Final Report for Publication

LOGICAT

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Project Coordinator:	EXPERTEL CONSULTING (France)
Partners:	CAT Group (Compagnie d'Affrètement et de Transport) (France) ISL (Institut Fuer Seeverkehrswirtschaft und Logistik) (Germany) METTLE (Maritime Engineering and Technology for Transport, Logistics and Education) (Italy)
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1 PARTNERSHIP

This section presents the different partners of the project:

1.1 Expertel Consulting

Expertel Consulting is a subsidiary of France Telecom (FT), the French Operator. Expertel Consulting aims at assisting companies all along their telecommunication projects- before and after any investment. Corporate telecommunication services are to be dealt with through a new and original approach.

The Expertel Consulting know-how covers all ranges of corporate network services and business communication skills, including intermodal transport applications. Expertel Consulting engineers are able to design, implement and operate companies' telecommunication systems and networks.

Expertel Consulting 's scope of work is diversified. The main objective of Expertel Consulting is to advise companies in developing their results using IT. It includes:

- Use of intranet / extranet
- Local Area Networks, Wide Area Networks
- Mobile networks
- High Speed Networks
- Terminal and interfaces;
- Network management system;
- Multimedia networks
- Elicitation of user requirements
- Evaluation of new usages
- Project Management
- Marketing studies.

Expertel Consulting is in good position to understand the evolution of intermodal transport, logistics and its link with worldwide telecommunication evolution, thanks to its permanent technological watch and to its marketing consulting activities.

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1.2 METTLE

1.2.1 METTLE Groupe

In a world of information overload, good, clear, focused mechanical engineering, product design and technology development is more important than ever.

When the very future of our clients hinges on their ability to enhance their business and to communicate with their own customers, engineering and design have a vital role to play. This is where METTLE GROUPE can help. METTLE GROUPE specializes in new product design and development offering a total turnkey service, from concept to manufacture. The group personnel includes Engineers and Designers with more than 25 years experience assisting and advising companies with the design and development of attractive, functional and ultimately profitable products and services. METTLE GROUPE companies have a broad scope of product and engineering design experience including; maritime, transport and mobility, consumer goods, telecommunications, electronic markets and products, industrial capital goods, processing equipment and transportation. METTLE GROUPE client base comprises small entrepreneurial companies, right through to major blue chip multi nationals who are operating within the global marketplace.

Successful product development programs only occur through teamwork and communication between the client and METTLE GROUPE consultant engineers.

METTLE GROUPE was first incorporated in 1991 by offering high quality engineering services to the wider maritime industry, and since then offers important competence in Engineering, Design and RTD. Today METTLE GROUPE is composed of 7 companies offering services in 5 countries of 2 continents. METTLE GROUPE also designs and develops customized designs and projects, and validation methodologies often based on know-how and expertise from full-scale experiments and scale experiments and scale model tests, combined with theoretical approaches.

Goals

- To rationalise abilities and resources in the corporate maritime, transport and tourism industry fields;

- To aim to assist companies throughout their projects before and after any investment;
- To sustain the innovation process for the maritime industry. The exploitation at full scale and the technology transfer and consultancy of maritime engineering and design to the industry is a key factor of the METTLE GROUPE corporate policy and strategy.

METTLE GROUPE Group of Companies Key services

- ***Transport Engineering:*** key competences for intermodal transport and logistics, including vehicle and terminal designs, maritime technology, re-engineering, safety, marine environment impacts and assessment, risk analyses, Intelligent Transport Systems, automatic control, together with broad experience of full-scale maritime operations
- ***Creative Design and Engineering***: new concepts, product styling, product strategies in color and finish, product configuration, mechanical concepts, mechanisms.

- ***Basic Research***: fluid dynamics, hydrodynamics, materials, processes, product profiles, competitors' products.
- ***Ergonomics***: human interface analysis, anthropometrics evaluations, control sequence design.
- ***Product Engineering***: strength, stress and stability analysis, Concurrent Engineering and standards compliance, documentation for manufacture, assembly systems.
- ***Product Graphics and Multimedia***: corporate and product branding, product labeling, product information documentation, product packaging.
- ***CAD***: modeling, surface modeling, system assembly, photo realistic visuals, structural analysis, animated simulations.
- ***Prototyping***: one off replicas, batch production samples, and function assessment rigs.
- ***Information Society Technology:*** Application of Telematics to the Maritime Industry. Software Development and Production. System Integration and Implementation of telecommunication and information technologies to shipbuilding, shipping and transport. Intelligent Transport Systems applications
- ***Industrial activities:*** Design of ships, luxury boats, fast crafts, and others; Concurrent engineering of shipbuilding activities; Prototype of new concepts.
- ***Consultancy:*** Project management of large industrial and engineering project. Business planning. Logistics and Inter-modal Transport

METTLE GROUPE Experience in Technical Assistance and RTD

METTLE GROUPE is highly involved in engineering, design, research and consulting activities for various clients. It has provided the following key services:

Creative Design and Engineering

An innovative and truly original concept is pivotal to the success or failure of the future product. METTLE GROUPE has built up an international reputation for producing innovative concepts, which are coupled with commercially realistic production engineering. A team of engineers, designers and technical assistants are selected for each individual project and tasked with generating a wealth of concepts answering the challenges identified in the project specification. These concepts take the form of sketches, renderings, computer-generated visuals, card and virtual models, which explore the spatial forms and mechanical solutions.

Product Engineering

Each project team is made up of an equal number of product assistants and engineers working in collaboration. This has enabled METTLE GROUPE to not only define the preliminary construction of the product but also produce solutions to complex functional mechanisms, environment protection and technical compatibility. Following refinement and detailing the definitive engineering solution is put to test via the construction of working prototypes. METTLE GROUPE engineering team optimizes every design in terms of material selection and performance, production technology, assembly systems and production runs. METTLE GROUPE maintains an extensive database and library of approved suppliers, partners and components.

METTLE GROUPE Capability Statement in RTD

Key areas of strength of METTLE GROUPE:

- Extensive knowledge and involvement in issues, activities and programmes concerning the maritime and intermodal transport as well as logistics sector in order to assess the competitiveness at European level.
- Extensive consulting activities on regulatory issues on Freight and Passenger Ships and Terminals to Public Authorities, Local Governments and Companies;
- Extensive knowledge of Intelligent Transport Systems and Decision Support Systems for transport, as well as safety and risks assessment and management.
- Knowledge of macro and micro measures needed for the maritime transport necessary to adapt the requirements of the accession markets and of the single in particular.
- Good understanding, and contacts within the European Commission, government Departments, Research Organizations, the ship and transport operators, and the shipbuilding industries.

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1.3 ISL

Institute of Shipping Economics and Logistics

1.3.1 The Institute

Legal form:	Independent, private non-profit foundation
Founded in:	1954
Leadership:	Prof. Dr. Manfred Zachcial (Executive Director), Prof. Dr. Hans-Dietrich Haasis Prof. Dr. Volker Speidel
Tasks:	Business Management, Transport and Telematics in Logistics and Transport Systems; Technology and Prospects for Maritime Transport and Logistics
Capacity:	50 permanent staff members working in interdisciplinary teams; these teams are supplemented by free-lance specialists; National and international partnerships/co-operations
Clients:	National and local governments, the European Commission, international organisations, service providers and enterprises from trade and transport industries (e.g. ship owners, ship yards, ports, forwarders, cargo handling companies) from different places in the world

1.3.2 The Departments

1.3.2.1 Logistics Systems

The structures of logistic services are changing. A prerequisite for innovation is feasibility within business organisations. **Corporate concepts** for global logistics have to be designed to be practice-oriented, upgradable as experience is gathered and, above all, economically efficient.

Logistics systems are **co-operative systems**. The logistic enterprise is, together with its partners, a service provider for distributed production and trading processes. Alliances and networks involving all transport carriers require success-oriented correlation by a moderator.

Global supply and waste management are becoming local factors. Above all, logistics has also to fulfil social aims. Environmental pollution, energy and land consumption have to be kept to a minimum - exacting demands to be met in the development of **logistics locations**.

The aforementioned bottleneck factors necessitate higher productivity. Public/private partnerships are to be guided in conformity with free market principles. The planning of networked **macrologistics systems** is a main focus of transport policy programs.

1.3.2.2 Transport

The planning of transport systems means recognising economic and social interrelationships as well as the co-operative advantages of the transport modes; shipping and ports take on a new, pioneering role in the **transport concepts** that are to be developed for the future.

In Bremen, the **maritime economy** has a long tradition and a special status. In the German seaports, it requires tailor-made and innovative integration into current lines of development. In shipping and shipbuilding it is a question of finding new ways to retain or regain international competitive ability.

Planning succeeds only on the basis of comprehensive information. The acquisition and editing of reliable data and the utilisation of these to illuminate interrelationships as well as their conversion into **forecasts** of world-wide networked transport systems are a major focus of the research and consulting activities.

Transport systems are subject to constant change. They prove themselves dynamically and in long-term processes. Capital investment in traffic and transport as well as new technologies requires **evaluation by impartial experts**.

1.3.2.3 Telematics

Logistic processes deal with flows of material and information seen from a single viewpoint. To plan and control these flows, it is necessary to develop processes based on scientifically proven methods. If these are not translated into information and communication concepts, logistics simply does not work.

The logistic processes have to be designed in such a way that they can be used with equal efficiency for different task profiles and different business enterprises. On the one hand, this facilitates process integration along logistics chains and, on the other hand, the supporting information and communication system become reusable, i. e. adaptable to differently organised enterprises and different branches of business for a minimum outlay.

The main tasks for the application of telematics in transport and traffic are: strategic planning, short-term scheduling, control and monitoring, as well as the networking of the relevant processes with each other. The micrologistics of individual service providers have to be integrated into networked co-operative processes of macrologistic systems.

The optimisation of logistic progresses through interaction with information/communication technology. The possibilities offered by innovative technologies are incorporated into the design of logistic systems.

1.3.3 The Services

1.3.3.1 Information Centre/Library

The ISL Library is one of the largest in the world in the fields of maritime transport and logistics. The information centre gathers together international literature and economic data in the following fields:

- Shipping
- Shipbuilding
- Ports
- Sea canals and waterways
- Traffic, transport, logistics
- Economics and trade

The literature data base ISL-SEABASE is continually updated. Since 1986, a stock of 70,000 bibliographical records has been built up; this is expanded by about 5,000 documentation units per year. Literature and fact researching is carried out to customers' orders and, if desired, the full texts themselves are also delivered on the basis of current copyright laws.

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1.4 CAT

CAT Group (Compagnie d'Affrètement et de Transport, i.e. Freighting and Transport Company) is a French company founded in October 1957.

CAT Group's five main branches of activity are as follow:

- Vehicle Logistics : vehicle transport and operations (preparation, storage...)
- General Cargo : goods haulage and logistic operations
- International Transportation : sea and air agencies
- Travel agency
- Consulting in Logistics

CAT Group will work closely together with a number of partners who together make up the Consortium which bids for this tender.

CAT CONSULTING IN LOGISTICS

Its originality lies in that it is part of an industrial group for which it carries out studies and implements solutions.

This experience allows the consultants to view a situation pragmatically while at the same time reviewing existing methods in their entirety.

CAT Consulting in Logistics provides a customised service covering all or part of the organisational needs in all areas of logistics.

CAT Consulting in Logistics not only helps companies to define and implement their European logistic Network, but also supports the Group's European development and as such is a truly European company in its range of activities.

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2 EXECUTIVE SUMMARY

The "Concerted Action on Logistics, Supply and Demand Chain Management in Europe" (LOGICAT) aims at outlining future direction and strategy for a European development of RTD activities in more effective logistics of intermodal transportation with beneficial social and environmental effects. The main steps of the project consist in collecting and analysing current information on national, European and global strategies for RTD and then identifying future research needs.

This deliverable presents the **results of work** carried on during the whole phases of the LOGICAT activities. The **objective** of this document is to enable the results of the LOGICAT project to be brought to a wider audience.

The LOGICAT work was organised basically within the following units and procedures :

- **Steering Committees (SC)**
- Technical Secretariat (TS)
- SC plenary meetings
- On-site visits
- Ad hoc working groups
- **Workpackages**

At the end of the concerted action, it was agreed that an overall RTD European strategy to further develop logistics requires a research approach that is:

- integrated across all transport modes, so as to improve an overall efficiency and competitiveness in Europe;
- integrated with the environment, so that the industry plays its part in achieving the environmental objectives;
- integrated with the European and national wider policies for health, education and wealth creation, so that freight transport contributes to a fairer, more inclusive society.

3 OBJECTIVES OF THE PROJECT

LOGICAT aimed at determining fundamentals for formulating an over-all RTD European strategy to further develop logistics of competitive external and internal trades of the states, while reducing congestion, pollution and other negative effects on environment, property and human life, by using fully integrated intermodal systems.

Specifically, the **LOGICAT** aimed to :

- Collecting and analysing current information on national, European and global strategies for RTD on logistics, supply and demand chain management, and specifically including air, land and sea cargo intermodal transportation.
- identifying future research needs in above areas
- identifying and demonstrating the potential of some promising innovative intermodal transport concepts related to «green logistics»
- designing conceptual road maps for the implementation of selected new logistics concepts
- formulating and making a preliminary study of up to three specific selected potentially beneficiary logistical strategies

An other objective of **LOGICAT** was to outline future direction and strategy for a European development of RTD activities in more effective logistics of intermodal transportation with beneficial social and environmental effects.

The last objective of LOGICAT was to bring an added value due to the clustering exercise. The clustering will group together finalised, existing and proposed European and National (Member States) RTD projects as well as relevant U.S. RTD projects with a European impact to enhance the effectiveness of logistics of the intermodal transportation.

4 MEANS USED TO ACHIEVE THE OBJECTIVES

To achieve the objectives, the work was developed according to the **following methodology** :

- State of the art;
- Best practices;
- Apparent solutions;
- Dissemination of developed information.

The work was **subdivided in the following phases**:

Phase 1: **identification and synthesis**

During this phase the present European logistics situation was analysed and assessed to get a complete picture.

Phase 2: **clustering**

The objective was to select relevant European and nationally funded projects and subdivide them in clusters according to specific criteria based on their objectives and results. As a result of the clustering exercise a **RTD database** will be realised, it will be accessible from the LOGICAT home page.

Phase 3: **devising**

The objective was to synthesise the previous results and to devise a common European view of the current situation and desirable future actions.

Phase 4: **development of small support studies**

The objective was to understand in more details the European application of specific logistical solutions, through one or two small studies.

Phase 5: **design of roadmaps**

The objective was to design conceptual ways and means for the implementation of selected new logistics concepts

The different phases of the methodology, and the management, technical secretariat and exploitation activities, were subdivided in the following work packages :

Work Package 0 : Management

Work Package 1 : Technical Secretariat

Work Package 2 : Identification and Analysis of logistics practices and options

Work Package 3 : Clustering of European and nationally funded projects

Work Package 4 : Devising a European View

Work Package 5 : Case studies- development of up to three small studies

Work Package 6 : Design road maps

Work Package 7 : Demonstration of potential innovative concepts

Work Package 8 : Exploitation Plan

5 SCIENTIFIC AND TECHNICAL DESCRIPTION OF THE PROJECT

5.1 Work Package 0 (MANAGEMENT), Work Package 1 (TECHNICAL SECRETARIAT)

In the frame of the LOGICAT project, three workpackages were dedicated to the project management and technical support :

Work Package 0 (MANAGEMENT)

This work package has not produced any special deliverable, except the LOGICAT website (www.innovation.expertel.fr/logicat).

Work Package 1 (TECHNICAL SECRETARIAT)

The organisation of the different Steering Committee was organised in the frame of this work package. The organisation of the fourth EU/US forum on Intermodal Freight Transport was also organised in the frame of this Work Package :

Fourth EU/ US Forum on Intermodal Freight Transport

LOGICAT organised the 4th EU / US Forum on Intermodal Freight Transport, with the help of the Port Authority of Genoa, which hosted the meeting, and in close relationship with the EC DG TREN and the ENO Foundation in the United States.

The dialogue in the field of intermodal freight transport was opened in October 1997 between officials of the European Commission, the US Department of Transportation, and transport industry leaders. The Eno Transportation Foundation hosted the first policy forum, which took place in October 1997 in Washington, DC, USA. Three other fora have since been organized in 1998, 1999 and 2001 in Munich, Germany, New York, USA and Genoa, Italy. The next forum will be held in Jacksonville, Florida, USA, in April 2002.

This fourth forum on intermodal freight transport in Europe and the United States, hosted by the Port Authority of Genoa, Italy, brought together more than 50 transport leaders from both sides if the Atlantic to discuss steps toward improving intermodal freight transport in Europe and the United-States. The aim of this forum of industry leaders was to improve intermodal transport between Europe and North America by generating a better understanding of the complex set of issues that affect it, helping inependent organizations, both public and private, to coordinate their activities into an integrated whole.

Five major key areas were examined during the forum :

- The effects of e-commerce on supply chain management and logistics
- Best practices in intermodal transport
- Projects for increasing EU / US progress toward improved intermodal operations
- Institutional Data Collection
- Global trade forecasts and transport policy implications

In the frame of this forum, a report about "**The Effects of e-commerce on SCM and Logistics in Europe**" was prepared as supporting paper by the LOGICAT Consortium.

Following the forum, Expertel Consulting has created :

- a brochure about the different fora and specially about the fourth EU / US Forum held in Genova.
- a report entitled "Report on the Fourth Forum on Intermodal Freight Transport in Europe and the United States", including the forum proceedings and supporting papers to the forum.

5.2 Work Package 2 (IDENTIFICATION AND ANALYSIS OF LOGISTICS PRATICES AND OPTIONS) : State of the Art Report

For several decades, the industrial sector has taken strategic and investment decisions in the fields of logistics and supply chain management, aiming at an enhanced cost efficiency in production and distribution activities. These decisions have had a direct impact on transport needs and transport mode choice. Nevertheless, transport activities are only considered as a consequence of the above mentioned strategic options.

At the same time, Public Authorities have been facing a wide set of problems related to the compilation of all transport needs, especially in the field of freight movements. The volumes transported by road in Europe have grown dramatically, creating pollution and congestion. Infrastructures are saturated, thereby raising land use problems and security issues. The respect of the transport chain requirements, especially for perishables and hazardous goods, also falls to the responsibility of the public sector.

Policy makers attempted to restrain traffic growth through several measures such as pricing, taxation and strict regulations, but have always felt powerless against decisions taken by the private sector. Consequent research efforts have been dedicated to the identification of possible improvements, especially in the fields of intermodal transport and urban freight distribution. New ICT tools are being developed, and will undoubtedly make a crucial contribution to possible solutions.

The scope of the LOGICAT Concerted Action was precisely to overcome the gap between logistic and supply chain management decisions on one side, and policy issues related to transport on the other. The concerted action will promote debates between all parties, in order to define adequate research orientations in the fields of Logistics, Supply Chain Management and Intermodal transports.

In the first phase of the Concerted Action, research projects dealing with Logistics, SCM and Intermodal transport have been gathered in several Member States and at European level. A large majority of these projects are funded by Public Authorities (corresponding RTD efforts made in the private sector are not accessible). The description of all identified projects constitutes the LOGICAT database. The collected projects have been classified in areas, categories and domains, through a clustering exercise (please refer to Work Package 3 (CLUSTERING OF EUROPEAN AND NATIONALLY FUNDED PROJECTS) deliverable from LOGICAT “Clusters’ Review Report”).

Starting from the LOGICAT database, the aim of this “State of the Art” report is to highlight the main research trends, to illustrate them with a selection of projects, and to draw some conclusions or remarks regarding further research needs. The consortium proposes to describe five main research activities, each of which contains several RTD trends :

1. Logistics and SCM trends
2. Logistics and SCM tools
3. Intermodal Transports
4. Urban Distribution
5. Efficient Market Place

The logistics and SCM trends (1) could not be drawn from the LOGICAT database, as they are mainly the result of decision making in the private sector. The consortium resorted to an OECD funded project, named TRILOG, which identified precisely these trends during 1999.

Taxonomy of logistics and supply chain trends (TRILOG Europe End Report, table 1.2.)

Level of logistical decision making	***Trend***
Restructuring of logistics systems	Spatial concentration of production and inventory
	Development of break-bulk / transhipment systems
	Creation of hub-satellite networks
Realignment of supply chains	Vertical disintegration of production
	Rationalisation of the supply base
	Postponement / local customisation
	Increased direct delivery
	Wider geographical sourcing of supplies
	Wider distribution of finished products
	Concentration of international trade on hub ports
Rescheduling of product flows	Time-compression principles applied in retail and manufacturing
	Increase in retailers' control over supply chain
	Growth of 'nominated day' deliveries and timed delivery systems
Management of distribution	Reduction in international transport costs
	Increased use of information and communications technology
	Developments in vehicle and handling technology
	Changes in freight modal split

	Impact of legislation and regulation
Changes in product design	Complexity, Packaging, Modularity
	De-materialisation

These trends are a useful framework to understand the options taken by the private sector, and their consequences for the orientation of future research efforts.

The logistics and SCM tools (2) are all ICT tools which are currently being used to implement the above quoted logistic and SCM trends. These tools have been classified into four trends :

Tracing/tracking, and positioning technologies, information and communication systems, integrated production management software, and electronic marketing and commercial tools.

Most of these ICT tools are currently being developed by private firms, for private needs. The main observation, going through publicly funded research dealing with logistic and SCM tools, is that public funds are invested to :

- Develop generic applications which can be easily transferred to several industries,
- Help SMEs and SME co-operations overcome the cost entry-barrier to many of the new ICT developments,
- Strive for common standards in communication systems.

Public research is used to have a role of "follower" in this field. One of the remarks of this report is that Public Authorities should now take a leading position, at least regarding one important issue : the evaluation of the impact of new E-commerce Business to Customer applications on distribution patterns, especially in cities.

Intermodal transports (3) related research projects have been classified into four trends, namely intermodal network efficiency, technical improvements of intermodal transports, improvement of the ICT related to intermodality, and different developments for different goods.

The LOGICAT database shows a wide variety of projects dealing with technical improvements of the networks, nodes and means of handling. Organisational aspects are seldom investigated, but often represent the main brakes to the intermodal development (projects including ICT applications give more consideration to organisational issues).

Shippers' requirements regarding door-to-door services are only met by service providers offering road transport (monomodal). This is due to the multiplication of actors involved in the multimodal transport chain : State-owned railway companies, publicly held platforms, etc. Research should help reduce the transaction costs, so that door-to-door services become feasible in the intermodal transport sector.

Generally speaking, we can note a lack of implication of hauliers in the management of intermodal platforms. This can be explained by the initial public funding of these platforms. Further research could identify and simulate other financing possibilities, promoting an even implication of all the platform users.

Urban Distribution (4) related projects have been classified into five trends, namely best practices/conceptual level, efficiency of platforms and freight villages, ICT issues, environmental impact of urban distribution systems, and special goods distribution.

Most of the research efforts, mainly at national level, concentrated on the development and improvement of urban platforms, distribution centres and freight villages. Actors' participation in these organisations is optional, but can be imposed through different regulations. Most projects have led to pilots, some to a real implementation, but results were not always conclusive (in some cases, the centres were eventually closed).

Research should therefore investigate alternative solutions, such as enhanced co-operation between hauliers, shop keepers and Local Authorities, through ICT developments.

Efficient Market Place (5) related projects have been classified into six trends, namely benchmarking, quality level certification, market tools for shippers, integration of environmental issues, fair and efficient pricing, and training in logistics.

All these trends are relevant to the overall efficiency of the logistics and transport market. They provide private actors with the access to all relevant information (information about competitors, about possible transport solutions, about service level, and about best practices through training).

For policy makers, two of the above quoted trends are particularly relevant : the integration of environmental issues and the fair and efficient pricing of transport, two topics which are closely related.

The RTD trends described above, and the related comments made by the Consortium, will be submitted to a selection of national researchers, local and national Authority representatives, logistics and transport associations, shippers, hauliers and industrials, during several workshops, organised in most European Member States.

The participants will have the possibility to comment the results, and to make proposals regarding their own RTD expectations. These expectations will be exposed to all parties, in order to define a European view regarding RTD in logistics, SCM and Intermodal transport.

They constitute the transition to the Work Package 4 (Devising an European view) of the LOGICAT Concerted Action "Devising a European View".

5.3 Work Package 3 (CLUSTERING OF EUROPEAN AND NATIONALLY FUNDED PROJECTS) : Cluster's Review Report

The third workpackage of LOGICAT deals with the clustering of European and nationally funded projects.

The main objective of Work Package 3 was to enhance the effectiveness of research activities in the fields of logistics, supply chain management and integrated intermodal systems. The approach is a clustering exercise which groups EU and Member States' national projects into clusters according to defined clustering criteria. Work Package 3 (CLUSTERING OF EUROPEAN AND NATIONALLY FUNDED PROJECTS) consists mainly in three working steps, i.e. the identification of project clusters, the development of a clustering database (as a tool for information storage) and finally the evaluation of this stored information by use of the database.

The first task was to select those criteria according to which the clustering has been carried out. The original idea was that these criteria refer to different aspects, the most important of which is undoubtedly the content of the RTD projects. In order to classify the project content domains have been used that clearly describe the project. Other clustering criteria should have refered e.g. to the kind of partners involved (private companies, consultants, universities, ministries) and to the geographical area covered (EU, USA, Asia). The final step in this task has then been the definition of the clusters according to the criteria. In the course of this report it will be shown that the planned combination of clustering criteria as described above has not led to valuable results so that just the project content has been used for the clustering.

The second working step, the development of the clustering database, has been done in parallel. Here the "project files" for information collection and the input mask for the database follow more or less the same structure. In this database the information on RTD projects in the field of logistics, supply chain management and intermodal transport is included that has been collected in Work Package 2 (IDENTIFICATION AND ANALYSIS OF LOGISTICS PRATICES AND OPTIONS). The third and final working step deals with the evaluation of the clustering database. In this task the RTD projects collected in the database are assigned to the defined clusters by a query according to the clustering criteria.

The clustering exercise was based on the available information on research projects in the field of logistics, supply chain management and integrated intermodal systems stored in the LOGICAT Database which is a computerised version of the "*project files*" described above. As mentioned before, the original idea was to have clearly identified but multi-dimensional clusters which are built by a combination of criteria, like categories/areas/domains by type of contractor and by covered geographical area.

After having programmed this query and looked through the output it became clear that for different reasons this combination does not seem to be feasible. The technical reason is that due to

the fact that a project may have been assigned to more than one domain there appeared several double assignments so that the results of the query were falsified. On the other hand, it became only obvious after getting the results of this query that the assignments to domains, to contractors and to geographical areas were so varied that a clear statement about a number of projects assigned to just one cluster was not possible. As a result of these facts it was decided to concentrate for the cluster building on each aspect separately. By doing so it was possible to identify major fields of interest in European research on logistics and supply chain management as well as the major players and the geographical regions mainly covered.

It has been discussed several times before that the project content is the most important aspect when it comes to the clustering of research projects. The classification of the content was done by the assignments of research domains. It became obvious that the main focus of research is put on aspects dealing with the organisation of transports in the broader sense. This is proved in all three categories. Within the framework of logistics emphasis is put on physical flows which includes projects dealing with location, quality and service of nodes as well as with the function of service providers. This can be seen in direct connection with the category of intermodal systems where main fields of interest are aspects of transport/mode choice and physical interfaces, like the improved networking and linking of modes and the organisation of traffic flows. In the category of supply chain management the supply and demand chain planning as well as the services of transport organisation play an important role.

On the other hand the LOGICAT Database shows that research in the fields of financial and legal interfaces of intermodal transport is quite poor. The same goes for supply chain management in general, although this may be due to the fact that research in this category is mainly private so that it is very difficult to get access to information. Because when looking at current information on latest literature and conferences it is clear that SCM and especially e-business plays a major role in the world but is commercially driven and any analyses are not made public.

When going deeper into detail of the projects' content by evaluating the project description field, certain topics were discovered that showed some relevance for European research. Besides the already mentioned importance of intermodal aspects, the tools for supply chain management and also urban distribution are themes of interest. There are several projects included in the database which focus on the latter aspect. The interest in urban distribution is also proven by the evaluation by geographical area covered by the project because several of the 'local' projects deal with certain cities and their logistics problems. A further detailed analysis of these matters is given in the State-of-the-Art report.

The clustering according to the geographical areas covered by the projects showed that in both, the European Union as a whole and in certain countries a main field of interest is research dealing with physical as well as information flows and with transport/mode choice aspects. It might be expected that there appear some overlaps between the funding of projects in these areas. This because projects covering the whole EU are – generally spoken – also funded by the European Commission and projects covering certain countries are quite often funded by the national governments.

In general, the funding of research projects included in the LOGICAT Database comes mainly from the EC as well as governmental and other public organisations, while industrial and other private funding is restricted. This supports again the statement that there was poor access to this kind of business which led to the few information on supply chain management projects. On the other hand as regards the contractors of research projects, the majority are industry or other private companies as well as international consultants. This shows that the participation of private companies and especially industrial ones in research projects is quite advanced, i.e. input of end-users in research should be guaranteed.

When combining the different aspects, i.e. project content, covered geographical area and business field of client, the clustering exercise led to the result that research in Europe concentrates mainly on the organisation of transports as regards both, the physical aspects as well as the informational aspects. This is true not only for European-wide research but also for national research which both is in majority publicly funded but privately carried out. In order to further enhance the effectiveness of research activities in the categories under consideration, emphasis should be put on aspects of supply chain management with special regard to work carried out in industrial companies. Here the weak point of publicly known research was identified.

The clustering database is currently available for download on the LOGICAT website (www.innovation.expertel.fr/logicat).

5.4 Work Package 4 (DEVISING AN EUROPEAN VIEW) : The EU perspective for RTD on Logistics and Supply and Demand Chain Management

The term "logistics" is widely and commonly used today to describe the process of designing and managing the supply chain in the wider sense. Logistics can involve the movement of people as well as goods, and information as well as materials. It is the process, which ensures that the resources needed for work and production are positioned in the right places, at the right times, in the quantity and quality required and at the right price. Logistics is critical to our economic success whether in manufacturing or services, in the private or public sectors.

The principal economic importance of logistics is as a contributor to economic growth. This contribution is manifest in two main ways:

- First, **efficient logistics extends market reach**, by giving manufacturers access to a wider range of raw materials and supplies from different sources, and consumers access to a wider range of manufactured goods or services, both domestic and international. However, logistics in its widest sense also includes the distribution of information and services.
- Second, **efficient logistics reduces waste**, both in production and in the deployment of capital. In this area the European economy has evolved substantially in recent years, as industry has successfully adapted to exploit economies of scope and scale and to spread the advantages of "just in time" practices widely throughout the manufacturing and retailing sectors.

The key factors for enhancing logistics are:

- Changing economy;
- Information Technologies;
- The EU integration;
- Welfare of EU citizens.

The development of logistics in the European Union (EU) has been already promoted through many European initiatives:

- The EU common policy;
- The Trans-European transport Networks (TENs);
- The safety and environmental protection.

The objective of the Work Package 4 (DEVISING AN EUROPEAN VIEW) report was to provide the results of the various activities of the LOGICAT Concerted Action which will lead to a European view on Logistics and Supply & Demand Chain Management. The scope of this report is to present a wide perspective of EU needs in RTD; following reports of LOGICAT will focus on specific issues.

This report was based on the work of the four first Steering Committee of LOGICAT (03/06/99, 20/01/00, 06-07/06/00, 26/10/00) and the six first Workshops (04-05/05/00 in Wien, 18/05/00 in Paris, 24/05/00 in Gothenburg, 25/09/00 in Duisburg, 09/10/00 in Porto and 19/10/00 in London). Moreover, a questionnaire has been filled by the Member States representatives in order to collect major results regarding the relevance of RTD.

It summarised in a compact and useful fashion the RTD needs expressed by the Member States representatives during the first 22 months of LOGICAT activities and synthesises the results in order to provide the bottom line which will lead to a consolidated European perspective of RTD needs on Logistics and Supply & Demand Chain Management and desirable future actions.

Work Package 4 (DEVISING AN EUROPEAN VIEW) focused on:

- ***Logistics impact on transport management***: efficiency and competitiveness, intermodality, needs for RTD strategies in transport;
- ***The main logistics requirements***: impact of e-business, information and management system as well as training and education,
- ***The increasing attention to social and environmental issues:*** management of infrastructures, harmonised regulations and social and economical impacts.

The development of transport networks and the broaden perspectives of European participating in such programs will enhance the effectiveness and value of European actions such as LOGICAT.

Concrete recommendations have been identified, regarding greater communication and coordination, public involvement in decision-making, standardisation, and harmonisation of technologies and policies. The challenge is now to act on these recommendations and to develop mechanisms to integrate the voice of Member States into the European process.

The European economy needs a clear policy framework within which the future development of major freight interchanges can be planned and considered, following the key objectives:

- **to promote the contribution of major freight interchanges to national and international competitiveness**, by pursuing policies of fair competition throughout Europe, by giving due weight to the need for efficient transhipment between the different transport modes; and by providing efficient access to and from major interchanges - not only by road, but also by rail and, where appropriate, by coastal shipping or waterways;
- **to improve the operational and environmental performance of existing facilities** through regulation, monitoring and enforcement to control noise and pollution and safeguard habitats;
- **to encourage full and efficient utilisation of existing facilities**.

The objectives of further European RTD trends should:

- improve the efficiency of distribution;
- involve directly industries, representing the demand side of intermodal transport;

- increase added-value of intermodal transport;
- improve security of e-commerce
- develop standardisation in information management systems;
- make better use of existing transport infrastructures;
- minimise pollution and reduce greenhouse gas emissions by promoting 'green' transport modes;
- minimise congestion by promoting modal shifts;
- promote transversal approach of Logistics and transport issues, embracing together environmental, social, operational and technical issues.

To achieve these objectives, it requires an approach that is:

- **integrated across all transport modes**, so as to improve an overall efficiency and competitiveness in Europe;
- **integrated with the environment**, so that the industry plays its part in achieving the environmental objectives;
- **integrated with the European and national wider policies** for health, education and wealth creation, so that freight transport contributes to a fairer, more inclusive society.

5.5 Work Package 5 (DEVELOPMENT OF SMALL STUDIES) : The effects of e-commerce on SCM and Logistics in Europe

Logistics has changed during past last years by decreased road transport costs as well as changed demands and behaviours of the actors in the supply chain. In former times, goods were produced on stock and transported to other manufacturers for processing or to the retail trade. The carriage was done in relatively large consignments, and the share of railway transports was relatively high as road transport was expensive due to national regulations. High transport costs made it economical to carry the goods in large consignments and keep them on stock.

By abolition of the rules which should protect the railways and by opening the transport market e.g. for cabotage, prices for road transport sank dramatically because of more competition on road transport. This made it possible to reduce the capital for goods on stock, and the goods are transported in more and smaller consignments. “Just in time” is a term which describes this development. More and more transports were shifted from rail to road, as the former national railway companies did not need to reduce their prices because of public subsidies and as trucks are more flexible than railway wagons.

Other developments, combined with the flexibility of trucks, led to increasing road transports: The lifecycles of many products became even shorter, the number of seasons, e.g. for clothes, is increasing. The growth of mail order houses, and the world-wide trade with regional products (e.g. kiwis from New Zealand to Europe) increased numbers of transports as well as transport distances.

Within the last few years, another development has changed logistics mainly in the USA and will change transport and logistics in Europe considerably. It is the use of the Internet1. The developments in the past took place on a paper-based trade, but the Internet technology makes it possible to link world-wide different information technologies of different enterprises. This allows to transmit information much quicker than in the paper-based way and to have access to more suppliers and customers, respectively. In addition, the private use of the Internet has increased enormously, and the net is not only used for collecting and exchanging information but also for the order of goods.

Selling and buying via the Internet is called “electronic commerce” (e-commerce). Trade between enterprises is the so-called business to business (B2B), and trade between enterprises and private customers is “business to consumers” (B2C). As e-commerce is expected to have a great influence on the behaviour of the actors in selling and buying in B2B as well as in B2C, it was the objective of this paper to describe the expected effects of ecommerce on logistics and supply chain management and to develop recommendations to avoid congestion and a collapse in road transport. For a better understanding, in the first chapter the development of the use of the Internet is described. The second chapter deals with B2B and the function of different electronical marketplaces, and the third chapter with B2C. Chapter four describes the expected effects of e-commerce on logistics including the current situation of logistics in Europe, challenges for logistics service providers as well as problems and demands in the future. The final chapter five deals with recommendations for the European Commission. Alternatives for political actions are derived and concrete steps in the political and economical context in Europe are described.

It has been shown in Work Package 5 (DEVELOPMENT OF SMALL STUDIES), that :

- the numbers of consignments, the number of transports and the transport distances will increase,

- the level of quality and the efficiency of logistics services has to be raised concerning punctuality, safety and information, and

- global networking is needed.

The last two points need investments in capacities, hard- and software.

A politics of laissez-faire will lead to a collapse on Europe's roads and to increasing congestion as most of the transports will be done by road. Another consequence will be a market concentration because only the bigger logistics enterprises have the money to invest globally in such systems. The following alternatives are possible examples to avoid these consequences.

Derivation of Alternatives for Political Actions

Without bundling e-commerce will drive into a dead-end street. In general, the cost of logistics in manufacturing industry and retail trade are about 11% to 12% of the total costs. The potential for cost reduction in logistics is enormous: In the manufacturing industry about 11%, in retail trade about 10%. Internet and e-commerce open the possibility for more cooperation and outsourcing of logistics and to integrate all actors of the chain, to increase the quality level of transport and logistics and to reduce the costs of logistics.

Facing the current situation of logistics in Europe, it should not be the aim to start-up a lot of new logistic systems in Europe, but to initiate a better use of the existing systems and –where needed – to re-engineer the systems. Efficient logistic networks are run by :

- the former national post administrations,

- the parcel services and

- the international and global acting road hauliers.

But the SMEs in transport and logistics should not be excluded. It is suggested to build up a hierarchy in such a way, that shippers and networking companies have global contracts, but the SMEs have access to the transport information and can offer their services.

Concrete Steps in the Political and Economical Context in Europe

- **Political Context**

Europe has formed a Union, but in many fields there are national competencies and jurisdictions. This concerns the fields of transport laws and purchase laws as well as e.g. guarantee, safety, information and data protection. As e-commerce is border crossing, the actors (e.g. buyer, forwarder and seller) often do not know, which legislation is valid for the contract. As a world-

wide unification of legislation cannot be expected, the unification of laws concerning Internet and e-commerce should be forced in the EU.

Indeed, the lack of a common European legislation ground for harmonisation has led the actors of the logistics and supply chain to develop and use different information systems for their transactions through Internet. These differences are mostly related to the structure of the data, operating systems, transmissions, organisational between companies. Thus, there is a clear and urgent need to find a general agreement on all that issues.

The European Commission shall contribute to sustain an overall simplification and eventually harmonisation of European and national legislation. The Commission adopted, in July 1994, a communication 3 addressed to the parliament and to the Council on European Information Society. Information and communication technologies and related services have the potential to promote steady and sustainable growth and to increase competitiveness in the European Union. To achieve network interconnection, it shall be essential to put at the same level the standardisation of data and the interoperability of software and systems.

The European Council, Corfu June 1994, agreed on a first priority list of major transport projects and reaffirmed the importance it attached to all transport projects in the report. Traffic management services have an important contribution to make in achieving the goals of the common transport policy. More recently, on 8 December 1999 the European Commission has launched an initiative entitled "eEurope An Information Society for All", which proposes ambitious targets to bring the benefits of the Information Society within reach of all Europeans. The initiative focuses on ten priority areas, from education to transport and from healthcare to the disabled. The initiative is a key element in the European Commission's strategy to modernise the European economy.

The key objectives of the eEurope Initiative are:

- Bringing every citizen, home and school, every business and administration, online and into the digital age.

- Creating a digitally literate Europe, supported by an entrepreneurial culture ready to finance and develop new ideas.

- Ensuring that the whole process is socially inclusive, builds consumer trust and strengthens social cohesion.

To achieve these objectives, the Commission proposes ten priority areas for action with ambitious targets to be achieved through joint action by the Commission, the Member States, industry and the citizens of Europe. In particular, these areas of actions include:

- **Accelerating e-commerce:** speed up implementation of the legal framework and expand use of e-procurement.

- **Intelligent transport:** safer, more efficient transport through the use of digital technologies.

Since its launch, eEurope has had a broad policy impact, strengthening existing initiatives and fostering the development of new ones. It has become a policy concept, not only at European level, but also in Member States. One of the most perceptible impacts of eEurope has been on the

legislative process. Governments and administrations, including the Commission, have recognised that the 'new economy' and particularly the Internet, pose challenges to the legislative framework.

One of the main problems to be solved is the full enforcement of organisations, companies, and countries to really put into practice these recommendations and also the implementation of the eEurope initiative until the regional level in each Member State.

- **Economical Context**

- Investments of SMEs

As many European SMEs in transport and logistics do not have the money to invest bigger amounts for Information Technology which is necessary to participate in e-commerce, there is the risk that these companies are excluded from the market of e-commerce. This would lead to more concentration in this branch of industry.

- Infrastructure

The existing road infrastructure will not be able to absorb the expected additional transports initiated by e-commerce. The Trans-European Network (TEN) for transport contributes to the development of installations permitting transhipment between railways, roads, inland waterways and shipping routes. Indeed, in the 1995 Maastricht Treaty, the EU decided, among other measures, to create a Trans-European Transport Network. This was followed in 1996 by the "Common Guidelines for Developing a Trans-European Transport Network", containing eight concrete transport projects, both for high-speed and conventional traffic, which have been pursued consistently since that time. The TEN Projects are infrastructure schemes of central significance for European Union policy, and through them it will be possible to take the transport plans made by individual countries, which tend to be oriented to national interests, and harmonise them better with a view to cross-border traffic.

In particular, the network must:

- offer users high-quality infrastructure on acceptable economic terms;

- include all modes of transport, taking account of their comparative advantages;

- allow the optimal use of existing capacities;

- be, insofar as possible, interoperable within modes of transport and encourage intermodality between the different modes of transport;

- be, insofar as possible, economically viable;

- cover the whole territory of the Member States of the EU so as to facilitate access in general, link islands, landlocked and peripheral regions to the central regions and interlink without bottlenecks the major conurbations and regions of the EU.

The development of such networks really contributes to solve the problem of road infrastructures, but it must be closely linked with initiatives for increasing the overall efficiency of these networks. Indeed, as seen previously, the progress of e-commerce, especially in B2C, leads to an

enlarged number of small-distance transports from the stocks to the customers. The efficiency of the overall chain for just in time delivery is a must, for instance by introducing sophisticated and efficient technologies for vehicles, goods handling equipment, packaging and IT support systems, such as EDI (Electronic Data Interchange) which allow better stock management and shorter lead times for ordering.

U.S. government has established the National Infrastructure Protection Centre (NIPC), and the President has included $ 2 billion in his 2001 budget request to protect critical infrastructures.

- Modal Shift

As the current situation of some railway companies is not very good, the modal shift from road to rail is not always a sufficient alternative to avoid collapse on the road, as the railway systems are not able to absorb more than 10% of the road transport. The capacity of railway systems without building new tracks must be increased by “intelligent systems” as the ETCS (European Train Control System). Short sea shipping and inland navigation should be used for non time-critical transports and goods.

- **Concrete Steps**

- Promoting De-central Suprastructure and Modal Shift

Today’s systems of stock and retail can not be used for e-commerce in B2C. The existing systems are planned for delivery retail trade from centralised stocks. These stocks are centralised for one country each or a group of countries. In most cases the retail trade is delivered once or twice a week from central stock with large consignments in fully loaded trucks, containers or swap bodies. The planning period for one transport is three days at minimum. The de-central stock is the retail trade. For the "last mile” the consumer has to commission his consignment and to transport it without being paid for it.

The current system will not work in e-commerce. It will not be possible to use the premises of the retail trade as de-central stocks, as it will be too expensive to put the goods into the shelves, freezers, etc. and than take them out for consignments to be brought to the consumer. In addition, it is not useful to concentrate delivery traffic where customers traffic and other urban traffic already exists.

On the other hand, it is not useful to use central stocks for home delivery of the consumers.
The transport distances from central stocks to the consumers will be very large in most cases, and as the consignments will be relatively small on average, the transport will be too expensive. Furthermore, these transports will need more time than the consumer will accept. In order to reduce delivery time, to reduce distances between stocks and customers, to reduce congestion and to optimise the use of delivery cars, a de-central system of local stocks should be implemented. These local stocks may be delivered from central stocks, directly from the production or the port/airport of import by regularly, large units, and the distribution may be done by smaller vans (hub and spoke approach). As the long-distance transports are expected as regularly scheduled flows, there is the opportunity to shift these transports from pure road to intermodal transport. As the situation on the European roads is becoming more and more inconvenient because road transports are often delayed due to of traffic jams, it makes sense to shift these transports from road to rail in order to make the lows punctual.

- Promoting Co-operation in Logistics

Not every enterprise acting in B2C should plan and realise its own logistics system for the delivery of the consumers, as it will not be useful to have dozens of such systems each moving only a very small part of the goods ordered in e-commerce. It will be more economical, ease the transport systems and avoid congestion if they co-operate in common regional stocks and common delivery systems. It must be clear, that competition ends when the customer has made his choice. As different goods need different transport equipment and handling, it is reasonable to develop systems for groups of goods with similar demands, e.g. clothes, frozen food, electronical equipment, furniture, China and household goods. These Regional Branch Distribution Centres can develop some value added services in order to react more flexible on the demands of the customers, e.g., they could offer assembling services for computers or furniture.

- Risk Capital for SMEs

In order to avoid more concentration in transport and logistics, a program is suggested to provide SMEs with risk capital for investments in Information Technology for participation in e-commerce. Software licences and new hardware can run into thousands of Euro, and installations can need a lot of time and money. If SMEs do not react in time on the new demands because of not enough capital, they will be out of the market.

5.6 Work Package 6 (DESIGN ROAD MAPS): Road maps

The first goal of the LOGICAT Concerted Action was to draw a state of the art of the research led all over Europe in Logistics, Supply & Demand Chain Management and Intermodal Transport.

The second step of the project consisted in getting a European overview on "EU Perspective for RTD on Logistics and Supply and Demand Chain Management". To achieve this objective the consortium organised several workshops gathering shippers, responsible for transport firms, researchers and other decision-makers and actors of logistics. The participants gave their opinion on the state of the research in Europe and stated the problems they face in their everyday logistics business life. The information gathered has been compiled in the Deliverable DELIVERABLE 4 «THE EU PERSPECTIVE FOR RTD ON LOGISTICS». The Deliverable D5 was dedicated to an analysis of the impact of e-commerce on Logistics and Supply Chain Management in Europe.

The Work Package 6, entitled "Road Maps", aimed at providing suggestions on: **how to implement step by step the recommendations stated in the deliverable Deliverable 4 «The EU Perspective for RTD on Logistics»**. The action plan intends to bring a methodological tool for the EC, the Member States and / or the industrial, commercial and Logistics sectors in order to get a more flowing, environmental and social-friendly Logistics networks.

The recommendations stated in the deliverable Deliverable 4 «The EU Perspective for RTD on Logistics» dealt with :

- General efficiency
- Railway freight transport
- Intermodal nodes
- General public awareness
- Urban distribution
- Impact on the environment

For each recommendation or each group of recommendations, **some suggestions of practical actions to implement are identified**. For each suggestion, a **roadmap or some suggestions of steps are defined**.

Here is a summary of the **suggestions** :

General Efficiency

- Implement a consistent and accessible data collection system covering Europe (**a roadmap is associated**)
- Create and / or promote the market places (**a roadmap is associated**)
- Improve the use of small containers and grouping of SMEs (**a roadmap is associated**)
- Improve communication between the different actors in logistics
- Encourage the creation of interoperable information systems
- Studies and legal framework (**a roadmap is associated**)
- Let the market regulate itself, and local authorities incentives
- Create an information web-site and promote Concerted actions-like activities

Rail Freight transport

- To make European legislation evolve in the way of a more opened market

Intermodal nodes

- Adequacy and improved services of the plateforms

Urban distribution

- Re-organisation of urban areas and implementation of management, information and communication tools (**a roadmap is associated**)

Impact on the environment

- Deontological behaviour and promotion of intermodal transport use
- Give at the company level tools for analysis of modal options, and decision
- Higher capacity transport means and control over patents' sales

General public awareness

- Education and advertisement campaign

5.7 Work Package 7 (DEMONSTRATION OF POTENTIAL INNOVATIVE CONCEPTS) : Potential Innovative Concepts

This deliverable presented the work carried on during the sixth and last phase of the LOGICAT technical activities in the formulation of an overall RTD European strategy to further develop logistics.

The objective was to demonstrate the potentials of some innovative concepts as established in Work Packages 4, 5 and 6, indicating rewards and possible difficulties.

The Work Package 4 report (D4) "The EU perspective for RTD on Logistics and SDCM" presents the RTD needs expressed by the Member States representatives during the first 22 months of the LOGICAT activities. The Work Package 7 (DEMONSTRATION OF POTENTIAL INNOVATIVE CONCEPTS) report synthesises these results by providing a bottom line, that lead to a consolidated European perspective of RTD needs on Logistics and Supply & Demand Chain Management and desirable future actions.

This EU perspective focused on the following main items:

- **Logistics impact on transport management**
  - Efficiency and competitiveness: a matter of network organisation,
  - Intermodal Approach to transport,
  - RTD strategies: necessary goals for the EU transport policies.
- **Logistics requirements**
  - Impact of e-business,
  - Information and management system,
  - Training and education on logistics.
- **Increasing attention to social and environmental issues**
  - Logistics management of infrastructures,
  - Harmonised regulations,
  - Improvements in social and environmental impacts.

Then, some roadmaps have been elaborated under the workpackage 6, corresponding to the following recommendations:

General Efficiency

- Implement a consistent and accessible data collection system covering Europe
- Create and / or promote the market places
- Improve the use of small containers and grouping of SMEs
- Improve communication between the different actors in logistics
- Encourage the creation of interoperable information systems

- Studies and legal framework
- Let the market regulate itself, and local authorities incentives
- Create an information web-site and promote Concerted actions-like activities

Rail Freight transport

- To make European legislation evolve in the way of a more opened market

Intermodal nodes

- Adequacy and improved services of the platforms

Urban distribution

- Re-organisation of urban areas and implementation of management, information and communication tools

Impact on the environment

- Deontological behaviour and promotion of intermodal transport use
- Give at the company level tools for analysis of modal options, and decision
- Higher capacity transport means and control over patents' sales

General public awareness

- Education and advertisement campaign

Work package 7 (DEMONSTRATION OF POTENTIAL INNOVATIVE CONCEPTS) presented a selection of the RTD trends expressed in the deliverable D4 and D6. This selection is mostly based on the indications provided by the Steering Committee members.

For each category of the selected recommendations, the following methodology is:

- Identification of the current situation, including overview of the current problems, gaps and impediments;
- Identification of aspects to be improved and of the potential concepts and possible challenge of the selected scenario.

The results of the LOGICAT questionnaire that has been filled in by representatives of members States and stakeholders (see LOGICAT deliverable D4) enhanced the fact that more RTD efforts should be done in the following categories:

1. Intermodal network efficiency (*average mark 8.1/10*)
2. Environmental Impact of urban distribution systems (*average mark 7.5/10*)
3. Integration of environmental issues (*average mark 7.4/10*)

6 CONCLUSIONS

As a conclusion of the deliverable D4 and the final LOGICAT event, it was agreed that an overall RTD European strategy to further develop logistics requires a research approach that is:

- integrated across all transport modes, so as to improve an overall efficiency and competitiveness in Europe;
- integrated with the environment, so that the industry plays its part in achieving the environmental objectives;
- integrated with the European and national wider policies for health, education and wealth creation, so that freight transport contributes to a fairer, more inclusive society.

These research trends should be emphasised by the development of the following potential concepts:

- *Promotion of modal shift and better integration of short sea shipping in the network*, in particular by developing of company-level tools and methodologies for estimating intermodal transport potential and by adapting the existing tools to help companies to evaluate the consequences of modal choices on a more realistic basis.
- *Information systems:* new information systems for better planning of resources and logistical activities as a potential for increase efficiency; improvement of the resource utilization and the load factor contributing to better economy and furthermore less environmental impact from the transport industry. *Communication systems:* Increase in resource planning and utilization of track products through the supply chain. By applying advanced tracking & tracing systems, the efficiency of the logistics industry can be increased as it makes improvements possible.
- This system integration between different types of networks from an operational and a logistical point of view is a challenging and major issue. The potential of this integration is huge from an environmental aspect, by making good use of existing infrastructures and facilities.

7 ANNEXES

7.1 Publications, Conferences, presentations

- Dissemination through the web of the project site (www.innovation.expertel.fr/logicat) continued during the whole project.

- ISL wrote a document on dissemination by using the LOGICAT database, in particular through the web site. The document was reviewed and delivered.

- A short paper on the State of the Art was prepared and presented on the occasion of the EC CONCERTO Workshop, held on June 14-15, 2000 in Brussels under presidence of Mrs K. Sterner. The Technical Manager of the LOGICAT Technical Secretariat was also "Rapporteur" for this meeting.

- An extract from the "State of the art" report was prepared by Expertel Consulting and sent to NEA Transport research and training, in the Netherlands.

- Expertel Consulting also disseminated results of Logicat inside the France Telecom Group, towards the Transport Sectorial Division and the Account Managers responsible for the French Railways Company, SNCF.

- Expertel Consulting also disseminated information related to Logicat towards several divisions of the French Railways Company, SNCF : Direction de la Recherche, Direction de la Stratégie.

- Expertel Consulting participated in the Intermodality Conference in Genoa in November and took this opportunity to disseminate information about LOGICAT among participants.

- Expertel Consulting provided information to VIA-DONAU Vienna, a service-company from the Austrian ministry of transport. A link was established between the web site of LOGICAT and the Web site of Via-Donau (www.via-donau.org)

- Mettle gave a presentation of LOGICAT at the ELA Conference, in Brussels in November.

- Dissemination also took place on the following occasions :

- *Workshop organised in Germany, in Duisburg, on September 26, in the premises of the Dusiburg Chamber of Commerce, with participants from Germany and Denmark;*
- *Workshop organised in Portugal, in Oporto, on October 9, with the help of CCRN, with participants from Portugal;*
- *Workshop organised in the UK, in London, on October 19,with the help of the Science and Technology Policy Division of the Department of the Environment, Transport & Regions from the UK, with participants from the UK.*

- Upon invitation from the European Commission, Jean-Manuel Canet from Expertel Consulting prepared a speech on the impact of the e-economy in the transport and logistics sectors, to be presented on the occasion of the "e-Economy Conference" held in Brussels on March 1-2, 2001. Jean-Manuel Canet prepared the speech around the following topics :
  - *impact on Passengers Transport (transport related to tourism, transport related to commuting, transport related to business trips, transport for consumption activities)*
  - *impact on Logistics and freight transport*
  - *impact on the environment*

On this occasion, he disseminated the results of LOGICAT as far as impact on logistics are concerned, and as well as far as RTD identified needs in the fields are concerned.

In the proceedings prepared after the event and published by the EC, the rapporteurs largely used the contribution of JM Canet.

- The LOGICAT Paper "The effects of e-commerce and e-business on logistics and supply chain management" was presented by C. G. Biancardi in Genova, 4-6 April 2001 during the 4th EU/US Forum on Intermodal Freight Transport.

- Upon demand from the European Commission, and in relatinship with the ENO Foundation, Expertel Consulting prepared a brochure on the EU/US Dialogue on Intermodal Freight Transport, using the following principles in order to prepare the brochure :
  - *to show the concept of the dialogue, its objectives,*
  - *to entitle the brochure "EU/US Dialogue on Intermodality",*
  - *to say how many meetings were organised, where, give the details,*
  - *to give a flavour of which kind of participants participated in each forum,*
  - *to give an idea of the topics discussed.*
  - *the people targeted by this brochure are, among others, EU Commission officials, people from Member States, people being interested in participating in future Fora.*

- Upon demand from the European Commission, and in relationship with the ENO Foundation, Expertel Consulting prepared the proceedings of the EU/US Dialogue on

Intermodal Freight Transport. Expertel Consulting also realised a brochure about the EU / US dialogue on intermodal freight transport.