



Summary of projects and results from topic
Modelling and data analysis

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Modelling

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INTRODUCTION AND METHODOLOGY

This report has been compiled by **Helsinki University of Technology** to summarise the conclusions of the activities undertaken on the key topic **Modelling and data analysis** as part of Work Package 2 of the PORTAL project.

1.1 Methodology

The main source used in gathering information about modelling and data analysis projects was the Internet. The search was started from the Internet sites containing summary information of transport related EU-projects, like CORDIS (Community Research and Development Information Service) and ELTIS (The European Local Transport Information Service).

When the basic information and project participants were found, additional information was gathered and deepened by visiting the project home pages (if they existed) and the home pages of project participants. In many cases, the Internet search services were useful.

Other information sources were personal contacts with the project participants and project reports found in libraries. Interviews were carried out by e-mail and phone calls.

Problems encountered

- Availability of sources:
- Quite a lot information can be found in the Internet, but relevant and detailed information data are hard to find.
- In many cases, co-ordinators did not have any additional data compared to the web pages.
- Sometimes unnecessary, information is presented in multiple sources.
- Some project web sites have expired or malfunction.
- Sometimes information on the Internet is only in the native language (not in English) and can not be studied in all European countries.

Contact-information:

- In some cases, the right place for information is hard to find from the huge amount of data in Internet. This is due to the lack of proper contact information on the project web sites.
- Only the most active project partners can be contacted easily.
- In several cases (AIUTO, DIRECT), no information about the contact person of expert partners or LEI's could be found.
- Because of the above-mentioned total lack of expert information and/or insufficient partner introduction, the specialities of each expert were hard to identify. This problem was encountered in almost all projects.
- The same problem was encountered when specifying the key topics of LEIs.

IPR-related problems:

- Information on IPR does not exist or it is hard to interpret.
- Even the co-ordinators do not necessarily know the IPR status of their deliverables.

Availability of interesting information:

- Most of the introductions of projects suffered from lack of clear lists of information about project reports and deliverables. Only the existence and availability of final reports were clearly presented.
- Information was mainly in written form, and can not be reached easily.
- Due to the insufficient information and availability of the project deliverables, it was hard to give any description of contents (keywords) about the deliverables found.
- There was a lack of proper descriptions of study sites and the results achieved in pilot cases.

1. MODELLING AND DATA ANALYSIS

1.1 Description of the key-topic Modelling and data analysis

The key-topic includes EU projects concerning modelling of all kinds of traffic-related phenomenon, data gathering of such phenomenon and systematic analysis of the gathered data. Modelling of traffic relates closely to demand forecasts and operational analysis. Projects under this key-topic are often aimed at improving traffic planning and management at the strategic level, combining the main components affecting traffic: land use, transport modes and environment.

The Modelling and data analysis key-topic discusses different modelling methods (micro- and macro-level simulations, scenarios and other) and data analysis (statistical analysis of the basic data and the reliability of the model results).

Subtopics of this key-topic are traffic management, simulation, telematics and environmental impacts. Thus, modelling and data analysis –topic relates closely to the other PORTAL key-topics - 2 (Urban traffic management and restraint), 5 (Environment, energy and transport) and 9 (Transport Planning & Implementation).

Projects that were allocated to the modelling and data analysis are listed below.

AIUTO: Models and methodologies for the assessment of innovative urban transport systems and policies options

BRIDGES: Building Bridges between Digital Transport Databases, GIS Applications and Transport Models to Develop ETIS Software Structure

DIRECT: Data integration requirements of European Cities for transport

ESTEEM: European Scenarios on Transport-Energy-Environment for Metropolitan Areas

FATIMA: Financial Assistance for Transport Integration in Metropolitan Areas

MESUDEMO: Project concerned with methods for compiling, storing, maintaining and disseminating information on transport networks and on flows of goods and of passengers

OPTIMA: Optimisation of policies for transport integration in metropolitan areas

SCENES: Modelling and Methodology for analysing the interrelationship between external developments and European transport

SESAME: Derivation of the relationships between land use, behaviour patterns and travel demand for political and investment decisions

STEMM: Development of strategic models for passenger and freight transport, which are spatially aggregated at the intercity or inter-provincial major corridor level

STREAMS: Strategic transport research for European member states; Modelling and Methodology for Analysing the Interrelationships between External Developments and European Transport

1.2 Results of project AIUTO

The **AIUTO** project is aimed at identifying new methodologies, methods and models to deal with innovative transport demand management (TDM) policies in urban contexts. Its concern is to provide an insight of what methods have to be used when forecasting the impacts of 'soft' transport policies, that is, transport measures that are reversible, flexible and that do not imply strong modification of existing infrastructures (e.g. parking pricing and management, road pricing, pedestrianization, access control, etc.).

The material includes sub reports and final report, which is available at CORDIS.

The experts in the AIUTO project were CSST (Italy), SINTRA s.r.l (Italy), EURO TRANS CONSULTING LTD (UK), HAGUE CONSULTING GROUP B.V. (Netherlands) and Trias S.A. (Greece).

Leading educational institutes in the AIUTO project were POLITECNICO DI MILANO (Italy), Facultés Universitaires Notre-Dame de la Paix (Belgium), Università degli Studi di Napoli "Federico II" (Italy), UNIVERSITY OF NEWCASTLE (UK), UNIVERSITY OF LEEDS (UK) and UNIVERSITY OF YORK (UK).

Demo sites of AIUTO project were Como (IT), Salerno (IT), Randstad (NL), York (UK), Thessaloniki (GR) and Geneva (CH).

Website of AIUTO project: www.cordis.lu/transport/src/aiuto.htm.

Results of the project

The AIUTO project has demonstrated that adequate modelling capabilities to analyse TDM measures are generally available (in the form of disaggregating travel demand model systems and dynamic network assignment). However, from some site-results it appears evident that more validation tests would be useful for a better assessment of the accuracy of such models.

As part of this validation process, it would also be useful to conduct comprehensive sensitivity analyses to identify the most critical aspects and the key parameters of the models. However, the state of development of these tools is such that they are not yet readily available for wider dissemination or for quick policy analyses. In their existing state these capabilities require a long period of data collection and calibration, as well as heavy user intervention and too much manual data-handling from sub-model to sub-model. Thus, their application to a new study area would call for a major investment in terms of time, money and involvement of highly skilled persons trained and experienced in transportation demand and network modelling.

Materials

Final report

- includes overview of the whole project
- available at CORDIS web site
- The final report is quite limited

Demo site reports

- Available from project participants

The available material is too limited to be used for educational purposes. For example in the final report, the modelling methods are explained in a rather general way, and no modelling method can be studied deeply. On the other hand, the report emphasises local models, which makes the educational suitability of the material questionable even in general overview purposes.

1.3 Results of the project BRIDGES

The objective of the project **BRIDGES** is the development and implementation of the software structure supporting the European Transport Information System (ETIS). This structure is understood as an open network of decentralised applications, where none of them becomes indispensable. Therefore, links between applications ("bridges") are the crucial aspects of the research. The research followed these stages: - Assessment of future Transport Digital Data market trends: Creation of the Transport Digital Data Sources Guide (DDG) - Development of a standard format for Data exchange between Transport Models (GTF) in the frame of ongoing Models software modernisation trends -Development of efficient links and specialised interfaces for expert-users (SIs) between common transport planning tools: Transport Models, Geographic Information Systems (GIS) and Database Managers.

The material of the BRIDGES project includes software packages, as well as an overview of the project and presentations.

The experts of the BRIDGES project were Multicriteria Consulting Ltd (Spain), Marcial Echenique and Partners Ltd (UK), MKmetric Gesellschaft für Systemplanung Mbh (Germany) and Transporti e Territorio Srl (Italy)

The leading educational institutes of the BRIDGES project were the National Technical University of Athens (Greece) and the Technical University of Denmark (Denmark)

Demo site of the BRIDGES project is EC / DGVII

Website of the BRIDGES project: www.transport.civil.ntua.gr/ECprojects/Bridges.html

Results of the project

The main goals of the project BRIDGES were successfully achieved. The new data transfer protocols handled the linkage of both alpha numeric and graphical data, and were able to evolve through time according to the changing requirements of transport models. As a result, a significant part of work was to look at recent advances in transport modelling and consider how transport models were likely to change over the next few years. The form of the next generation of modelling software to meet these changing needs was also investigated. Demonstration workshops were carried out to present the progress in the ETIS system to potential users.

Materials

- Overview of the project is available at CORDIS web site and project home page

- Software packages (DSS, SI, CI) are available from EU/DGVII (Mr. Kiouisis) or from NTUA

The material includes technical data, like data transfer protocols, and it is not suitable for educational purposes. However, some important future guidelines for traffic modelling could be significant in education, and the technical reports could be edited to more comprehensive format.

1.4 Results of the project DIRECT

The integration of long/medium term planning and short-term traffic management procedures could both benefit through better data consistency, lower costs for data collection, improved quality and coverage of the data, better background for the development of new modelling, prediction and analysis tools. The project **DIRECT** analyses the various aspects of the development, implementation and operation of transport-data sharing structures (TDSS) facilitating this integration. Not only the technological aspects are envisaged, but also the institutional, legal, organisational and financial aspects.

The Material of the DIRECT project includes final report, which is available in the project home page.

The experts in the DIRECT project were Stratec S.A (Belgium), Centre D'Etudes sur les Réseaux, Les transports, L'Urbanisme et les Construction Publiques (France), Centre D'Etudes Techniques de L'Equipment Nord Picardie (France), Centre D'Etudes Techniques de L'Equipment de Lyon (France), Lille Métropole – Communauté Urbaine (France), Simulog S.A. (France), Azienda Torinese Mobilità (Italy), Netherlands Organisation for Applied Scientific Research (Netherlands) and Barcelona Tecnologia S.A. (Spain).

Leading educational institute in the DIRECT project was the University of Southampton (UK)

Demo sites of the DIRECT project were Barcelona (ES) and Lille (FR)

Web page: www.infoservice.fr/simulog/direct/direct.html

Results of the project

The results of the project DIRECT contain the following topics:

- The summary of DIRECT research and expected guidelines for European cities.
- The classification of TDSS
- Development of guidelines for designing and implementing any TDSS under the form of checklist
- General guidelines for TDSS evaluation
- Evaluation of Barcelona and Lille DIRECT prototypes

Materials

Final report

- Includes an overview of the whole project
- Is available at the project home page
- contains experiences of TDSS use in many cities

Demo site reports

- Summary available at project home page and more detailed information available from project participants

The deliverables of DIRECT need some modification to be suitable for educational purposes, due to the fact that the results include mainly guidelines on how to implement TDSS for organisations.

1.5 Results of the project ESTEEM

The purpose of **ESTEEM** is to adjust and validate integrated models of the interactions between land-use, transport and environment and to apply it to four large European cities: Rome, Lyon, London and Brussels. The simulations will aim to assess the effects of land-use and/or transport policies on mobility and environment.

The material includes final report and some preliminary and case reports. The final report is available on ISIS (Institute for System Integration Studies) ESTEEM web site.

The experts in the ESTEEM project were Stratec (Belgium), Ove Arup and Partners (UK), CERTU (France), ISIS (Italy), Agence D'Urbanisme (France) and Royal Borough of Kensington and Chelsea (UK).

Leading educational institutes in the ESTEEM project were ENEA (Italy) and Comune di Roma (Italy).

Demo sites of ESTEEM project were Rome, Lyon, London and Brussels, where the use of modelling and forecasting tools was validated.

Web site of ESTEEM project: ELTIS database (www.eltis.org/en/index.htm) and ISIS project home page (www.isis-it.com/Project/Esteem.htm).

Results of the project

The procedures and models developed with the ESTEEM study are now applicable to support public stakeholders of cities in the production of reliable **estimates of impact of transport activities** on energy and environment and in the identification of optimal policy options.

The ESTEEM project has been tested out in practice in Brussels, London, Lyon and Rome using a number of different approaches. In order to appreciate them and decide which combination of them can be used to better advantage in other cities, the project has produced a set of **Guidelines for Other Users**. These illustrate, in simple terms, the choices available to urban decision-makers :

- **building of urban scenarios**, based on the modelling and forecast of exogenous and policy factors influencing the demand of mobility, and interfacing them with transport models, the outputs of which are fed to emission/dispersion models.
- **testing land use and transport policies** with an integrated intermodal land use/transport model, working with utility functions.
- **exploiting credible exogenous forecasts** on land use and recurring in enhanced transport models and environmental dispersion/energy models in order to forecast energy consumption and pollutant emissions under various assumptions of local decisions on urban development.

Materials

Final report

- includes comprehensive overview of the whole project
- available at on ISIS (Institute for System Integration Studies) ESTEEM web site
- includes also test site descriptions

Demo site reports and other deliverables

- Available from ISIS.

The study aimed mainly to support public stakeholders of cities in production of reliable estimates of impact of transport activities, which does not provide suitable educational material. However, the final report includes chapters of general descriptions of different modelling methods and previously used techniques, which can be included in education.

1.6 Results of project FATIMA

The main aim of the **FATIMA** project is to identify the benefits of the optimal urban transport strategies to the private sector and the potential for obtaining private sector funding to reflect those benefits. It also determines the differences between strategies optimised using public funds and those optimised within the constraints imposed by private funding initiatives. With the results from the identification process it proposes mechanisms by which private sector funding can be provided appropriately while maintaining the quality of operation and provides more general guidance on the role of private sector funding for urban transport in EU.

The material includes a final report and a lot of preliminary publications. The final report and a list of preliminary publications are available at the project home page.

The experts in the **FATIMA** project were The Technical Research Centre of Finland (Finland), The Centre for the Study of Transport Systems (Italy), Azienda Tranvie Municipale – Torino (Italy) and The Institute of Transport Economics (Norway).

Leading educational institutes in the **FATIMA** project were the University of Leeds (UK) and the Technical University of Vienna (Austria).

Demo sites of FATIMA project were Edinburgh and Merseyside (UK), Vienna and Eisenstadt (AT), Helsinki (FI), Torino and Salerno (IT) and Tromsø (NO)

Website of FATIMA project: www.its.leeds.ac.uk/projects/fatima

Results of the project

The project adopted an approach, which involved the application of the same study method to nine cities, chosen to reflect a range of urban transport policy contexts in Europe: Edinburgh, Eisenstadt, Helsinki, Merseyside, Oslo, Salerno, Torino, Tromsø and Vienna. This method involved specifying appropriate policy objective functions against which transport strategies could be assessed, and finding the specific strategy that optimised each of these functions. The objective functions covered a range of differing regimes with respect to constraints on public finance and the involvement of the private sector.

It was found that, in a majority of the case study cities, optimal socio-economic policies could be funded by road pricing or increased parking charges, considered over a 30-year time horizon. Such measures would typically be used to make it feasible to increase public transport frequency levels or decrease public transport fares. In general it was found to be important that the city transport planning authority had complete control over all transport measures, affecting both private and public transport. However, such strategies are likely to require significant levels of investment and, given current attitudes towards constraints on public spending, it might be politically awkward for the public sector to raise such finance. There is, thus, a potentially useful role for private finance to be used to help overcome such (short-term) financing problems. However, it must be appreciated that the private sector will expect to make a profit on such investment. In cities where optimal policies are funded by travellers, the private sector can be reimbursed by travellers. In cities where it is not feasible for travellers to fund all the costs of optimal policies, it will be necessary for the private sector to be reimbursed from public funds (raised from taxes). An important issue here is that the use of private finance should not be allowed to replace optimal policies with sub-optimal policies.

Materials

Final report

- Includes an overview and full results of the project
- Available at the project home page

Other documents

- A list is available at the project home page

Demo site reports

- Available from project participants

The material is suitable for educational use as an example of one approach in evaluating traffic policies. A more compact and general presentation might be more appropriate for course material.

1.7 Results of the project MESUDEMO

The aim of the **MESUDEMO** project is to develop a methodology for creating a general European database on transport infrastructure and flows of passenger and goods. The methodology will address the establishing of the framework of the database as well as supplying a procedure for estimation of those variables which are urgently missing in a potential database. The database will cover the EEA + Switzerland, and take into account a progressive inclusion of the CEEC/CIS countries.

The material includes deliverables and final report, which are available at MESUDEMO Web server.

The experts in the MESUDEMO project were AGDER Research Foundation (Norway), NEA Transport Research (Netherlands), ISTAT (Italy), National Technical University of Athens (Greece) and Ministerie van Verkeer en Waterstaat (Netherlands).

Leading educational institute in the MESUDEMO project was National Technical University of Athens (Greece).

Websites of MESUDEMO project: <http://www.cordis.lu/transport/src/mesudemo.htm> and <http://www.telecom.ece.ntua.gr/mesudemo/index.html> (MESUDEMO Web server).

Results of the project

In order to achieve an effective dissemination of the results of the work on the ETIS (European Transport Information System) overall and internal architecture, the working group of MESUDEMO have constructed a tool for the presentation of the new concepts, ideas and methodologies for the creation of an ETIS and the demonstration of the advantages of the novel points of the proposed architecture.

This tool is a Web-enabled environment, with a 3-tier, client-server architecture and advanced capabilities for handling geo-information through the Web. Web-based hypertext (html documents) will be used for the presentations, so that the users (i.e. the target audience for the dissemination and demonstration) will be able to concentrate on the points of their interest. Special clickable buttons in the Web documents will initiate demonstration programs.

Materials

Final report

- summarises the main findings in the MESUDEMO project
- available at MESUDEMO Web server

Deliverables

- available at MESUDEMO Web server

The aim of the **MESUDEMO** project was to develop a methodology for creating a general European transportation database. As a specific technical study, the reports can mainly be used as examples in transportation courses.

1.8 Results of the project OPTIMA

The overall objectives of Project OPTIMA (Optimisation of policies for transport integration in metropolitan areas) were:

- to identify optimal urban transport and land use strategies for a range of urban areas within the EU
- to compare the strategies which are specified as optimal in different cities, and to assess the reasons for these differences
- to assess the acceptability and feasibility of implementation of these strategies both in nine case study cities and more widely in the EU
- to use the results to provide more general guidance on urban transport policy within the EU.

The material includes

- Optimisation of policies for transport integration in metropolitan areas: Optima
- OPTIMA Consortium (1997a). Report on Work Package 10. ITS Working Paper No 498, Institute for Transport Studies, University of Leeds, England.
- OPTIMA Consortium (1997b). Report on Work Package 20. ITS Working Paper No 499, Institute for Transport Studies, University of Leeds, England.
- OPTIMA Consortium (1997c). Deliverable 2.

The experts in the OPTIMA project were Anthony May and Paul M. Timms from The University of Leeds, Institute for Transport Studies, UK, Hermann Knoflachner from The Technical University of Vienna, The Institute of Transport Planning and Traffic Engineering (TUW-IVV), Austria, Veli Himanen from The Technical Research Centre of Finland, VTT Communities and Infrastructure, Finland, Silvana Toffolo from The Centre for the Study of Transport Systems (CSST), Italy, Enzo Corrado Bason from Azienda Tranvie Municipale - Torino (TT-ATM), Italy, and Harald Minken from The Institute of Transport Economics (TØI), Norway.

Leading educational institute in the OPTIMA project were The University of Leeds, Institute for Transport Studies and The Technical University Of Vienna,, Faculty of Civil Engineering, Institute for Transport Planning and Traffic Engineering (TUW-IVV).

Websites of OPTIMA project are: <http://www.cordis.lu/transport/src/optima.htm> (CORDIS project description page), <http://www.cordis.lu/transport/src/optirep.htm> (Final Summary Report),

<http://europa.eu.int/comm/transport/extra/res-optima.html> (Final Summary Report on TransportRTDProgrammeKnowledgeCentre),

<http://www.its.leeds.ac.uk/projects/optima/> (Project pages by the coordinating partner, incl. Contact point, Objectives, Technical approach, Results and conclusions and Dissemination of results).

Results of the project

From the results, the following recommendations can be made for policy makers

- strategies should be based on combinations of measures, and should draw fully on synergy between success measures;
- economically efficient measures can be expected to include low cost improvements to road capacity, improvements in public transport (increased service levels or reductions in fares), and increases in the cost of car use;
- public transport infrastructure investment is not likely, in the majority of cases, to be a element in economically efficient strategies;
- reductions in capacity to discourage car use are not likely to be economically efficient;
- the scale of changes in service levels and fares will be influenced by the current level of subsidy; in some cases a reduction in service levels or an increase in fares may be on economic grounds;
- the scale of increase in costs of car use will depend in part on current levels of congestion; the study suggests that road pricing and parking charge increases are interchangeable, but this needs assessing in more detail;
- in most cases economically efficient strategies can be designed which are financially feasible, provided that revenues can be used to finance other strategy elements;
- the pursuit of sustainability is likely to justify investment in public transport infrastructure, further improvements to public transport services and/or fares, and further increases in the cost of car use;
- availability of finance will be a major barrier to implementation of many sustainability-optimal strategies, and further work is needed to investigate the extent to which financial costs can be reduced by strategies which are slightly sub-optimal;
- legislation will be needed to enable implementation of road pricing and to control parking charges; in the UK and Italy there is also a case for changing legislation to permit economically more efficient public transport strategies;
- public acceptability will be a significant barrier with those measures which reduce service levels or increase costs; this implies the need for effective public relations campaigns, and carefully designed implementation programmes;
- detailed measures to improve the environment and provide better facilities for cyclists, pedestrians and disabled people should be designed within the context of a preferred strategy.

Methodological conclusions and recommendations

- the optimisation procedure has been shown to be successful, and has attracted widespread interest; however, it is important that careful thought is given to the policy implications of each stage of the process;
- the frequent use of upper and lower bound values in the optima is a cause of some concern;
- strategic models are in many ways more appropriate than tactical models in the development of optimal strategies;

- such models should include walking and cycling, both peak and off peak conditions, and the effects of public transport loadings on user costs;

Materials

- Optimisation of policies for transport integration in metropolitan areas: Optima
- OPTIMA Consortium (1997a). Report on Work Package 10. ITS Working Paper No 498, Institute for Transport Studies, University of Leeds, England.
- OPTIMA Consortium (1997b). Report on Work Package 20. ITS Working Paper No 499, Institute for Transport Studies, University of Leeds, England.
- Report on Work Packages 30 and 40
- Report on Work Package 50
- OPTIMA Consortium (1997c). Deliverable 2.

1.9 Results of the project SCENES

The **SCENES** project is based on the earlier 4th Framework Programme projects SCENARIOS and STREAMS. Work Area 10 embraces **research work on drivers of transport demand**. The analyses of the SCENARIOS project are extended by incorporating research on demand/ supply interaction, by examining regulatory systems applied in the transport sector, and by considering institutional aspects and studies on breaks in trends. In Work Area 11 **the STREAMS Strategic Transport Model of the EU is extended to Eastern Europe** and enhanced. After its recalibration this model is validated as the SCENES European Forecasting Model. Work Area 12 covers the issue of defining **transport demand scenarios for the EU for 2020 and beyond**. These scenarios are made up of external, socio-economic scenarios, and sets of policy scenarios.

Material includes ten deliverables, in which six are available on the Internet at this moment. Deliverables can be downloaded from web site of The University of Karlsruhe, Germany.

The experts of SCENES project are ME&P Ltd. (UK), CSST (Italy), DLR (Germany), ISIS SA (France), LT Consultants Ltd. (Finland), Marcial Echenique y Compañía (Spain), NEA (Netherlands), KTI (Hungary), NOBE (Poland), TIS (Portugal) and TRT (Italy).

Leading educational institutes in the SCENES project are IWW (Germany), INRETS (France), ITS (UK), EPFL (Switzerland), NTUA (Greece), University of Gdansk (Poland), UPM (Spain) and TNO Inro (Netherlands).

Demo sites: The effects of deregulation on transport demand are analysed by examples for regional public passenger transport (Frankfurt, London, Lyon) and rail freight transport (Great Britain, Germany, USA).

Web sites of SCENES project are Scenes co-ordinator homepages including participants and goals (fpiv.meap.co.uk/fpiv/SCENES.htm) and IWW (University of

Karlsruhe) project pages including links to all participants and deliverable downloads (www.iww.uni-karlsruhe.de:8002/SCENES).

Results of the project

The SCENES Internet Database has been established for the SCENES project in order to provide a common **platform for regional data**. The access to the database system is password-protected. Access to the SCENES Internet Database is given to the European Commission and the partners involved in the SCENES project. The SCENES Internet Database is a large assortment of regional data for nearly all countries in Europe. The SCENES Internet Database is an information pool for socio-economic, technology, transport and tourism indicators at regional level.

All the ten deliverables are not yet available, thus the final results can not be presented. For example, the results of transport demand forecasting model are not presented.

Materials

The deliverables are

- CEEC data and method (available from IWW's SCENE project site)
- SCENES European transport forecasting model specification (available)
- Drivers of Transport Demand- Western European Countries- (available)
- Drivers of Transport Demand- Central and Eastern European Countries (CEEC)- (available)
- SCENES European Transport Forecasting Model and Appended Module: Technical Description
- External scenarios development (not available)
- An Information System for Regional Socio-Economic and Transport Demand-Influencing Factors: The SCENES Internet Database (available)
- SCENES transport forecasting model results and regional model results (not available)
- Case studies on scenario development (not available)
- European scenarios: description of process and quantitative results (not available)

The material seems to be exact and thorough. However, a simple summary of goals and achieved results are missing, at least at this moment.

1.10 Results of the project SESAME

The **SESAME** project aim is to define the relevant indicators of transport, traffic, land-use and relevant externalities for transport/land-use planning and analyse the relationships between these indicators in view of deriving a better understanding of the

impacts of policies. Based on the indicators and their relationships, it provides an operational framework for evaluating and effectively planning local policies.

The material includes final report, which is available at CORDIS.

The experts in the SESAME project were Centre D'Etudes sur les Réseaux, Les transports, L'Urbanisme et les Construction Publiques (France), Centre D'Etudes Techniques de L'Equipment Mediterranee (France), Barcelona Tecnologia S.A. (Spain), Socialdata Institut für Verkehrs-und Infrastruktur-forschung GmbH (Germany), Netherlands Organisation for Applied Scientific Research (Netherlands), Transport Research Laboratory (UK), Peter Zeugin (Switzerland) and Systems Consultant (Switzerland).

Demo Sites of SESAME project were Barcelona (ES), Lyon (FR) and London (UK).

Website of SESAME project: www.arttic.com/projects/sesame.

Results of the project

One common hypothesis argues that public transport and non-motorised modes are competitors on the transport market, while the car has no real competition from public transport nor from non-motorised modes. The result obtained is contrary to this hypothesis. One can conclude that in urban areas the car has strong competition from the non-motorised modes and, especially in the central city of the local urban area, there are signs of some competition for the car from public transport. Little competition was found between non-motorised modes and public transport.

Small cities have a larger car share while larger cities have a better ability to reduce the car share. This hypothesis is true to a certain extent. The car share does decrease for cities of over 750 000 inhabitants. For cities smaller than 750 000 inhabitants there is a tendency towards a positive relationship between city size and car share. There is a positive correlation between the density of the local urban area and non-motorised mode share. Higher concentrations of inhabitants and workplaces benefit to public transport as it intensifies trip movements.

Car ownership per household is strongly positively correlated with mode share. The more people have access to a car, the higher the car share in trips as well as in kilometres travelled. As it is commonly stated in literature, car ownership remains one of the most important variables influencing the car share. About mode choice and time used for travel, the common hypotheses in the literature is that the time used for travel per day is constant and that mode choice changes will result in a change of trip distance rather than a change in the total time used for travel. These hypotheses are not proved by the data. The total time used for travelling per day varies between 50 and 90 minutes and this difference is strongly dependent on the particular modal split of a city.

The relationship between public transport supply and densities is well proven. The higher the density the higher the service level (measured in number of vehicle-kilometres). Further analyses indicate that the improvement of the service-level is the result of higher frequencies rather than a higher line-length.

Cities or local urban areas that grew heavily in the last ten years have currently a low percentage of young and old people in the city and a high percentage of middle-aged people. Apparently cities grew because more middle aged people remained living in the local urban area. The growth did not come from families with young people/children. Based on the experiences made in the project, in particular during the

data analysis, a set of recommendations for politicians and planners has been worked out.

Materials

Final report

- includes overview of the project, results and conclusions and exploitation and dissemination plan
- available at CORDIS web site

Demo site reports

- available from project participants

The final report is quite narrow, and does not fit for educational use as it is.

1.11 Results of the project STEMM

The main objects of **STEMM** project are:

- identifying and quantifying the factors affecting modal split and route choice for passengers and freight,
- developing methodology for modelling intermodal chains for passenger and freight transport,
- applying the developed methodologies to models representing mode and route choice for European networks and particular case studies,
- examining barriers to intermodality arising from institutional and regulatory measures,
- utilising these models to examine and test policy instruments for increasing the use of intermodal methods of transport and
- preparing contributions to seminars at which results obtained from investigations of different types of policy instrument will be considered

The material includes final report and is available at CORDIS.

The experts in the STEMM project were Baxter Eadie Limited (UK), BETA. ULP (France), CERTE. UKC (UK), Coherence S.P.R.L (Belgium), DST.DETR (UK), ECOPLAN (Switzerland), ITS.UL (UK), IWW.UK (Germany), MDS Transmodal (UK), Mkmetric (Germany), SINTEF Transport Engineering (Norway), Technicatome (France) and VTT (Finland).

Leading educational institutes in the STEMM project were Universite Louis Pasteur (France), The University of Kent at Canterbury (UK), The University of Leeds (UK), The University of Karlsruhe (Germany), Cork Regional Technical College (Ireland) and The Institute for Transport Economics (Germany).

Demo sites of the STEMM project were Transalpine Traffic, Channel Tunnel, Scan-Link Corridor, Nordic/North Sea Freight and Walloon Region/Pyrenees.

Website of STEMM project: www.cordis.lu/transport/src/stemm.htm.

Results of the project

A sophisticated multi-country model of passenger transport has been developed, with innovative representation of non-linear modal choice, integrated multimodal networks, and estimation techniques taking account of variation and correlation in estimation precision. This model has been applied to the Trans-Alpine region, and to the Scan-Link Corridor.

Two freight models have been developed and tested, both using similar conceptions of factors affecting mode and route choice. The results produced by the model at its current state of development are reliable, intuitively sensible and consistent with other studies and also commercially plausible.

Materials

Final report

- includes overview of the whole project
- available at CORDIS web site

The final report is quite limited for educational purposes.

1.12 Results of the project STREAMS

The central objective of the STREAMS (Strategic transport research for European member states; Modelling and Methodology for Analysing the Interrelationships between External Developments and European Transport.) project was to build and implement a prototype model to (i) predict the demand for transport across the EU, and (ii) assign this demand to a set of networks representing transport supply in the EU. An initial 'Reference Scenario' forecast for 2020 were also to be produced. In parallel with model development, there were objectives to research modelling issues applying to the development of strategic models. An important element of this objective was the development of new software products, designed to make the use of large, strategic models more straightforward.

The material includes Deliverables from 1 to 9, Marcial Echenique & Partners (2000), 'Forecasts of EU/TEN-T transport and emissions: A pilot study' – Final Report, and Final Report for Publication.

The experts in the STREAMS project were John Larkinson and Scott Leitham from Marcial Echenique and Partners Limited, UK, Paavo Moilanen from Strafica Oy, Finland, Michael Wegener and Klaus Spiekermann from Universität Dortmund, Institut für Raumplanung, Germany, Angel Gil and Emilio Sanchez from Marcial Echenique y Compañía, S.A., Spain, and Angelo Martino from TRT Trasporti e Territorio SrL, Italy.

Leading educational institute in the STREAMS project was Universität Dortmund, Institut für Raumplanung, Germany.

Websites of STREAMS project are: www.cordis.lu/transport/src/streams.htm (CORDIS project description page), <http://fpiv.meap.co.uk/fpiv/streams3.htm> (Project homepage by the coordinating partner), http://www.trttransportieterritorio.it/streams_eng.htm (Description of activities), http://europa.eu.int/comm/transport/extra/final_reports/waterborne/STREAMS.pdf (Final report for publication), <http://fpiv.meap.co.uk/fpiv/Environ.htm> (STREAMS extension: strategic environmental assessment pilot study).

Results of the project

A strategic prototype model to predict the demand for transport across the EU was built and implemented. The demand element of the model comprises independent passenger and freight components, since they employ different methodologies. The model is well suited to testing 'demand' scenarios in terms of their effects on the overall level of transport demand. Variations in population, employment and car availability on the passenger side, and production, and growth by sector on the freight side can be tested using the STREAMS model structure. Combinations of these 'demand' and 'transport policy' scenarios can of course also be run.

A strategic prototype model to assign the demand to a set of networks representing transport supply in the EU was built and implemented.

The model should encapsulate all travel within the EU, also short distance and slow mode trips. This called for a new approach to the treatment of 'local' (or intra-zonal) trips, which account for the vast majority of trips made within the EU, given the zoning system. Using this system, it was possible to model more accurately the number of passenger trips within certain 'distance bands' by mode as a representation of 'local' trips. The model is therefore suitable for forecasting aggregate transport statistics for the whole of the EU area, including as it does all trips (including short and walk trips).

The 2020 Reference Scenario model run produced interesting key results for passenger and freight transport.

The model was used to produce traffic forecasts by mode at the level of individual links, for use in calculating various emissions data at the EU level associated with the TEN-T. This application of the model enabled valuable lessons to be learned, which are being applied in the development of the model within the follow-on SCENES project

Materials

- Deliverables from 1 to 9: Most of these may be too complex for outsiders. Deliverable D8 / D10 – 'STREAMS Model Structure and Results' has received a wide circulation.
- Marcial Echenique & Partners (2000), 'Forecasts of EU/TEN-T transport and emissions: A pilot study' – Final Report: useful in large strategic and policy approaches, presented to Commission policy officials
- Final Report for Publication: overview of the whole project, available as pdf-file from the Internet, quite accessible

2. RECOMMENDATIONS FOR NEW MODULES

The development of new modelling and data analysis methods has been quite limited. The methods of studied projects have not been fully comprehensive, and quite few new methods have been properly introduced. For example studies of new GIS-applications were not widely presented.

Data integration should be studied more carefully. Now the models were quite site-specific (FATIMA, STEMM). The applicability of study results in general and more theoretical conclusions should be included in the future studies. Some studies did consider the general use of data, but the level of sophistication was quite technical and perhaps too detailed for non-experts (BRIDGES, SCENES, MESUDEMO). In general, quite many projects and their reports emphasised technical development of some specific method, which make the educational use of the study material quite difficult.

Another study object that could have more weight is digital databases and especially the use of these databases. Digital maps and information systems (GIS, GPS) build on the top of database provide practical tools for research as well as several customer applications. For example MESUDEMO and SCENES handled specific transportation databases, but the practical applications, which are the most interesting issues from the educational point of view, were not clearly presented.

The effective use of databases and models, and generalisation of data collection and use across Europe require flexible system architectures and standardisation. The simplest way to create at least some possibilities to transfer models and data collection studies to other geographical locations is to form a general approach to the modelling problem. At first, the approach could be just an instruction for the model structure, and secondly, the effective and inter-active solution of technical problems. As mentioned earlier, more a general approach might be more effective than site-specific modelling.

This level of sophistication was also one problem of our key topic when considering the educational use of study reports. No basic study or state of the art review were available, and most of the material is too complicated to understand for non-experts. The subject is too narrow to be used in education European wide. The studies were often directed to city authorities (DIRECT, ESTEEM, OPTIMA) and focused on giving planning guidelines. This kind of focus does not provide very useful educational material without some editing of the material. The database and software oriented studies, of which results included database prototypes or software products (MESUDEMO, BRIDGES), are also quite difficult to use in the education of transportation engineering.

In general, the project reports did not provide ready material for education. The quality and particularity of the reports were either too sophisticated and wide, or too poor. Some of the project results, however, can be used as examples and demo cases (FATIMA, MESUDEMO), or with some editing of the reports, even in larger scale (SCENES, ESTEEM).

One scientific focus of future studies could be the more emphasis on the mathematical modelling techniques and, especially, trying to develop new methods. Artificial intelligence (AI) and rule based modelling provide a simple approach to complicated

phenomenon modelling. Sometimes it may be impossible to model the phenomenon strictly by theoretical formulas, and then using AI can be the only possibility to handle the problem. This is why new techniques, like fuzzy logic, neural networks and genetic algorithms, should have stronger weight in traffic modelling research than they do nowadays.

3. FINAL CONCLUSIONS

Different models are widely created and used, but some relevant issues are left outside the studies. The transferability and data recording are sometimes neglected, which makes future studies harder to make, current studies harder to repeat and different models harder to compare to each other.

The solution to the problems in transferability and comparability is clear model architecture, data standardisation and comprehensive reporting. Another problem in research co-operation and learning from other studies is the lack of information about existing studies, or the availability of study reports. In addition to the technical standardisation, the (EU) study organisation structures, the research work completed and the report availability should be standardised or at least well instructed by the European Union. At the moment, the information of EU projects is hard to find and the reporting of study results varies a lot, which makes also the educational use of study results very difficult.

Other important future study objects in traffic and transportation modelling are telematics and digital databases to support site-specific studies. After some general methods for modelling are available, different databases provide data for the models. In addition to data collection of modelling, telematic solutions can be used for traffic control and customer services.

Focusing only to the EU funded projects does not necessarily provide comprehensive picture of studies of traffic and transportation in Europe. One alternative could be emphasising the research work of Leading Educational Institutes (LEI's), which may have many interesting projects that are not included in the EU-project category. Some relevant data can be missed, if the projects of top research institutes are not in the project database. It should also be remembered, that traffic and transportation is studied all over the world. If only European studies are collected to databases, important data is left outside.