / ORGANISATION / PARTNERS:

- forwarders / carriers;
- parcel services;
- courier services;
- company owned transport / haulage contractors;

- postal services;
- disposal services;
- construction support services.

LOGISTICS / ORGANISATION / CO-OPERATION:

- co-operation without organisational structures;
- co-operation with organisational structures based on contracts;
- city logistic service provider formed by co-operating freight providers.

LOGISTICS / ORGANISATION / CONSOLIDATION:

- collection and distribution trips;
- combined short distance transportation.

LOGISTICS / ORGANISATION / COMMERCIAL:

- cost reduction;
- improved quality;
- increased income;
- improved customer service.

LOGISTICS / LOGISTIC SERVICES / BASIC SERVICES:

- delivery;
- pick-up.

LOGISTICS / LOGISTIC SERVICES / ADD-ON SERVICES:

- warehousing for the retail sector;
- stock management;
- preparing of articles for presentation and sale;
- home delivery services;
- disposal services;
- ordering.

LOGISTICS / FACILITIES:

- freight village;
- city-terminal;
- freight railway station;
- inland port;
- terminals of the freight providers.

LOGISTICS / TECHNOLOGIES / ALTERNATIVE TRANSPORTATION:

- cargo tram;
- shuttle train;
- alternative road based vehicles.

LOGISTICS / TECHNOLOGIES / SOFTWARE & NETWORK:

- data clearing applications;
- advanced planning, scheduling and re-scheduling;
- networked order management;
- vehicle routing and scheduling;
- computer aided networking.

LOGISTICS / TECHNOLOGIES / WAREHOUSE & TRANS-SHIPMENT:

- automation of warehouse and trans-shipment.

LOGISTICS / TECHNOLOGIES / FREIGHT EQUIPMENT:

- equipment for transportation packing;
- loading equipment.

TELEMATICS / IDENTIFICATION AND SENSOR SYSTEMS :

- Barcode Identification Systems;
- Inductive Identification System;
- Microwave Identification Systems;
- Infrared Identification System;
- OCR Identification Systems.

TELEMATICS / VEHICLE LOCATING SYSTEMS :

- GPS;
- DGPS;
- GLONASS;
- Locating via GSM.

TELEMATICS / COMMUNICATION TECHNOLOGY:

- GSM/SMS;
- DAB;
- Inmarsat;
- RDS-TMC.

TELEMATICS / GEOGRAPHIC INFORMATION SYSTEMS:

- Geographic Information Systems.

TELEMATICS / DYNAMIC LOAD ZONE MANAGEMENT SYSTEM:

- Dynamic Load Zone Management System.

TELEMATICS / TRACKING AND TRACING SYSTEM

- Tracking and Tracing.

TELEMATICS / INTERACTION WITH CITY TRAFFIC INFORMATION SYSTEMS:

- Interaction with City Traffic Information Systems.

PUBLIC ADMINISTRATION / SYSTEM OF INCENTIVES / POSITIVE :

- Freight carriers co-ordination;
- Common terminals;
- Street blocking allowance;
- Direct economic benefits.

PUBLIC ADMINISTRATION / SYSTEM OF INCENTIVES / NEGATIVE :

- Load/unload zones vigilance;
- Road pricing;
- Route and access control.

PUBLIC ADMINISTRATION / PLANNING OF CONSTRUCTIONS / NEW AND EXISTING BUILDINGS:

- Parking space planning;
- Use of private parking;
- Load/unload interface;

PUBLIC ADMINISTRATION / PLANNING OF CONSTRUCTIONS / INFRASTRUCTURE AND EQUIPMENT:

- Public parking;
- Mini-warehouse;
- City terminals;
- Outskirts logistic centres.

PUBLIC ADMINISTRATION / TRAFFIC PLANNING / LAND AND STREET USE:

- Street classification;

- Access regulation to pedestrian areas;
- Lorry-reserved streets;
- Load/unload zones;
- Use of taxi zones;
- Hub areas.

PUBLIC ADMINISTRATION / TRAFFIC PLANNING / TEMPORAL ACTIONS:

- Closing the city centre;
- Freight zone classification;
- Double-parking short time restrictions;
- Access time window;
- Temporary load/unload zones;
- Load/unload zone time restrictions;
- Valley-hour deliveries.

PUBLIC ADMINISTRATION / TRAFFIC PLANNING / VEHICLES:

- Access according to weight;
- Alternative vehicles;
- Final delivery;
- Vehicle communication capabilities.

COMMERCIAL & MARKETING / ORGANISATIONAL:

- Establishment of City Freight Forum;
- Marketing Strategy;
- Positioning.

COMMERCIAL & MARKETING / APPLICATION:

- Pricing;
- City Logistics Co-operation;
- Concept Support;
- Product Development and Improvement;
- Business Plan;
- Promotion.

COMMERCIAL & MARKETING / STRATEGIC

5.4.3.1. Conclusions

Based on the strategic objectives of the LEAN project and the experience from the research activities in WP 200, the LEAN-partners set up a broad generic outline for the development of city logistic concepts in Europe:

1. Modern city logistics means the optimisation of the total freight traffic with a focus on the urban traffic situation.
2. City logistic systems have to consider European national, regional and local multi-modal networks.
3. Objective of the development of a city logistic concept has to be the realisation of flexible systems capable of recognising:

- ?? number of involved partners and types of partners;
- ?? handling of different types of goods;
- ?? wide regional scope for providing ranges of logistic services;

?? planning, processing, monitoring and controlling of integrated logistic chains (source to destination).

4. These complex systems have to be based on legal and organisational structures for operation.
5. City logistic organisations have to be planned and operated based on transparent cost calculations and market analysis.
6. For the economic efficient operation of complex city logistic systems, administrative processes should be computer-aided. Therefore appropriate network-applications for data communication have to be installed and software-applications - especially for the support of planning, order management and cost sharing - have to be used.
7. Complex city logistic concepts should integrate the use of modern technologies, concerning:

?? automation of warehousing and trans-shipment;

?? telematics;

?? alternative transportation.

8. Concerning ecological objectives of city logistic concepts, the public administration has to play an active role within the city logistic system. Therefore the public administration should be an integrated partner of the co-operative system. Promotional and restrictive measures, should be considered for the control of urban freight traffic.
9. Logistic centres (e.g. freight village, inland port etc.) have to be an integrated part of city logistic solutions. These centres could be the basis for the organisational structure of city logistics.
10. City logistic providers could be an integrated logistic outsourcing partner for urban enterprises.

5.4.2. Application to specific Urban Areas (WP 300)

5.4.2.1. Overview

WP100 created a well-defined picture of the freight traffic problems in each, and WP200 supplied the tools to solve these problems. The objective in WP300 was to show the possible effects that might be caused when applying some of these tools to the original problems within the framework of specific urban areas of the LEAN demonstration cities.

Depending on the city, the elements used are different. In each case, the applied concept is focused mainly on a single kind of concept: either logistic, or telematic, or public administration or marketing / commercial.

As a result of this variety the LEAN project improves its richness. Many of the theoretical concepts are considered for putting into practice. Furthermore, in the British case an overall concept is applied, including aspects from each conceptual branch.

In the Case of German reports, two specific concepts are defined: CHIEF in Halle and RoLLen in Regensburg.

In Spanish cities the main focus is the Public Administration concept, due to the importance of this role in the urban freight transport in this country.

For Austria, the Telematic concept dominates the concept in Linz, as well as the Logistic concept in Vienna and Wiener Neustadt.
The table below gives an overview of the applied concept areas in the different LEAN demonstration cities:

		Concept			
		Logistic	Telematic	Public Administration	Marketing & commercial
Cities	Cordoba	+		++	+
	Halle	++		+	+
	Linz		++		
	Norwich	+		+	+
	Regensburg	++		+	+
	Sevilla	+	+	++	+
	Vienna	++			
	Wiener Neustadt	++			

Code: ++ Main focus
+ Complementary focus

5.4.2.2 Summaries of the Applied Concepts

5.4.2.2.1 Cordoba

Logistic Concept:

The Logistic Concept applied in Cordoba by PROINCA is focussed on Freight carrier co-ordination.

As is explained in the next paragraph, seven independent applied concepts have been developed which can be taken into account simultaneously or separately. Only one directly involves a Logistic element.

Any kind of city-logistics concept indirectly links to other logistics elements.

Administration Concept:

In the case of Cordoba, several concepts were analysed:

- ✂✂ General Public Administration concept;
- ✂✂ Pedestrian zones;
- ✂✂ Closing the city centre;
- ✂✂ Hub areas;
- ✂✂ Load/unload facilities;
- ✂✂ Street classification;
- ✂✂ Freight carrier co-ordination.

All these subjects have already been completely developed by PROINCA and checked by the User Groups in Cordoba.

The main emphasis in the LEAN project was the development of a main General Public Administration Concept. This is the combination of several elements for the Public Administration system. The 'umbrella' concept is made up of:

- ✘✘ Freight Zone Classification;
- ✘✘ Access according to weight;
- ✘✘ Access time window;
- ✘✘ Route and access control;
- ✘✘ Load/unload time restrictions.

There are others that could be included here, but will be analysed next, such as:

- ✘✘ Load/unload zone designation;
- ✘✘ Streets classification;
- ✘✘ Temporary load/unload zones;
- ✘✘ Streets blocking allowance.

The first proposed concept to be applied consists of a classification of the city centre in two or three different zones that have different constituents, planning, differing priorities, permissions, etc.

Firstly, these zones (rings) have, like centres, the main points of businesses, commercials and administrative areas of Cordoba.

The next step is to apply restrictions to each defined area. These restrictions are based on the access of vehicles and loading/unloading activities.

Focusing on these two points, for one there is the access ordering. This is controlled through the following elements:

- ✘✘ Access according to weight;
- ✘✘ Access time window;
- ✘✘ Route and access control.

Although this access could be done according to other patterns, e.g. volume, the freight providers have agreed on this subject: weight, etc.

The usual classification is shown in the table below. However, data about sizes are not specially relevant at this moment, as metropolitan regulations in Spain about truck access into the city are only concerned with weight issues.

Vehicle	Authorised max. Weight	Length (m)	Width (m)	Height (m)
Van	1.5 – 3.5 Tm	4.1/7.0	1.5/2.0	1.8/2.5
Lean lorry	3.5 – 11 Tm	5.0/9.0	1.8/2.3	2./2.3
Medium-sized lorry	11 – 16 Tm	5.7/11.6	1.8/2.5	2.3-2.8
Heavy lorry	16 - ... Tm 18 - ... Tm	6.3/12.0 5.6/11.5	2.0-3.1 2.2/2.6	2.5/3.5 2.5/3.8

The access time windows into the city centre are one of the most common policies used to manage urban freight accesses. They usually cover from the early morning

hours up to well into the morning business hours. Others think this should be just the opposite, always to be prohibited except in the defined time windows.

In the case of Cordoba, the idea is to control access and permitted routes for the freight transporters. Often the access regulations are not observed or consistently implemented. The authority should try to maintain the quality of life for citizens and one way is through good control as well as allowing (in special cases) limited access. This regulated entrance needs a permit that is given by the city authorities and Council. Examples include:

- ≪≪ Container transport;
- ≪≪ Construction transport;
- ≪≪ Large vehicles.

These measures include and involve loading/unloading activities and imply loading/unloading time restrictions, as a practical and pragmatic balance to the access restrictions.

The telematic and marketing concepts were not considered important for this application step in Cordoba.

5.4.2.2.2. Halle

Generic Concept for the City of Halle

The concept described below aims to be just the basic step of an open, self-developing system on a strict economic and marketable level. Existing structures, facilities and corporations should be involved as far as possible, e.g. the river port of Trotha and the freight station are logical centres for a freight village. The implementation of already proposed or planned infrastructure measures are crucial to the development and to the economic and ecological effects of the concept. The close relation and interdependency between public, community and traffic economics should be reflected by a high level of co-operation between user groups and affiliated partners.

Additional conceptual elements are the co-operation of freight providers, organised in a joint corporation to share the investments in information data management. A company has to be formed, as a legal and economic basis for contracts, business plan, invoicing with subcontractors etc.

The concept also deals with divergent requirements of user groups wishing to set-up logistic centres at either the port and / or the freight station, and developing strategies at the same time to solve the problems of inner-city deliveries.

CHIEF - City of Halle Information Exchange for Freight; Set-up of a Freight Village Network / Dislocated Freight Village

City-Logistics for the area of the town of Halle had to be aware of the given geographic and infrastructure characteristics and circumstances. Therefore, it was decided to follow the topographical structure, and to split up the city into four target regions, each region setting-up or expanding its own distribution center at an already existing location. Different to a City Freight Center, a zonal freight center covers the regional logistic tasks for only one clearly defined destination area, interchanging and transferring data and freight with other related zonal centers. Transshipment between transport modes should be possible, the task is the consolidation of short and long distance transport in the destination area. Two possible locations for modal

hubs in Halle are the Saale river port at Trotha and the central railway freight station. A close co-operation with GVZ Leipzig to combine air-freight will be necessary.

?? The Regions

The target delivery regions of the zonal freight centres are described as follows:

North: the existing inland port at Trotha, with its already adapted infrastructure could serve as a distribution centre for the area between Saale and Berliner Chaussee including the old city centre. It should also serve as a modal hub between river shipment, rail freight and road transport.

East: the existing railway transport centre for the section between Berliner Chaussee and Leipziger Straße and, if needed, additionally for the city centre. The station serves also as a modal hub between road and rail.

South: use of one of the existing freight centres (e.g. Ammendorf/Radeweil) to provide the southern part of the city between the river Saale, Frankplatz, Leipziger Straße and the south border of the community

West: mainly Neustadt and the left side of the river, with its new industrial and economic centres.

Co-operation will be between at least one freight forwarder in each area. The partners will have to form a new company to invest in an information data management system, in the first instance mainly to provide the processing data for freight forwarding and the invoicing between partners and eventual subcontractors.

It is basically intended that the City of Halle will have no direct major investment in the project. Besides the role of co-ordination and guidance, a possible direct participation by the government in the corporation could be considered. The impact on the project would not only be even more security for the project partners, but also a direct influence of the city in city-logistic decisions. Even without joining the partners, city administration can make the project more attractive for other transport agents, e.g. plant-transport and others, by actively supporting it. Support could be in the form of e.g. exclusive loading / unloading areas, time slots and many more, following the user group requirements.

The project partners as a group always have the opportunity to shape city-plans and regional plans to be realised or executed within the proposed time-schedules.

?? The Information Management System and the flow of freight

The set-up of a central information management system consists of the adequate hardware and software components. The location of the hardware may either be with one of the CHIEF partners or at a distant office. The transfer of data passes via the Internet.

Incoming freight data is processed to the central information management system. There Data of customer-supplier relevance are cleared out and only relevant data is forwarded to the area where the goods have to be delivered. There the local partner and subcontractors prepare delivery management.

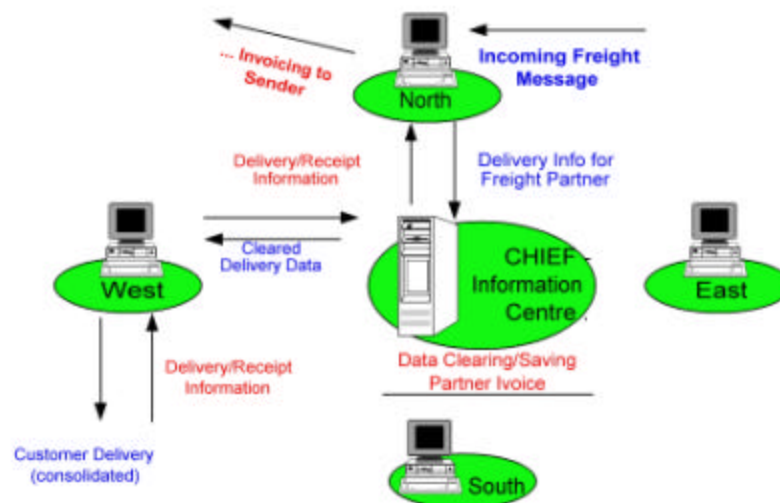
Local data processing at the CHIEF-region reflects the ordinary delivery management and returns delivery clearing data to the central CHIEF unit. Invoicing between partners is prepared and then the clearing and delivery message goes back to the original customer's forwarder. The arrival of the goods at the receiver is confirmed, and invoicing by the forwarder has to follow.

To set up routines and consolidation already for incoming long distance freight, the corresponding delivery target areas have to be communicated to the carriers concerned.

It is suggested that delivery information i.e. the corresponding CHIEF-freight village for the receiving customer, is already known by the long-distance freight provider. The function of the central information management system depends on accurate database management.

It is suggested that this system of a zonal freight village will evoke new partnerships with and amongst long-distance forwarders and carriers, as well as with the freight village of Leipzig.

Pick-up routines will either consequently follow by partner-initiative or may be projected for a second step, as direct forwarder-customer relations should not be altered during the first step.

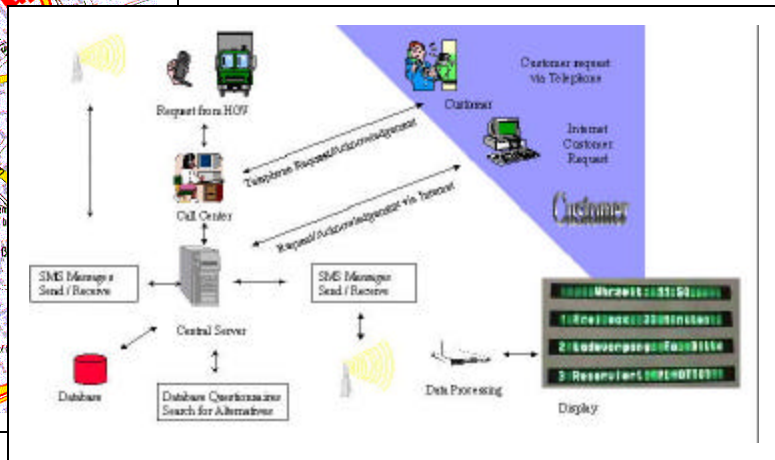
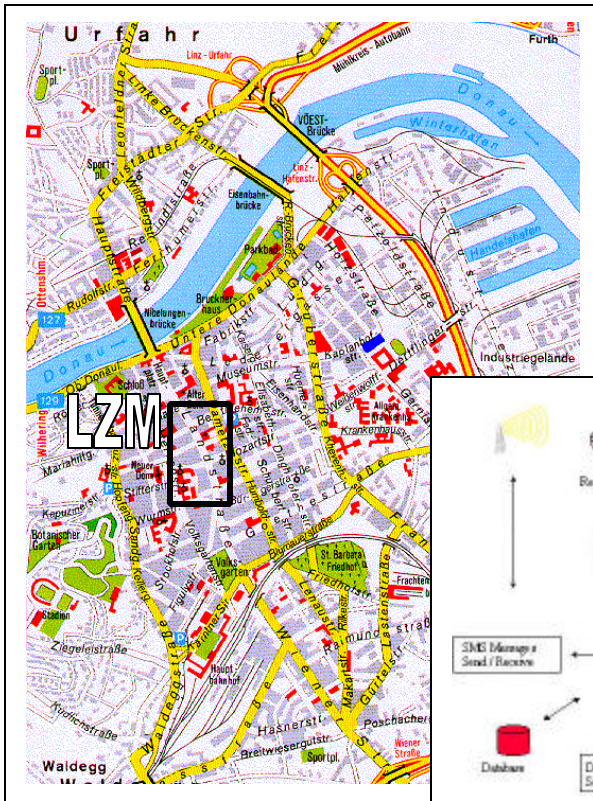


5.4.2.2.3. Linz

Linz is the provincial capital of Upper Austria, and is located at the river Danube between Salzburg and Vienna. From an economic point of view Linz is a part of the Upper Austrian centre covering the area between Wels, Steyr and Enns, characterised by intensive development and municipal interconnection. The national census of 1991 states the number of inhabitants of Linz at 203,044 people. The population density is 22.1 people per hectare.

For the participation of the city of Linz in the Lean project the problem of goods delivery in the city centre, combined with attractivation of city shopping played a major role. Specific measures including ongoing requests of local shops for a better parking situation and a reduction of congestion in the city centre in order to be more attractive for consumers from outside and inside the city, formed the basis for the application analysis of innovative solutions in Linz. As an innovative city-logistic solution to be evaluated in a feasibility study, the system of 'Load Zone Management' was chosen as a main focus for the application of City Logistic Concepts in Linz.

Based on the experience of ALCATEL in the implementation of innovative telematic solutions, and the participation in various national and international city-logistics research projects, the study of a 'Load Zone Management' in the preselected pedestrian area of the Linzer Landstraße shows the technical and economical feasibility, together with all the benefits for the public and the local traffic situation specifically.



The first was the estimation of some cost factors and benefits in order to give the community decision-makers an overview of the system. This was made in the form of a simplified Cost-Benefit Analysis which shows some estimated cost factors and benefits for all three major user groups.

Freight Providers

Cost factors	Benefit
?? Reservation Costs depending on time, location and vehicle data have to be calculated by the Service provider (currently estimated at ATS10 / average reservation).	?? Guaranteed Loading Zone in the shop vicinity
	?? No need for illegal parking or penalty payment
	?? Reduction of delivery time per stop
	?? More delivery stops per day

Freight Receivers

Cost factors	Benefit
?? Depending on involvement in the system investment costs (range from 0 to full-display costs...currently estimated at 10kATS/Load Zone once).	?? Reservable parking space for customers in the shop vicinity
?? Reservation costs for customer parking	?? Higher customer satisfaction
	?? Additional parking space in comparison to permanent Loading Zones

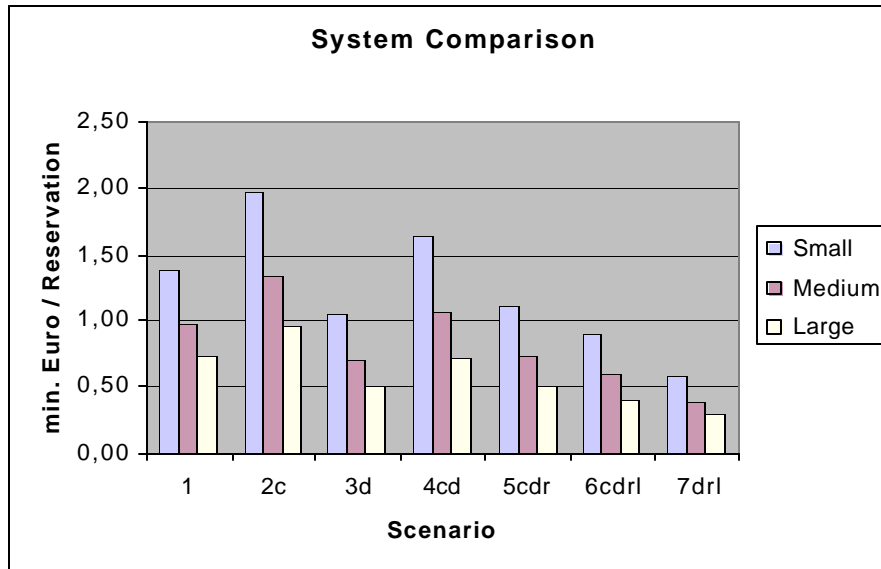
Public (or Public/Private partnership)

Cost factors	Benefit
?? Yearly costs for system can be estimated for a medium-sized system at approx. 700kATS (20 Loading Zones with 10 Displays)	?? Better usage of Loading Zones
	?? Additional parking space in comparison to permanent Loading Zones

?? Running costs and investment costs can be shared between public and a market oriented system provider

?? More attractive shopping in the city centre
 ?? Less traffic congestion due to reduced double parking
 ?? City image improvement through application of innovative solutions

A further detailed feasibility analysis, including business planning processes and modelling of different implementation scenarios for Load Zone Management Systems, brought the following specific reservation cost comparisons:



Scenario coding: c.....with call centre; d.....long depreciation period; r.....high reservation density; l.....2,5 load zones per display.

By comparison of the achievable minimum costs per reservation and the local usual costs for normal parking activities it is possible to pre-evaluate a commercial success of the system.

For example, the best case reservation costs of a large system are already in reach of average normal on street parking costs in some Austrian cities including Linz.

5.4.2.2.4. Norwich

Logistic Concept:

This concept proposed by ARRC/WRDL has been identified as being one worthy of further detailed consideration to service the city logistics requirements of the city on a practical and pragmatic basis. It entails:

- ?? the transfer of goods and cargoes from large long-haul vehicles into smaller vans or trucks for delivery and/or collection within the central areas of the city. This removes the requirement for large goods vehicles to penetrate the core area of the city with the attendant risk of conflict and congestion within traffic streams, manoeuvring and pedestrian intimidation;
- ?? The use of smaller vehicles operating more efficiently and with greater flexibility on planned routes is a more appropriate response to the requirements of shippers and receivers and goes a considerable way to reducing the perceived threat of congestion, pollution and environmental intrusion created by larger units. The concept is based on the practical requirements identified across the various communities of interest within the city. It is a commercially driven concept that

recognises environmental concerns, together with legitimate needs to transport goods efficiently within the city core;

?? A system operating around or within specified time 'windows'.

Administration Concept:

Virtually all the city logistics operations are now road based within Norwich and the likelihood of this position changing markedly in the short to medium term is unclear. The city has to rely on the efficient use of road transport and the best use of the city's road infrastructure to sustain its economic vitality. The interplay of passenger and freight transport operations within the city at present does create some time-based congestion, which can seriously limit the efficient transport of goods.

Possible concept applications are:

- ?? Measures which constrain the infrastructure on a temporary basis (e.g. utility related works) or longer term traffic management measures (bus lanes/junction priorities/time limits etc) will need to recognise the legitimate requirements and objectives of city freight logistics;
- ?? Incorporation of these within any mandatory short term or strategic planning proposals. The adequate enforcement of any proposals particularly relating to freight vehicle access or prioritisation.

Telematic Concept:

To efficiently transport goods to, from and within the city relies at present on a random access situation with few means or measures to minimise congestion or to signal to operators intending to deploy vehicles that conditions may de-stabilise schedules or restrict access to the preferred point of delivery or congestion.

Possible concept applications are:

- ?? Existing signage is essentially passive and relies on an interpretation of directional information with prevailing congestion conditions – reinforcement existing signage is suggested;
- ?? Better active information made available to operators on a real time basis regarding the state of traffic activity within or on approach to the city. Cities in North America and Europe have experimented in certain areas in relation to more active signage and information media to inform drivers/operators of prevailing traffic conditions to allow re-scheduling, information transfer, updating to take place in an effort to minimise congestion and any consequential pollution and environmental problems;
- ?? The use of booked or tradable 'slots' for freight operations to make better use of the available circulation area perhaps incorporating some form of incentivised tariff to spread traffic away from congested time zones or traffic 'hot-spots' could be considered. The rapidly developing area of telematics readily lends itself to demonstration or full-scale application within congested city areas such as Norwich;
- ?? Shared use of bus lanes between freight vehicles and bus services on a trial basis.

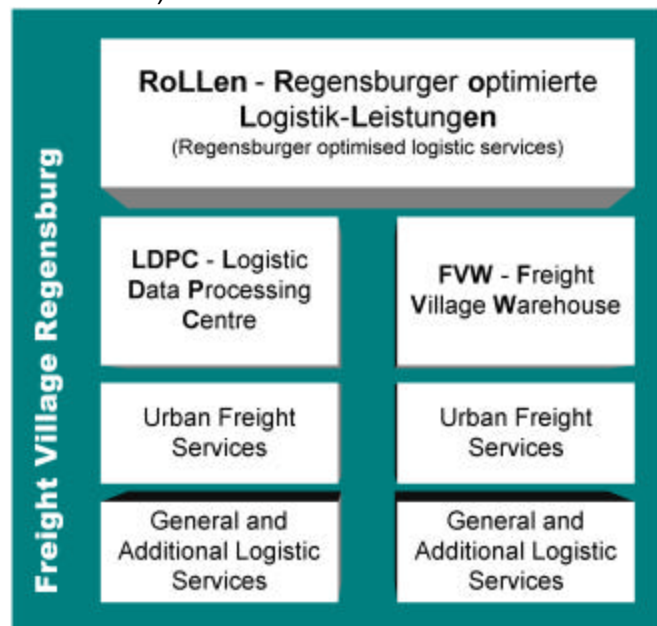
Marketing Concept:

There is no regular formal contact or medium for the exchange of ideas and information amongst the communities of interest within the city regarding city logistics and freight related issues. It is proposed that:

?? a city freight forum is brought into being as a genuine and effective means of raising levels of understanding and awareness of issues, priorities, imperatives by all parties as a means of developing positions on global, national and local matters. This forum will need to be seen not as a talking shop but as a genuine arena for dialogue and information exchange. For it to succeed will entail proper support, administration and nurturing during its early evolution.

5.4.2.2.5. Regensburg

For Regensburg BLSG created the RoLLen-concept - **R**egensburger **o**ptimierte **L**ogistik **L**eistungen (optimised logistic services).



RoLLen basics:

- RoLLen is a business service concept for the freight village company; shareholders of the freight village company are the companies of the freight village and the inland port;
- the RoLLen facilities are located within the freight village;
- the services of RoLLen are adjusted to the available services of the freight village companies and to the capacities of existing or possible facilities and infrastructure;
- all provided services of RoLLen are offered to all possible customers;
- all provided service of RoLLen are defined with two different prices: **internal prices on cost basis for shareholders** of the freight village company and **external prices for all other customers**; therefore price calculation for external prices is oriented towards market prices or customer perceived value pricing for new services, as well as cost oriented pricing for internal prices;

- RoLLen is set-up and developed based on business planning and permanent controlling concerning investments, financing, costs and results in relation to the market situation and marketing forecasts;
- RoLLen works with a low cost promotion concept, mainly based on public relations activities; the high innovative character of RoLLen guarantees constant public awareness; the public relations activities are supported by printed and electronic (internet) sales information concerning prices and offers;
- RoLLen works on a profit oriented basis for improvement of the general traffic situation in Regensburg and reduction of environmental impacts is expected by consolidation via an increasing number of customers and / or shareholders of the freight village company; the role of public administration should be as a shareholder of the freight village to observe the public benefits of the services provided.

RoLLen BUSINESSLINE 1 - LDPC - Logistic Data Processing Centre

LDPC basics:

- the provided services of the LDPC are in general (1) data clearing, (2) data processing capacities and (3) offer of electronic information;
- the heart of the LDPC is a central data server and processing system (hardware, operating system, database engine, network interfaces);
- the basic service of the LDPC is to serve as a data-exchange-provider (data clearing, preparation of customised interfaces to LDPC, network provider); only data clearing is already a service which can be sold;
- the LDPC is connected to wide area networks (i.e. WWW), provides point-to-point EDI-interfaces and can be a network server for a freight village intranet;
- the system world of the LDPC is an open, modular union which allows the implementation of a wide variety of electronic services in addition to the mentioned applications;
- all mentioned software technologies of the LDPC are state of the art of software engineering and most of the applications are available on the software market.

LDPC urban freight services:

- the LDPC offers 3 service lines: (1) vehicle routing and scheduling, (2) urban and regional traffic information system and (3) electronic shipping exchange for short distance freight transport
1. The LDPC provides a powerful **vehicle routing and scheduling system** for the city of Regensburg and the district Oberpfalz for all freight transport activities in this area; incoming electronic freight order data of freight providers are processed to prepare planned and scheduled delivery- / pick-up-tours based on the transportation capacities of the specific freight provider and on its specific restrictions (i.e. fixed delivery time windows); planning and schedules per vehicle are forwarded to the freight provider via fax or via electronic data exchange to the workstation of the freight provider (optional via mobile data communication to the corresponding vehicle); customer and processing data are deleted after the service process or stored for future data mining queries of the customer; customers pay per processing- and exchange-unit depending on differential rates and used data exchange interface.
 2. The LDPC provides a **traffic information system** for the city of Regensburg on the level of specific streets and the district Oberpfalz, adjusted for information to freight providers; the system is constantly updated with traffic information and

forecasts, street construction activities and corresponding planning, new permanent or actual non-permanent changes of traffic signs and signals, weather forecast, fuel prices, actual capacity of freight village facilities etc.; the traffic information system can serve input for the vehicle routing and scheduling system; the information is available on WWW and by regular or on-demand fax / e-mail service (optional on demand via mobile vehicle communication); customers pay a monthly rate for access to the information system; the service is partly financed by WWW advertising and presentation of commercial information (i.e. fuel prices).

3. The LDPC provides an **electronic shipping exchange for short distance freight transport** in the city of Regensburg and its surroundings; the shipping exchange is a virtual market for offer and demand of shipments and transport capacities for delivery and pickup in the area of Regensburg; offer and demand data entries include fixed or proposed offer prices / demanded prices for the transportation, therefore pricing works on a market based model. The shipping exchange information is available on WWW based on a electronic commerce database system; for preparation of contractual relations of two different parties two services of the shipping exchange are possible: (1) constant and automatic comparison of all offers and demands by the system and, in the case of a defined correspondence the system automatically informs the involved parties via fax / e-mail. (2) each member of the shipping exchange can collect offers in an electronic shopping basket and send an order to the system for this shopping basket. The system will automatically send a filled order form and a order confirmation to the corresponding parties via fax / e-mail; customer information of the freight providers dealing via the shipping exchange are reduced presented in the WWW-view (hidden name of the freight receiver / sender and address without house number), only in the case of an order the complete information will be sent to the corresponding parties; customers pay a monthly rate for access to the shipping exchange, a monthly rate for availability of the comparison service and a fee per order transaction; this system could be defined as a non-regulated co-operation, therefore the electronic shipping exchange for short distance freight transport is set up as a basis for a future general function of the freight village in terms of the main provider for deliveries and pick-ups in Regensburg (best price for transportation due to a high consolidation rate and best quality due to high level of logistic know-how and computer aided processing) in terms of development of the shipping exchange towards a co-operative order exchange system.

LDPC general and additional logistic services:

- optional / additional service can increase the rate of LDPC capacity utilisation and improve the commercial efficiency of the LDPC;
- interactive information system for transport of dangerous goods;
- custom information and administration system;
- timetable information for transport chains based on road, rail and inland waterway;
- electronic shipping exchange for long distance transport;
- based on a freight village intranet and telematic sensors: alarming of fire service and police for the freight village companies;
- general internet provider and webmaster for the freight village companies;
- processing of telematic information, i.e. tracking & tracing of vehicles;

- data processing for mobile communication to vehicles;
- national / international traffic information system;
- European vehicle routing and scheduling system (including major cities);
- central EDP-consultancy for the freight village companies concerning hardware, software, netware and operating systems.

RoLLen BUSINESS LINE 2 - FVW - Freight Village Warehouse:

FVW urban freight services:

- the main services of the FVW are warehousing and depending logistic basic and add-on services;
- the heart of the FVW is a new warehouse facility located in the freight village with corresponding load / unload facilities and storage areas as well as office capacities for the LDPC;
- the first basic service of the FVW is the **offer of warehouse capacities** and services for urban freight receivers (retail, craft business, construction general cargo etc.) and urban freight senders (industry, distributors etc.) in terms of imbalanced inventories of the receivers and senders;
- long distance transport chains with shipments for the freight receivers using the FVW are routed directly to the FVW - based on agreements with the corresponding suppliers and forwarders / carriers;
- the FVW will be administrated and managed by an electronic warehouse and stock management system provided by the LDPC; basic requirements for the system are:
 - ?? customer-customer-management
 - ?? management of storage area
 - ?? article based administration and management
 - ?? an open system architecture for administration of service and management of logistic statuses (to provide an absolute variable invoicing)
 - ?? an electronic view of the FVW customers on their stocks is possible via the LDPC data exchange services
 - ?? the warehouse and stock management system is capable of electronic processing of administration and management for delivery, pick-up and distribution activities as well as logistic add-on service of the FVW (see D3 - *Logistic Management System of BLSG*)
- the second basic service of the FVW is the **delivery of goods on demand** of the outsourcing customers to their urban outlets and pick-up of goods from their outlets; all delivery and pick-up services will be supported by information of the LDPC electronic shipping exchange with preference for members of the freight village to reach a high rate of freight consolidation for urban delivery and pickup traffic (demands for deliveries can be made by telephone or fax as well as using the data exchange options of the LDPC);
- the third basic service of the FVW is the **regional / national / international distribution** of goods for outsourcing customers by use of the logistic services of the members of the freight village;
- logistic add-on services of the FVW are the preparing of articles (like packaging, price tags, display handling, quality assurance etc.), home delivery services (from FVW to final customer), disposal services for packaging material (pick-up on demand, pick-up simultaneously with deliveries on demand, in combination with

preparing of articles), agreements on fixed delivery times or time slots and delivery by usage of customised multi-usage transport boxes;

- customers of the FVW pay for warehousing services variable rates depending on time, capacity utilisation, handling activities and availability of stock views ; for transport services variable rates depending on distance-areas, weight, volume, handling, specific restrictions (i.e. time restrictions) and mode of data exchange for demands; for logistic add-on service fixed rates depending on detailed price lists per handling unit.

FVW general and additional logistic services:

- optional / additional service can increase the rate of FVW capacity utilisation and improve the commercial efficiency of the FVW;
- warehousing for regional freight receivers and freight senders with the above mentioned service scope of the FVW;
- temporary request warehouse facility for members of the freight village;
- temporary request trans-shipment and cross-docking facility for members of the freight village;
- warehouse for co-operative supply of the members of the freight village.

5.4.2.2.6. Seville

The generic concept developed for the city of Seville is presented here. It consists of five different strategies, which are not necessarily separate alternatives, but rather are complementary. They are presented here from the easiest one to the hardest to implement, and can be viewed as five correlative steps which constitute the suggested solution for the centre of Seville.

1. Improve the performance of the current system (this implies better load zone management and time window revision, among other aspects).
2. Mini-Hub-System (provided and controlled by the Public Administration).
3. Valley-hour deliveries (with the appropriate regulations).
4. Freight carriers co-operation (within a framework designed by the Public Administration, with the agreement of all the other parties involved).
5. Restricted access for private vehicles.

In terms of the logistic, administration, telematic and marketing concept, this implies:

Logistic Concept

The effectiveness of logistic solutions proposed for Seville depends mainly on the direction taken by the Administration concept. New perspectives of load/unload and delivery activities could require:

- ?? new types of facilities, like city terminals near the city centre or mini hubs inside it;
- ?? new load/unload equipment on the vehicles, to allow for faster load/unload operations;
- ?? different types of vehicles, for access to the different areas of the city centre.

Administration Concept

According to the outcome of WP100, the needs and requirements of the different user groups (freight carriers, receivers and community) are often contradictory in the city centre of Seville. Due to this situation, it is usually the Public Administration who

needs to act as a referee, because individual user groups can barely achieve any improvements without affecting other user groups and thus creating conflicts.

This is why the strategic solutions developed by AICIA for the city centre of Seville are mainly based on Public Administration guidance, in the manner of regulations, sometimes co-ordination, and often funding support. These solutions include:

☞ Incentive systems for promotion and follow-up control of the new measures implemented;

☞ Traffic planning: optimisation of the use of load/unload zones, hub zones, time windows and alternative delivery practices. The main actions are directed towards better use of the existing load/unload facilities, including:

- Double-parking short time restrictions
- Load/unload zones
- Load/unload zones vigilance
- Parking space planning
- Public parking
- Street blocking allowance
- Temporary load/unload zones
- Use of private parking
- Use of other reserved spaces

The reason for choosing this group of concept elements is their easy implementation and the fast improvements that might be achieved for freight operation in the centre of Seville.

?? Construction planning: regulations for adapting new and existing buildings to effective freight operations, and building of the required infrastructure.

Telematic Concept

Telematic solutions require a gradual introduction in the freight scenario in Seville. Although the most urgent solutions seem to be on the planning and regulatory side, several telematic tools can be of great use from the first stages of implementation:

?? Identification and sensor systems

?? Dynamic Load Zone Management

Marketing Concept

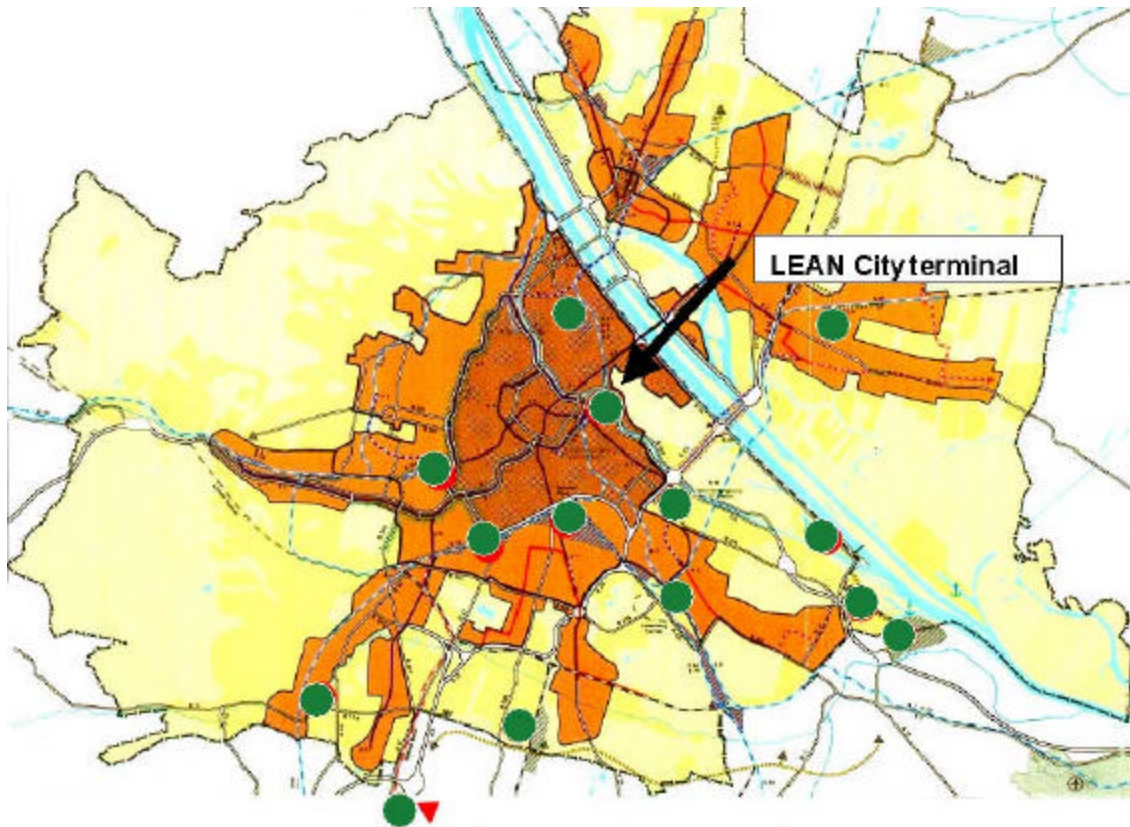
Due to possible controversies arising among different user groups, the intention is to use marketing techniques not only to create market niches, but also to inform and convince all user groups of the purposes of the logistic plan, and to reach a maximum consensus. The establishment of a local freight forum should be a first step, as well as every movement towards achieving higher degrees of co-operation.

5.4.2.2.7. Vienna

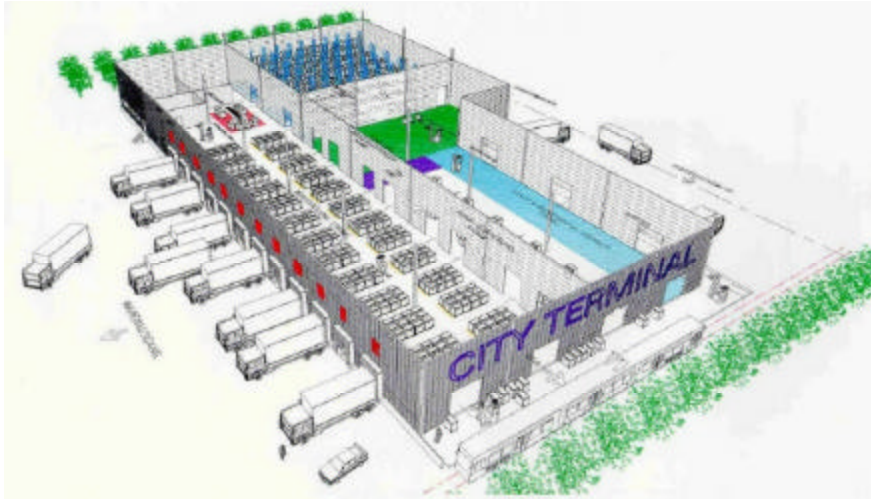
The multifunctional and complex structure (mixture of manufacturing, services and retail) of the town makes it difficult for developing efficient logistic concepts providing all affected groups. Although the development of a general logistic concept for Vienna is recommended, the concentration on problem zones makes more sense in order to demonstrate the potential of logistic concepts in pilots.

The city logistic concept for Vienna is focused on the central part of the town, the First district (Innere Stadt). Based on many logistic studies and experience in

implementing solutions of ECONSULT it is possible to choose a combination of conceptual elements depending on parameters like number of inhabitants, outlets, tourism, transported goods and others. Most important logistic elements are points for transshipment. In the case of Wien we suggest a combination of the advantages of freight village centres and city terminals together to transport consolidated goods and distribute them in the 1st District. A lot of locations for this type of infrastructure are available. The infrastructure situation allows intermodal transport (rail-road). The proposed LEAN city terminal close to the city centre is reachable by shuttle trains:



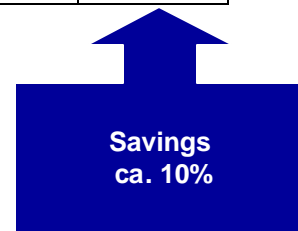
The city terminal is designed for intermodal transport including cargo tram, warehousing and several logistic add-on services:



The result of a first feasibility study shows positive effects for all affected groups defined as freight providers, freight receivers and the community:

?? There may be a reduction of transport costs and an increase of revenues for the providers:

	number of					
	tours	vehicles	distance	time	costs	diff
Mo before	10	9	113	42:56:00	12.892	-9,36%
Di before	9	8	111	40:04:00	12.117	-9,88%
Mo (CT) after	13	10	243	49:04:00	14.223	
Di (CT) after	13	9	242	46:09:00	13.445	



?? Receivers like small shop owners may take advantage of a high level of deliver service and the supply of additional services like warehousing

?? There is a reduction of traffic leading to a reduction of environmental emissions. The existing infrastructure and the economic structure of the city will be maintained and sustained.

To implement the concept it is recommended that a platform dealing with the urban transport issues is initiated. Participants will probably be: representatives of the three user groups. A logistic concept has to be elaborated including operational and commercial feasibility and a business plan. The municipality could support the concept financially, through planning and administration measures. The platform is already established, next steps are expected.

5.4.2.2.8. Wiener Neustadt

Within the LEAN Project a city logistic concept is applied to the historical centre of Wiener Neustadt. – a major problem zone. As described in the case of Wien it makes sense to combine certain logistic elements customised to the specific situation of this small/medium sized town. In case of Wr. Neustadt ECONSULT suggests the use of a city terminal (CT) for consolidating and distributing goods in the city. Within a reachable distance there is an already existing facility to be used as a city terminal:



Additional services can be offered include: redistribution, home deliveries, stock management (warehousing) and others. The city terminal is connected to the rail system and allows intermodal transport (rail-road). The formal concept structure is described below:

City-terminal – add on services - technology	
<i>organisation</i>	Cooperation with organisational structures based on contract
<i>Scope of application</i>	Region in the city
<i>partners</i>	Forwarders, carriers, parcel services
<i>Add on services</i>	Stock management Home delivery
<i>Types of goods</i>	Mixed cargo
<i>transportation</i>	Street, city-terminal
<i>bundling</i>	In the city terminal Combined short distance transportation
<i>Freight equipment</i>	No warehouse automation
<i>technology</i>	Data clearing application Vehicle routing and scheduling Application for processing of telematic information Computer added network

The result of a first feasibility study shows positive effects for all affected groups defined as freight providers, freight receivers (local retailers) and the community:

- ?? There may be a reduction of transport costs and an increase of revenues for the service providers;
- ?? Receivers like small shop owners may take advantage of a high level of delivery service and the supply of additional services like warehousing and home deliveries;
- ?? There is a reduction of traffic leading to a reduction of environmental emissions levels. The existing infrastructure and the economic structure of the city will be maintained and sustained.

To implement the concept it is recommended to initiate a platform dealing with the urban transport issues. Participants will probably be: representatives of the three user groups. A logistic concept has to be elaborated including feasibility and a business plan. The municipality could support such a concept financially, through planning and administration measures. The main actors should be the providers forming a city logistic service provider in co-operation with the local retail sector and other affected businesses.

5.4.3. Analysis of Feasibility (WP 400)

5.4.3.1. Introduction

The objective of this WP is to analyse and evaluate the feasibility of proposed city logistic concepts as well as various concept elements related to the chosen areas of research. With regard to the basic objectives and defined targets of the overall proposal, the results have to pay particular regard to the reality of industrial / retail

operations and a comparison of the magnitude and distribution of costs and benefits to be expected.

The WP is divided into five different work activities:



These work activities are related to the user requirements of WP 100 as well as to the logistic concepts of WP 200 and the applied concepts in the specific urban areas of WP 300. The first part of the WP – WA 410 is deals with the methods and development of evaluation models. The WP 420 – 450 are the evaluation of feasibility of concepts and cities developed in WP 300.

5.4.3.2. WA 410: Methods of Evaluation the general concept by theoretical models

There are three parts in this work activity:

- ~~///~~ WA 410_1 Evaluation models, general description
- ~~///~~ WA 410_2 Pro/contra of described evaluation models
- ~~///~~ WA 410_3 Summary

The contents of WA 410_1 is a general description of different evaluation methods including:

- ?? Scoring models utility value analysis;
- ?? Cost benefit analysis;
- ?? Strength weakness analysis (S.W.O.T.);
- ?? Portfolio technique;
- ?? Economy calculation;
- ?? Multi-attribute Benefit and value theory.

The focus of the description and analysis is based on the specific LEAN perspective and the possibility of application and implementation on a sustained basis. In general the evaluation is a decision problem concerning:

?? alternative concept approaches in relation to:

- + logistics
- + telematics
- + public administration
- + commercial and marketing

?? and alternative concept areas / elements of these approaches taking into account the satisfaction of requirements of the different user groups:

- freight providers
- freight receivers
- community

Quantitative and qualitative aspects have to be considered by the evaluation. The pros and cons of the various methods are described in WA 410_2. After an intensive discussion within the consortium, either to use different methods of evaluation or a common method, the application of utility value analysis (UVA) was adopted as a useful compromise. It deals with assigning scores to single alternatives that are to be evaluated (e.g., people or projects) in respect of each evaluation criterion, and to add these scores, rated according to the importance of each criteria, to form an additive preferential index. The order of preference of alternatives simply results from the overall aggregate scores.

A special characteristic of the utility value analysis is to be seen in the fact that the determination of the project value does not only result from objective information about the target profit of the project alternatives but also in regard of the subjective information.

The evaluation of the underlying target criteria is independent in utilisation from each other. We therefore have to ensure that possibly no specific criterion, dependent in utilisation, is defined or taken isolated as a basis for the evaluation, and that every part of the evaluation only heads to results under the aspect of a restricted independency of utilisation.

The single steps of the procedure are depicted in the following figure.

Step 1	Finding and preparation of a target system
Step 2	Preparation of target benefit matrix
Step 3	Preparation of a target rate matrix
Step 4	Determination of relative weights
Step 5	Multiplication of the grade of performance and finding of the important total
Step 6	Determination of the rank of the locations

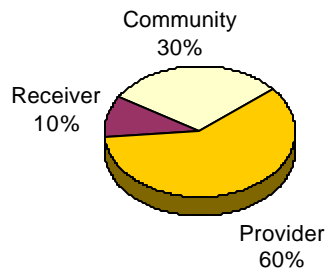
Conclusions:

The rational assessment of city logistic projects includes three stages:

- ?? Identification of a set of conceptual impacts that affect all actors (target groups) defined in terms of objectives
- ?? Measurement of the effects of action that constitute a city logistic project
- ?? Composing of a utility measure to evaluate projects

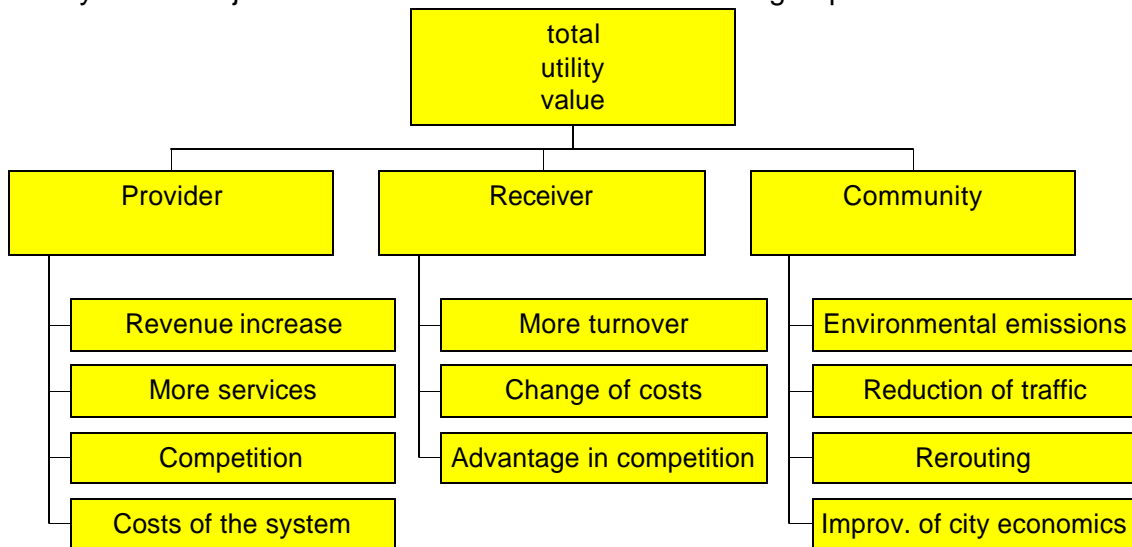
5.4.3.3 WA 420: Evaluation – logistic concept

In WA 420 the logistic concepts are evaluated by the utility value analysis (UVA). First the system of objectives of the utility value are defined. The objectives are allocated to special target groups – 3 user groups of city logistic systems (freight



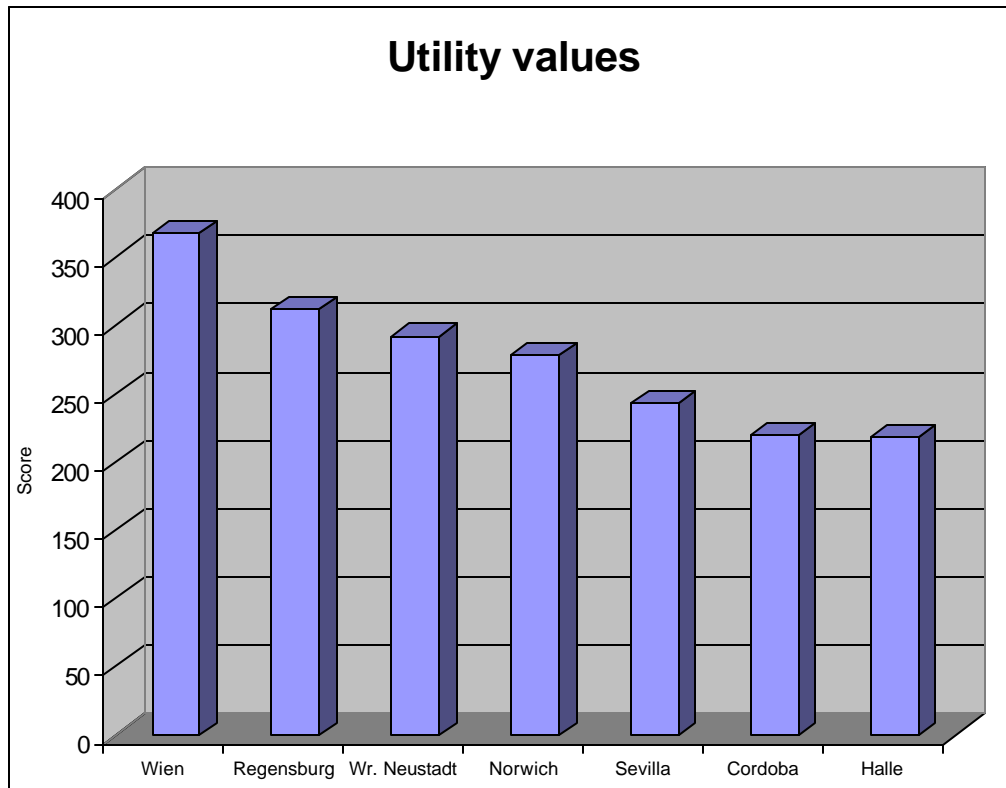
providers, freight receivers and community).The next step shows the relationships between objectives and concept areas. The generic UVA weights are defined in the following way:

The system of objectives related to the three defined user groups:



The details of the parameters of the calculation of the utility value are shown in annex of the WA 420. By this system the different applied concepts in the cities can be compared within the UVA .

Results:



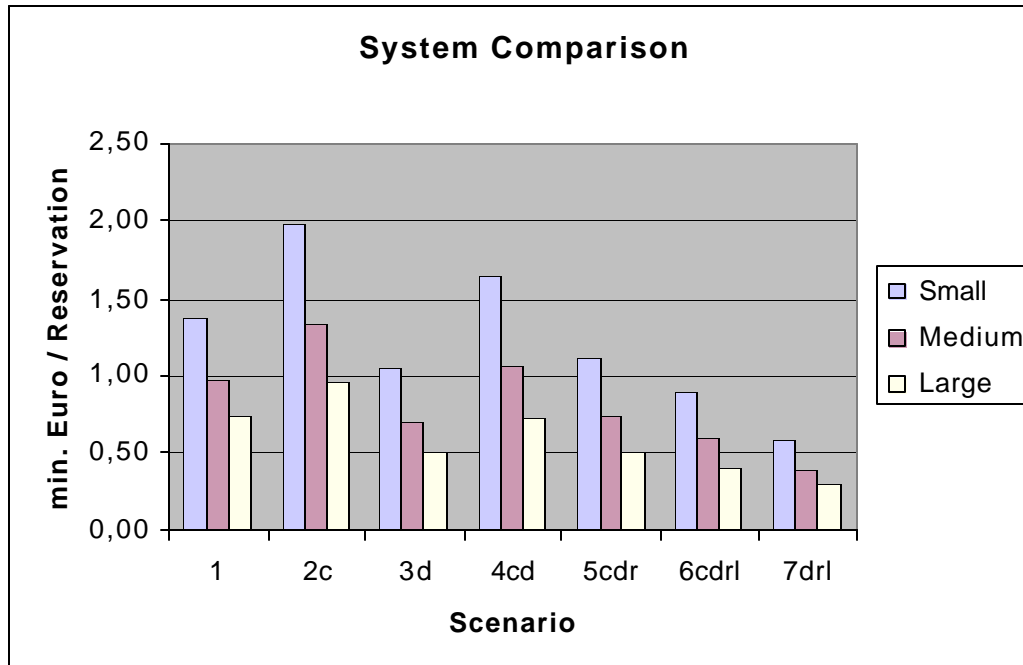
5.4.3.4. WA 430: Evaluation – telematics application concept

Based on the several logistic concepts with telematic applications the evaluations are part of WA 420 Evaluation of logistic concepts. A specific feasibility study of load zone management is prepared in WA 430. This is a commercial feasibility study, in order to give interested cities like Linz real decision criteria to decide whether the application of such a system is economically feasible for them or not.

Stages of the feasibility are:

- ?? Technical feasibility
- ?? Commercial feasibility
- ?? Legal and political feasibility

Assuming the Technical, Legal and Political Feasibility of a planned System Solution the key issue for real world implementation remains the Commercial Feasibility which is worked out in the business planning process. There is an estimation of the market potential, and the development and evaluation of seven different scenarios. The result shows a possible commercial success of a load zone management project when achieving costs comparable to usual local costs for normal parking:



Scenario coding:

c.....with call centre

d.....long depreciation period

r.....high reservation density

l.....2,5 load zones per display

5.4.3.5. WA 440: Evaluation – concept of public administration

WA 440 follows the UVA by adapting the model to the public administration concept elements. The part of the relationship between concept elements and objectives is not only focused on the effects on the three user groups but also on the objectives on:

?? System of incentives;

?? Planning construction activity;

?? Traffic planning.

This step is followed by the discussion of relative preference on the utility of each objective by every public administration concept. The assigned values are justified to the possible level of satisfaction of each objective, and finally the instances of the application of the methodology to the proposed public administration measures are shown in the cities of Seville and Cordoba.

Results:

In Seville the evaluation exercise of the Public Administration logistic concept gives a vector of utility values that may be interpreted as a balanced solution for every affected actor. Relating the values obtained by the utilities to the ranges of their respective scales, it is noticed that the providers attain the first third of the interval scale, while the receivers and the community almost reach half of it. Finally, costs and difficulty have been qualified in the middle of their scales.

The most important objectives improved by the concept for the receivers are the expected increase in revenues (by direct economic benefits application from the public authorities) and reduction in operational costs.

The expected results on the receivers come from the measures associated to improving the city centre situation as a commercial area. Those measures have expected positive effects on the turnover and competitive position of the business located in the area.

There is a positive outlook of the proposed concept for the community, improving in a balanced manner the environmental and traffic congestion aspects while increasing the outlook of the economic activity in the centre. Care should be taken in explaining the concept to the civil associations of the area in order to raise the support for the measures to be applied.

In the case of Córdoba, the evaluation of the Public Administration logistic concept gives a vector of utility values which represent a solution focused on the community. Whereas the utilities for providers and receivers are not very high within their respective scales, the utility for the community attains more than one third of its scale. Finally, costs and difficulty, as happened in Seville, have been qualified in the middle of their scales.

With respect to the providers, the main efforts are concentrated on reducing operational costs for the freight companies. Freight receivers in the city centre of Córdoba should expect to attain advantages in competition, or at least to reduce their logistic position with respect to the rest of the city.

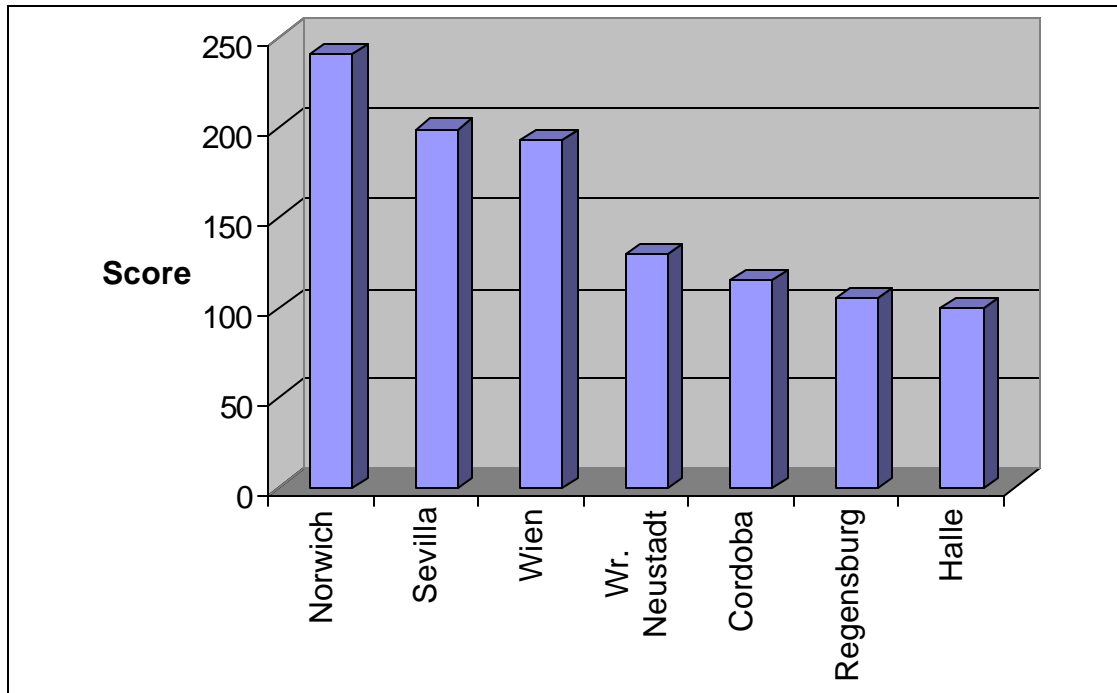
The reduction of traffic levels in the centre of Córdoba does not offer many possibilities due to the characteristics of the area, but both the environmental aspects and the city economics have relatively high scores.

5.4.3.6. WA 450: Evaluation – commercial and marketing and concept

In a similar way the commercial and marketing concept is evaluated in WA 450. First the objectives of the 3 user groups are justified. In the next step the calculation is done in the same way as in WA 420.

The final score of the UVA is:

City	Wien	W.Nstd.	Regen.	Halle	Sevilla	Cordoba	Norwich
Score	193	130	105	100	199	115	241



For the interpretation of the results, as a conclusion, it can be said that the higher the score, the higher importance the marketing concept for the city. Thus, for Norwich, Seville and Wien, the marketing concept is an important issue for the development of a city logistics plan. Wr. Neustadt is interested in the elaboration of its marketing concept while for Cordoba, Regensburg and Halle it isn't a key issue.

The magnitude of the differentials in this aspect of the evaluation demonstrates clearly the different priorities attached to concepts in differing national scenarios.

5.4.3.7. Annex

In the annex of WP 400 as an example of overall evaluation the case study Halle is presented. The Halle concept is called CHIEF (City of Halle Information Exchange for Freight) and the evaluation includes the logistic concept, the concept for public administration and the marketing concept.

Four stages of the Halle Concept are calculated, HA1 – HA4, referring to the additional features of the concept. The task is to demonstrate the calculation tool of the UVA as an aid to decision-making.

For comparison, Regensburg serves as reference of a highly developed City. Two benchmarks (min and max) are included.

6. Conclusions and Recommendations

6.1. Recommendations for the Community (WA 510)

It has been demonstrated by the preliminary work on this WP on city level and on national level, that administrative measures are often opposed to general user requirements or economic aims of companies, which are also opposed to each other. This is true throughout the countries involved, although targets and approaches differ according to some national specifics, as described in the next chapter. Integrative solutions not only for City Logistics but for European transport networks have to reflect these facts and must provide a generalised European context of guidelines and targets, to alleviate the problems of disintegration and opposing national strategies.

6.1.1. Summary of Regional and National Findings

6.1.1.1. Regional Projects

6.1.1.1.1. Austria

The different communities are seen as moderators and promoters of provider co-operation, in order to establish platforms of discussion for all user groups. Up to now, existing platforms in Wien, Wiener Neustadt and Linz still do not include providers. Public Administration should politically, legally, and perhaps financially encourage City-Logistic projects.

6.1.1.1.2. Spain

Public Administration plays a major role in the establishment of City-Logistic projects for Andalusia in southern Spain. The focus on an holistic view and the touristic importance of the selected cities also imply a more governed approach to the alleviation of general and transport traffic problems (e.g. access restrictions and area classification). The need for an important improvement in modal split towards railroad freight and passenger transport is already part of a national plan.

6.1.1.1.3. Germany

European deregulation and still developing harmonisation measures, along with new German transport laws, call for still more rationalisation, optimisation, and re-engineering of freight transport providers to compete within the open market. There is a need for even more strategic co-operation and more networked operational and administrative structuring. Public support for more co-operation of small and medium-sized urban and regional freight providers to suppress the danger of monopolisation by large and established commercial groups.

As for the new Länder, there is still a need for infrastructure development to decrease the existing differences with the West and to minimise negative effects by distortion of competition. The possible enlargement of the EC towards the east needs to be recognised as an opportunity.

6.1.1.1.4 United Kingdom

The key strategic issue for Norwich is the set-up of a freight forum, aimed as a general platform of discussion and decisions on urban transport problems. The high level privatisation of rail and the low public support suggest the need for a change in

modal split in favour of rail transports. Governmental planning up to now mainly focused on public transport, but this may change profoundly in the medium term. There is a need for a level playing field on regulation and safety to afford a degree of equity between modes of transport. Cost awareness of land-use and environmental impacts of road transport could be measured by taxation to improve rail competitiveness.

6.1.1.2. Relations

The necessary influence and the adequate degree of involvement of public authorities in the co-ordination of urban goods transport, and the improvement of urban freight traffic is seen as being very diverse by the LEAN project teams of the four considered countries.

Influence on, and co-ordination of, urban goods transport by the city authorities (results of the national recommendations):

<i>country:</i>	influence: actual	expected potential	recommended
<i>Austria</i>	low	medium	low
<i>Spain</i>	low	high	high
<i>Germany</i>	low	medium	medium
<i>UK</i>	low	low	low

One key fact common throughout is that the city authorities either cannot or do not understand much about urban goods transport or the specific problems / requirements of urban freight transport. The main emphasis of the public planning focuses on public transport and car traffic. The authorities deal much more with buses, pedestrians and cyclists - to replace cars - than lorries. But except in the UK - where the expected potential for public influence is measured as being very low - the experts of the other countries recommend an in-creasing awareness and more activities. At least the role of a moderating partner within a city logistic approach is recommended for all countries. It can be clearly stated that in many cities of the LEAN countries - and probably all over Europe - the relation between public consideration of urban freight transport (in political decisions, planning and measures) and the economical, socio-economic as well as environmental impacts of freight transport are not balanced. "City logistics" or similar expressions are well known words but it is still rare to find them in urban traffic plans or other official papers of the municipal authorities - it is even difficult to find the word "freight".

Despite the great variety of corresponding local, national and European research as well as many initiatives it occurs that the results and findings do often not reach the awareness of political and administrative city representatives.

Therefore a Europe-wide information campaign with a focus on urban freight traffic aiming to city authorities providing information as well as guidelines and operative aid is the major recommendation of the LEAN project in this area.

In addition, another common recommendation for the national public authorities can be stated:

Encouraged or incentivised enforcement of modal split rail-road (and corresponding support for the establishment of multi-modal hubs like freight villages).

6.1.2. Globalisation

6.1.2.1. “More Radical Policies” versus Deregulation

The stated decrease in transport prices all over Europe, and the corresponding massive breakdown of small businesses call for regulative actions of Public Authorities to prevent a predatory position by international carriers. Although this price decrease was experienced in Europe-made, public transport and former state-owned national means of transport now have to deal with these market-driven initiatives. A consolidated calculation of externalities on a national and a European level could be a tool for Public Administrations to play an active role within an self-regulating market, with-out losing social and other objectives.

6.1.2.2. Global Sourcing

The ongoing trend to improve efficiency in all commercial areas by global sourcing leads to an extended demand for logistic activities and freight transport movements. The large amount of additional tonnes/kilometres initiated by global sourcing can be visualised by some “funny” examples of the food-sector in retail business:

- ?? wine from Australia sold in Vienna;
- ?? American beer sold in Bavaria;
- ?? Spanish olives sold in Apulia (I);
- ?? strawberries sold in Middle Europe in winter time;
- ?? original Parma ham made from German meat.

Since “the customer is always right” these developments cannot be negated or rescinded by legal or regulative measures in the face of growing expectations and choice:

- ?? by a European marketing for European products;
- ?? by a European frame promoting the independence and economic efficiency of regional markets;
- ?? by detailed evaluation of intra European freight streams and development of corresponding multi-modal infrastructure, as well as restrictive enforcement of modal split in the main corridors.

6.2 Recommendations for Economy (WA 520)

6.2.1. Summary of National Recommendations

First, it is necessary to summarise the most important national recommendations. The different approaches, local preconditions and views lead to various recommendations.

6.2.1.1. United Kingdom

Based on the Norwich case study there are recommendations worked out including global and general strategic perspectives:

- ?? Urban Freight transport should become a higher profile in city planning and development issues which leads to several activities – maintaining the “do nothing” option is not tenable;
- ?? Environmental and economic requirements have to be taken into account;
- ?? Improvement of rail services, vehicles, cost competitiveness, security and responsiveness to raise attractiveness against road transport;
- ?? Measures have to be firmly commercially oriented in general. Commercial (logistic) trends have to be accommodated in any array of infrastructure or organisational initiatives;
- ?? Make the economic basis of road and rail transports equable through the possible introduction of road pricing or infrastructure provision at market rates;
- ?? Development of a long-term mechanism for common (including the involved groups) discussion and solution of city logistic problems;

6.2.1.2. Germany

These recommendations refer to the national transport related legislation and organisational structures as well as the case studies Regensburg and Halle:

- ?? In towns all public planning activities should consider logistics initiatives;
- ?? Strong strategic co-operation of independent providers for urban and regional logistic services should be developed and implemented;
- ?? Use of high tech for network data operating and administration is recommended;
- ?? Public support for co-operative initiatives of small and medium sized urban/regional freight providers;
- ?? Combination of long distance freight solutions with city logistic concepts;
- ?? Urban freight transport should become a higher profile public issue;
- ?? City logistic concepts should be economically independent and self-reliant, but supported by the public in the development phase and in the provision of infrastructure;
- ?? Use of basic applications for communication could be acceptable in the case of low cost concepts;
- ?? Public administration should co-ordinate city logistic approaches to reach efficiency through enforcement and implementation;
- ?? Public authorities should represent the ecological interests in all urban traffic issues;
- ?? Integrated logistic chains (intermodal hubs, etc.) are necessary for the reduction of environmental impacts;
- ?? More commercial and operational flexibility is achieved by improvement of the logistic organisation of rail and inland waterway sector;
- ?? Concentration of urban freight research on a national level is recommended (instead of different authorities);
- ?? Improvement of international research co-ordination.

6.2.1.3. Austria

The Austrian recommendations are mainly oriented at the Federal Transport Infrastructure Plan, especially the so called Master Plan 2015. These documents refer to the Austrian Overall Transport Concept which contains three main objectives:

- ?? Avoiding unnecessary traffic;
- ?? Switching traffic to environmentally friendly forms of transport;
- ?? Opening up regions to which access has previously been poor;
- ?? Involving the populations affected, in order to secure public acceptance of transport policy.

Recommendations:

- ?? In General, implementation of the Masterplan 2015;
- ?? Introduction of road pricing;
- ?? Cost reduction and a higher level of service in public urban transports to generate better conditions for urban freight transport;
- ?? Introduction of energy taxes and supporting of environmentally-minded solutions as incentives.

6.2.1.4. Spain

The Spanish recommendations are based on the case studies Cordoba and Sevilla. The conclusions from these cities are then put together with other ideas to develop national recommendations.

In general there are trends in Spain and Andalucía aiming at the improvement of road transport and accessibility (also in the city centres). In case of urban freight transport the recommendations are:

- ?? Achieve a higher load factor in trucks working in the Centre;
- ?? Decrease the number of trucks simultaneously working in the Centre;
- ?? Decrease operating time per freight activity (pick up/delivery);
- ?? Increase quality of freight service in terms of time-agreement fulfilment;
- ?? Maintain competitiveness of freight providers sector by introducing new services and better technology;
- ?? Assess the effect of sub-contracting in the sector;
- ?? Consider the establishment of a national network of freight villages;
- ?? Open and maintain a national freight forum;
- ?? Develop a homogeneous regulation for this kind of transport.

Focussing on the economy sector, the recommendations are:

- ?? Definition of specific economic objectives for the improvement of urban freight transport, freight transport has to become a higher profile issue;
- ?? Improvement of accessibility of freight transport in the cities (for maintaining the level of economic activities);
- ?? Establishment of funding guidelines to incentivise certain policies aimed to reduce negative effects associated to freight transport.

6.2.2. Resume on European Level

Comparing the national recommendations there are the following common aspects:

- ?? Urban freight transport is not just a business performed by providers to serve customers in cities, there is a significant impact affecting the public sector. Therefore it is necessary to establish platforms of discussion, interaction and development of solutions integrating the different involved groups and interests on an ongoing basis.
See: UK, Germany, Spain, Austria
- ?? According to the objectives of deregulation and more competition it is necessary to make costs more transparent. The introduction of road pricing systems is a step towards this direction.
See: UK, Austria
- ?? In the case of environmental impacts of urban freight transports incentives for the providers are necessary to encourage low emission vehicles, rail based systems etc. in the cities.
See: Spain, Austria
- ?? The rail sector has to significantly improve its services and products to compete with other modes in this sector
See: UK, Germany.

Other aspects:

- ?? Referring to the organisational sector improved co-operation between providers in order to establish urban logistic services is necessary (reduction of costs and improvement of services);
- ?? Another need commensurate with commercial and competitive positioning is the integration of logistic chains to reach efficiency but also environmental targets (when using intermodal city terminals);
- ?? The organisational recommendations depend on technological tools: the use of network data operating, controlling, administration, telematics. So, these instruments are highly recommended.

6.3 Recommendations for Policy/Environment (WA530)

6.3.1. Generic aspects

6.3.1.1. Policy

Sometimes it is difficult to separate this kind of recommendation from the others, particularly in relation to: economy and community issues, because the links are so close. Valuing sustain-able aspects for our mobility is necessary, that means taking into account for the policy the environmental circumstances.

Policies should help sustainable development in professional and economic activities through regulations, taxes and incentives.

Another key to be recommended is the accessibility to the city centre. This accessibility dictates the transport service and the infrastructure necessary. Good accessibility promotes economic growth and the development of the area. The

downside is that easy access can create a vicious circle, which could promote urban sprawl and congestion.

Infrastructure improvement has implications. It could lead to the development of growth zones (which have good access and disadvantaged, less accessible city zones).

Transport chains and activities can not be split, they must be analysed as a whole at the same time including all of the following which interact at different spatial and temporal points: public transport, private transport, freight transport, tourist transport, school transport, ...

One of the main problems in this kind of recommendation is that land use and transport planning, often including local, city, regional and national levels, are under responsibility of different units of the administration.

Because of the "europeanisation" of the countries, the consideration of other legislation, policies and the harmonisation implications are vital.

6.3.1.2. Environment

Transport in general is responsible for a high percentage of overall pollution. As with all polluting sectors, many policies and regulations are oriented to reducing pollution levels in the transport industry, which are reducing the problem, or at least preventing it from further investment growth.

Freight transport is also responsible for its share of pollution, but it is important to note that it is not the principal source of pollution in the transport sector. Significant improvements can be made in freight transport systems and procedures towards sustainability, but other areas of transport have even larger scope for improvements.

The first possibility for environmental advances within freight transport lies in the technical aspects:

- ?? General introduction of less polluting diesel engines and the use of gas-fuelled vehicles.
- ?? Improvements in engine design towards better performance rates.
- ?? Freight fleet renewing, to take old, inefficient vehicles off the road. Several actions have already been taken in this direction, like the RENOVE plan in Spain.

Technical improvements towards sustainable transport can be applied in all transport sectors and not only in freight transport. Funding help and tax incentives for less polluting vehicles are possible policies for introducing technical changes on the road.

Since logistic companies are usually interested in improving their commercial and competitive performance, freight transport could very well serve as a test bench for sustainable and more benign technologies. Again through funding help or tax pressure, these technologies could be implemented in freight operations (of special interest are those referred to urban freight transport). Later on, when they have proved effective, they might be incorporated into general transport policies.

The second possibility for environmental advances within freight transport is that of changing behaviours. It can also be extended to all kinds of transport, with measures like:

- ?? Internalise external costs such as noise, emissions, vibration, safety;
- ?? Change of procedures;
- ?? Reduction of delivery times in response to customers requests and requirements;
- ?? Increase the load factor in freight vehicles.

In many cases, public support (funding, taxes) will also be required for the initial implementation of these policies.

It is necessary to seek a wide range of alternatives in order to achieve general environmental improvements related to transport, including some of the following:

- ?? Reducing congestion is a positive gesture towards sustainability, but all types of congestion must be reduced simultaneously. There is no point in reducing freight vehicle congestion if that space is going to be occupied by additional cars and other traffic.
- ?? Building more roads and parking lots is not the solution if sustainable transport is to be achieved as this only encourages more car usage.
- ?? A strong promotion of public transport is fundamental if congestion levels are to be reduced.

6.3.2. Recommendations at European level

- ?? Any policy referring to an urban area should consider the urban freight transport as an integral and important part of it;
- ?? Public support as a policy to initiate changes;
- ?? Several local measures could be extrapolated to a wider concept and possibly transferred beyond national boundaries;
- ?? Any attempt to include environmental recommendations must be referred to policies;
- ?? It is necessary a experiences and researches exchange at European level, at least;
- ?? For any kind of harmonisation could be used other ones, trying to take advantages of the synergy and their potential development;
- ?? Possible co-operations among forwarders need to be promoted by public players.

7. Annexes

7.1. Dissemination Activities

The dissemination activities carried out by the different partners of the LEAN consortium are listed as follows:

Dissemination and exploitation		activities of	LEAN	
<i>date</i>	<i>activity</i>	<i>subject</i>	<i>participants</i>	<i>Published in</i>
15/07/97	presentation	objectives and approach of the LEAN project	members of the association for promotion of freight traffic logistics in Regensburg (presentation by BLSG)	minutes of that meeting to all members
26/08/97	workshop	requirements for optimisation of urban freight transport in Regensburg / conceptual strategy of the LEAN project	BMW Regensburg, BMW R&D-centre Munich, University of Regensburg, chamber of commerce Regensburg, city-council Regensburg, BLSG	minutes of the workshop to all participants
05/11/97	presentation	actual status of the city-logistic research	representatives of the ministry of transport, the innovation and technology funds, transport organisations	
13/01/98	information	city-logistic-model	Wirtschaftskammer (chamber of commerce) Vienna, Dr. Kunisch	
19./10. 01.98	information	city-logistic state of the art	Ing. Urban, representative of the ITF (Innovation and Technology Fund associated to the ministry of transport)	internet
28./29. 01.98	Lecture at the conference COST 321 in Rome	city-logistics	several representatives of the COST-participating countries as well as representatives of the City of Rome	conference report
14/01/98	UK National Press Release	The LEAN Project	Mark Robinson, Phil Mortimer and Sian Evans	Trade, Rail and Logistics Journals
12/02/98	workshop	approach of the LEAN project for Regensburg	BMW R&D-centre Munich, city council Regensburg, members of the round table "City-Logistics" in Regensburg, BLSG	not published
10/03/98	dialogue	city-logistics and LEAN status	Mrs. Ederer (Financial councillor of the Town of Vienna) and Mr. Fussenegger (head of the Innovation and Technology Funds)	
12/03/98	dialogue	city-logistic-activities in Lean	Mr. Mader Wr. Neustadt	

24.03.98	dialogue	city-logistic-activities in Lean	DI Solymos, Graz passinger traffic undertaking	
30.03.98	dialogue	new city-logistic-structures in Vienna	Dr. Kunisch, WWK (Chamber of commerce) Vienna	
16/03/98	Radio Interview	Application of the LEAN project to Norwich	Dr Mark Robinson and Bryan Stead (Norfolk County Council) were interviewed on BBC Radio Norfolk	Recorded by BBC Radio Norfolk
13/03/98	dialogue and presentation	city-logistics and LEAN	Representatives of the Royal Mail System of London	
01/04/98	seminar	city-logistic seminar	Dr. Riebesmeier, economic university of Vienna	
27.04.98	dialogue	city-logistic-structures in Vienna	Dr. Kunisch WWK Vienna and DI Arnost MA 46	
21/04/98	report	approach and first results of the LEAN project in Regensburg	author: G. Maas (BLSG)	GVZ Regensburg news (issue 2, May 1998)
11/05/98	presentation	actual status of the city-logistic research	representatives of the ministry of transport, the innovation and technology funds, transport organisations	
13/05/98	presentation	objectives and new conceptional approaches for city-logistics in Linz	chamber of commerce Linz, city council Linz (Alcatel, Econsult, BLSG)	not published
25/05/98	presentation	objectives and new conceptional approaches for city-logistics in Linz	chamber of commerce Linz, city council Linz (Alcatel, Econsult, BLSG)	not published
06/05/98	interview for newspaper	new approaches of the LEAN project for optimisation of urban freight transport	Simone Platz, Franz Ziering and H. Hertlein (BLSG), R. Gummelt (Mitteldeutsche Zeitung Issue 7)	Mitteldeutsche Zeitung (7.5.1998)
06/05/98	article	Integration of LEAN logistics	Mark Robinson	World Railway Management
27/05/98	LEAN FOLDER	LEAN Folder to contain the LEAN city inserts that are being created	ARRC and WRDL	Extensive Distribution particularly to the City Freight Forums
15/05/98	presentation	presentation of the LEAN project and invitation for participation	inland port Nürnberg, BLSG	not published
15/06/98	seminar	city-logistic	Dr. Riebesmeier, economic university of Vienna	
30/06/98	seminar	city-logistic	Dr. Riebesmeier, economic university of Vienna	
01.06.98	article	The European Commission and LEAN	Mark Robinson, Phil Mortimer and Sian Evans	Railway Gazette International p.363
15/06/98	article	Integration of LEAN logistics	Mark Robinson	EWS Focus (in press)

03/07/98	dialogue	objectives and new conceptual approaches for city-logistics in Vienna	Dr. Kunisch WWK Vienna and DI Arnost MA 46 (local administration)	
06.07.98	presentation	new ideas in city-logistic	Mr. Mader, economic department of council of Wr. Neustadt	
06/07/98	creation of a link to the future LEANhomepage	exchange of information with a national project concerning city-logistics	FORVERTS project (contact of BLSG)	a link to the LEAN-homepage will be created in the TTMLine information database (http://ttmline.forwiss.tu-muenchen.de/)
31/08/98	dialogue	objectives and new conceptual approaches for city-logistics in Vienna	Dr. Kunisch, WWK-Vienna	not published
	report	City-logistic, city-terminal	newspaper "Der Verkehr"	"Der Verkehr"
29.09.-1.10.98	Several activities in context with the fair: Lognet Vienna: 1) various dialogues with partners, politicians, representatives of transport organisations, 2) participation at the press conference 3) lecture on city logistics 4) interview in the Lognet-Video clip	urban freight transports, city logistic solutions	visitors of the fair Lognet, representatives of transport organisations and transport operators, secretary of the ministry of transport and other political representatives (representatives of the LEAN project of Alcatel, BLSG and Econsult)	several newspapers like "Wirtschaftsblatt", internet webpage, folders of the Logistic Austria, a CD will be published soon
10.9.98	Survey	urban freight transports, city logistic solutions	Responsible Local Transport Authority Officers	Distributed to Local Authorities and City Councils to determine the exploitation potential of the Requirement Methods Developed in LEAN. A seminar is planned to disseminate the results
11/10/98	dialogue	implementation of city logistic concepts in Vienna	CEO of the Wiener Hafen (Harbour Venna) Mr. Krämer	
22/10/98	dialogue	trams in city-logistics	DI Michlmayr, passenger traffic undertaking Vienna	
24/10/98	report	tour planning in city transports		ITR International Transport Revue 10/98
10/10/98	web site	LEAN web page structure established	Nick Harris	ARRC and WRDL
07/11/98	Norwich Insert	LEAN activities in Norwich	Norfolk County Council, Norwich City Council, WRDL and ARRC	Will be distributed to freight forum members, local and national press
28/04/99	presentation	freight views from local authority	repr. of Norfolk county	conference report
10/05/99	Regensburg insert	LEAN activities in Regensburg	BLSG	Will be distributed to freight forum members, local and national press

10/05/99	Halle insert	LEAN activities in Halle	AST	Will be distributed to freight forum members, local and national press
10/05/99	Seville insert	LEAN activities in Seville	Seville council, Transport ministry, RENFE, PROINCA & AICIA	Will be distributed to freight forum members, local and national press
10/05/99	Cordoba insert	LEAN activities in Cordoba	Cordoba council, Transport ministry, RENFE, PROINCA & AICIA	Will be distributed to freight forum members, local and national press
17/05/99	presentation	access restrictions in Seville & Cordoba	Guillermo Montero	conference report

Contact details and download information

For further information please visit our LEAN web-site at www.via-donau.org where you can find different parts of the project documentation available to download.

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