EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT

TRANSPORT INFRASTRUCTURE IN CENTRAL AND EASTERN EUROPEAN COUNTRIES

SELECTION CRITERIA AND FUNDING

THE EUROPEAN CONFERENCE OF MINISTERS OF TRANSPORT (ECMT)

The European Conference of Ministers of Transport (ECMT) is an inter-governmental organisation established by a Protocol signed in Brussels on 17th October 1953. The Council of the Conference comprises the Ministers of Transport of 32 European countries.[1] The work of the Council of Ministers is prepared by a Committee of Deputies.

The purposes of the Conference are:

a) to take whatever measures may be necessary to achieve, at general or regional level, the most efficient use and rational development of European inland transport of international importance;

b) to co-ordinate and promote the activities of international organisations concerned with European inland transport, taking into account the work of supranational authorities in this field.

The matters generally studied by ECMT – and on which the Ministers take decisions – include: the general lines of transport policy; investment in the sector; infrastructural needs; specific aspects of the development of rail, road and inland waterways transport; combined transport issues; urban travel; road safety and traffic rules, signs and signals; access to transport for people with mobility problems. Other subjects now being examined in depth are: the future applications of new technologies, protection of the environment, and the integration of the Central and Eastern European countries in the European transport market. Statistical analyses of trends in traffic and investment are published each year, thus throwing light on the prevailing economic situation.

The ECMT organises Round Tables and Symposia. Their conclusions are considered by the competent organs of the Conference, under the authority of the Committee of Deputies, so that the latter may formulate proposals for policy decisions to be submitted to the Ministers.

The ECMT Documentation Centre maintains the TRANSDOC database, which can be accessed on-line via the telecommunications network,

For administrative purposes, the ECMT Secretariat is attached to the Secretariat of the Organisation for Economic Co-operation and Development (OECD).

1. Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Moldova, the Netherlands, Norway, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom. (Associate Member countries: Australia, Canada, Japan, New Zealand, the Russian Federation and the United States. Observer countries: Albania, Morocco.)

Publié en français sous le titre :
INFRASTRUCTURES DE *TRANSPORT*
DANS LES PAYS DEUROPE CENTRALE ET ORIENTALE
CRITÈRES DE CHOIX ET FINANCEMENT

Foreword

The Second Pan-European Transport Conference was held in Crete on 14-16 March 1994 and offered the Ministers and Parliamentarians concerned in all European countries -- together with the representatives of international organisations, financial institutions and industry -- an opportunity to exchange views on the possible content of a pan-European transport policy and the priorities with respect to infrastructure of importance to Europe as a whole.

One of the main items on the agenda for this Conference was the question of the transport infrastructure needed and ways and means of funding it, a subject on which the ECMT submitted the paper reproduced in this publication. The paper was in fact drawn up in response to an explicit request made in a Resolution adopted by the ECMT Council of Ministers in May 1993 to the effect that a background report be prepared for the Second Pan-European Transport Conference which would in particular:

- specify quality criteria to be met by a number of priority infrastructure corridors for development in a pan-European multimodal context; and
- set out financing options for transport investment in this regard.

TABLE OF CONTENTS

Part I

CRITERIA TO BE MET BY TRANSPORT INFRASTRUCTURE ON PRIORITY CORRIDORS IN A PAN-EUROPEAN CONTEXT

Part II

FINANCING INFRASTRUCTURES AND TRANSPORT SYSTEMS IN CENTRAL AND EASTERN EUROPE

PART I

CRITERIA TO BE MET
BY TRANSPORT INFRGSTRUCTURE ON PRIORITY CORRIDORS
IN A PAN-EUROPEAN CONTEXT

It is in response to a formal request by the ECMT Council of Ministers that the criteria relevant to the choice of transport infrastructure on pan-European corridors have been established.

The Resolution on such infrastructure which **was** adopted at its Noordwijk Session in May 1993, the Council asked the ECMT to propose, as a contribution to the Second Pan-European Conference, quality criteria for these priority links in a multirnodal pan-European context.

This paper has accordingly been drawn up by the Secretariat in collaboration with the Chairman of the Group on Trends in International Traffic and with reference in particular to the note in this connection by the Netherlands Delegation [CEMT/CS/TTI(93)5] and the proposals made by a number of delegations in response to a survey initiated under letter **SA/93.384** [CEMT/CS/TTI(93)9]. It also incorporates certain analyses submitted to the Ministers at Noordwijk in the summary of the report on trends in international traffic and infrastructural needs in Europe [CEMT/CM(93)10] and in the background paper [CEMT/CM(93)9].

* * *

Any assessment of the pan-European transport infrastructure to be developed calls for a whole range of criteria, the weighing and ranking of which can only be carried out in the last analysis by means of a process of essentially policy trade-offs.

Three categories of criteria are proposed in this paper as yardsticks against which any pan-European investment project must be measured, so these criteria provide an initial frame of reference for the trade-off procedures. The order in which the criteria have been set out is not to be seen as an indication of either their relative importance or the sequence in which they are to be taken into account in an evaluation process. Moreover, while these criteria are given individually, this cannot obscure the interrelationships or interactions that exist among them and must be made explicit when infrastructure projects are examined.

As requested by the Council of Ministers, the criteria have been selected from a multimodal standpoint which is essentially reflected in the endeavour to find criteria which are harmonized for the different modes and, in the case of all projects, by the systematic consideration of alternatives that might be offered by other transport techniques or routes.

This paper takes account of the work already done on the subject by other international bodies, primarily the European Communities and the UN/ECE. More particularly, it incorporates the findings of the EC's studies analysing the criteria for each mode and, in conjunction with the EURET programme, comparing those each country uses to assess roadbuilding projects. The paper also takes full account of the conclusions of several round tables recently organised by ECMT as well as of various national studies evaluating investment in transport infrastructure. By way of illustration, Annex 1 lists the main criteria used in a number of countries. Spain's recent master plan for infrastructure (Annex 2) is **a** good example of the type of approach that this paper recommends at pan-European level.

It must however be emphasized that the proposed approach is an on-going process. The use of all the criteria listed must necessarily be gradual. Some of the criteria are simply listed and still need to be refined from a methodological standpoint, while others can be regarded only as objectives in the longer term, Inasmuch as the statistical data needed to assess many of the criteria are lacking, simple qualitative notations will have to suffice for the time being, Although it may therefore be necessary to show some flexibility in the use of these criteria, **the** fact remains that many of them are already operational, and **in** some cases even mandatory **in that** they are incorporated in regulations or agreements.

1. Service Quality Criteria

1.1 Technical characteristics

In order to ensure geographical continuity, pan-European networks must have **a** minimum degree of homogeneity in terms of their technical characteristics. National technical standards must **be** gradually raised to the most up-to-date levels of state of the art technology. The proposed criteria for doing so represent an ultimate objective that may take time and have to be achieved in stages. Until then, a Power level of service quality will have to suffice, although certain minimum requirements will still have to **be** met.

a) Railways

The technical characteristics which have to be met **by** rail infrastructure of pan-European importance are basically those laid down in the **AGC** Agreement set up by the **UN/ECE (Annex 3).** Among the standards adopted under the AGC, attention may be drawn in particular to the following provisions:

- number of tracks: double track (criterion for new lines);
- minimum distance between track centres: 4 m **and** 4 m 20 (criterion for new lines);
- the quality of the tracks has to be of **a** standard to ensure that the following speeds can be attained:
  - 100 km/h **and** 120 km/h (criterion for the year 2000) for freight trains;
  - 120 km/h and 140 km/h (criterion for the year 2000) for passenger trains;
- minimum loading gauge: UIC B and UIC C1 **gauges** (criterion for new lines);
- minimum load per axle for wagons;
  - 20 t and 22.5 t (criterion for new lines) at 100 km/h
  - 20 t at 100-120 km/h
  - 18 t at 120-140 km/h;
- electrification;
- elimination of level crossings;
- state of the art signalling facilities;
- interoperability of railway services.

b) Roads

The technical characteristics to be met by road infrastructure of pan-European importance are basically those laid down in the **AGR** Agreement set **up** by the UN/ECE and in the Community documentation on the trans-European road network (Annex 4).

Among the standards laid down in this connection, attention may be drawn to the following provisions in particular:

- minimum capacity: 20 000 PCU per day; while this objective could be met gradually, the minimum interim capacity should not be less than 10 000 PCU per day;
- minimum number of lanes for motorways: **2x2** lanes;
- the quality **of** the infrastructure has to be of **a** standard to ensure that the following speeds can be attained:.
  - 90 km/h for lorries (80 km/h in some hilly areas)
  - 120 km/h for private cars;
- minimum service level: fuel available, rest areas as defined in the **AGR** Agreement, emergency telephones, round-the-clock safety and maintenance service, efficient telecommunications, appropriate traffic management and real-time driver information, non-cash toll or road tax payment facilities;
- interconnections with other modes of transport (multimodal aspects).

*c) Inland **waterways***

The quality of the infrastructure has to be of a standard to ensure the handling of vessels of Class IV, as defined by ECMT and the UN/ECE (Annex 5).

*d) **Combined** transport **infrastructure, intermodal terminals and transhipment centres***

The **AGTC** Agreement set up by the UN/ECE gives some indication of the technical standards to be met by infrastructure networks as well as ports, airports and inland intermodal terminals, so as to make multimodal transport more efficient (Annex 6).

***e) Border** crossing*

Border facilities and the procedures used by police and customs, health and plant health inspectors should meet the requirements set out in Community Directives 83/643, 87/53 and 91/342 relating to the facilitation of physical controls and administrative formalities, as well as those set out in the UN/ECE international convention on harmonization of frontier controls of goods.

Facilitating border crossings was also the chief aim with respect to transport by both rail -- in a project carried out jointly by the UN/ECE and the OTIF -- and road, in an ECMT survey.

It is worth noting that the goals for certain countries are some of the boldest set forth herein and can be achieved only gradually. In many cases, however, border delays far exceed these targets, and meaningful reductions are needed fast. Such action is essential, seldom very expensive and was undertaken previously in connection with the PHARE programme, and the results will determine the economic viability of all outlays to improve pan-European transport infrastructure. The development of these facilities should therefore be tied in with quicker border-crossings and give practical effect to the interaction between service quality criteria.

The ultimate aim should be to ensure that waiting times at borders do not exceed:

- 15 minutes for passenger cars;
- 20 minutes for coaches and trains;
- 60 minutes for road freight vehicles.

For combined transport, the **AGTC** Agreement set up by the UN/ECE (Annex *6)* seeks to eliminate border stops altogether or **at** least, if they are unavoidable, to cut them very short (to no more than 30 minutes).

1.2 Environment, energy and safety

a) Environment and energy

For all infrastructure projects to be assessed in a pan-European context, systematic impact studies should be carried out in accordance with the standards recommended **by** the European Communities in Directive 85/337 (Annex **7)** or the Espoo Convention on transboundary effects. In this context it might also be noted that the **AGR** Agreement set up **by** the UN/ECE has been revised to include **an** environmental impact study whenever new road projects are prepared or existing roads improved,

Among the factors to be taken into account by means of environmental criteria -- factors that are essentially described in **the** Green Paper by the Commission of the EC concerning the **impact** of transport on the environment, and also in the studies **by** OECD and ECMT --, attention may be drawn in particular to:

- -- the integration of infrastructure into the countryside and the human environment, including severance effects and any damage to landmark **sites;**
- -- the consequences for natural resources (use of space) and ecosystems (e.g. **flora,** fauna, etc.);
- -- noise;
- -- air pollution;
- -- recycling of waste water.

Annex 8 gives examples of environmental effects to be taken into account and describes methods of placing **a** monetary value on these effects. It also gives a table of indicators which might be used.

Along with pollution analysis, an assessment of energy requirements should be carried out **as part of** the environmental impact study for all projects in **a** pan-European context. Such assessments should review the energy needed to build and maintain the proposed infrastructure and estimate the subsequent change in the fuel consumption of the vehicles using it.

b) Safety

Road infrastructure projects to be evaluated in **a** pan-European context should meet a number of criteria with respect to:

- -- anti-skid characteristics of carriageways;
- -- visibility **of** road **markings;**
- -- harmonization of signs and signals;
- -- characteristics of permanent road equipment (guard-rails, etc.);
- -- road traffic information.

The objective where all transport infrastructure is concerned should be to **keep** below *a* given number of killed and injured per vehicle-kilometre. Annex 9 gives an example of the criteria adopted by one Member State -- Germany -- to assess improvements in road safety **as a** result of infrastructural

work. It also specifies EURET programme data on the cost of accidents **as** various countries calculate it for use in their respective evaluation processes.

Safety is also a major concern of the Conventions signed under the auspices of the UN/ECE (Convention on Road Traffic, Convention on Road Signs and Signals) and of the European Agreements and the Protocol supplementing the Conventions.

1.3 Fluidity of traffic

Where this general criterion of fluidity of traffic is concerned, infrastructure projects in the pan-European context should primarily be assessed in terms of their capacity to eliminate bottlenecks and reduce congestion, i.e. to shorten transport times and therefore cut costs. Such projects, which are designed to make up for the deficiencies **of** existing infrastructure **(see** the ECMT and UIC maps), should be assessed in the light of the following factors:

- infrastructure designed to avoid highly congested **spats;**
- means of bypassing densely populated areas;
- saturated corridors (widening, **new** parallel infrastructure);
- control over demand;
- infrastructure specialisation (passengers/freight);
- alternative routes;
- use **of** other modes.

2. Criteria relating to Network Coherency and Institutional Constraints

There are at least four types of criteria in this category:

2.1 Incorporation into existing schemes

The aim in this context is to see whether a project is compatible with decisions already taken at national or international levels, **primarily** using the criteria to check whether the projects considered from a pan-European standpoint:

- fit in properly with national infrastructure schemes and the relevant priorities;
- are consistent with bilateral or multilateral agreements: agreements between countries, between the EEC and countries in transition, between the EEC and transit countries, etc.;
- are consistent with European schemes and international agreements such **as:**
  - **AGC, AGR, AGTC;**
  - TEM/TER projects;
  - PHARE projects;
  - the European Communities' trans-European networks and those currently being developed **by** the **START** task force;
  - the ECMT's pan-European priority comdors, as defined by the Committee of Deputies session on 7 and 8 October 1993.

In practical terms, these criteria might be applied **-- as** suggested by the German Delegation to the TTI Group (Annex 10) **-- by** drawing up maps on which all the schemes, networks, priority axes etc.

already defined at national or international levels are superimposed. Such an exercise would promptly show **any** ways in which a project is incompatible with the pan-European context.

2.2 Links between networks

Following **the** example of **what has** been done in **the** Community studies on trans-European networks, the aim of this criterion is to identify missing links so **as** to ensure, in **a** pan-European context, that existing or planned networks are satisfactorily interconnected. The missing links may be attributed either to the shortcomings of the European transport system or to pointless formalities or inappropriate facilities at frontiers.

2.3 *Multimodal consistency*

The aim here **is** to promote a truly multirnodal approach in the projects being assessed by evaluating all investment in infrastructure in **the light** of alternatives offered by other modes of transport or other routes, and with due regard to intermodal complementarity so **as** to combine the advantages specific to each mode.

The criterion of multimodal consistency should make it possible to assess an infrastructure project from the standpoint of the efficiency of transport chains and the quality of interfaces between modes or between long and short haul traffic, the ultimate aim being to create a truly multimodal pan-European transport scheme.

2.4 Acceptability by the public

Here the aim is to check the consistency of a project with the aspirations of the public concerned, which in fact involves **a** major institutional constraint that can considerably modify the socio-economic or financial return on **a** project, or even entirely prevent its implementation. Acceptance by the public does of course largely depend on the service quality criteria adopted **as** regards the environment and safety **as** well **as** fluidity of traffic.

Throughout a project's planning and preparation, consistency criteria, including those for interconnections and interoperability, should be weighed against economic efficiency; otherwise they may prompt investment that **is** far too premature.

3. Return on Investment

If infrastructure projects are to have a chance of being implemented and the necessary finance **is** to be found, it is imperative that they meet certain criteria of profitability. In view of the substantial bodies of literature and of largely co-ordinated methodology existing in this connection in Europe -- primarily **as** a result of the studies relating to a number of major transfrontier projects (cross channel link, **PBKA,** etc.) and concerted action in connection with the EURET programme --, this paper will not examine in depth the **various** factors to be taken into account in economic and financial analyses of the return on investment in transport infrastructure. Notwithstanding, such analyses must systematically draw upon the world's most sophisticated evaluation techniques.

Suffice it to say that any infrastructure project must be examined from two standpoints:

3.1 Economic and financial return

The criteria used to assess **a** project's economic and financial return should focus on the following three aspects:

a) Need

The decision to carry out infrastructural **work** means that certain criteria have to be used to estimate demand, since such criteria serve as a basis for all economic and financial assessments.

- Current demand: it is essential to know the volume of traffic involved in order to determine whether or not investment in transport infrastructure is advisable and to confirm forecast congestion, which tends to be overestimated. To assess whether a project is necessary, all traffic involved should be taken into consideration, since local flows often constitute the **bulk** of it.

  This type of analysis -- which may take the form of traffic density maps and, in the long run, detailed origin/destination matrices -- should also differentiate clearly between national and international traffic so as to draw attention to the specific pan-European importance of certain projects that would otherwise have no priority at national or regional levels (Annex 11).

- Potential demand: the criteria to be used to assess the scale of the requirements to be met cannot relate solely to a static situation but must be part of **a** dynamic approach based on traffic forecasts and simulation exercises.

  The fact that a lack of available data can make future demand particularly difficult to forecast explains the advantage of approaches based on the best estimates of recognised authorities and on probable scenarios, for which project priority may be tested using sensitivity analysis.

b) Efficiency

There is an extremely wide range of criteria that can be used to assess an infrastructure project's economic efficiency. Given the extensive body of existing research on the subject, including recent work under the EURET programme, they will not be listed again here.

In view of current practice in a number of countries, the use of efficiency criteria in a pan-European context should entail:

- A close **look** at the alternatives: the building of new infrastructure should always be compared with the upgrading or rehabilitation of existing facilities; similarly, the time savings -- one of the most commonly **used** criteria of efficiency -- expected from improved transport infrastructure should be compared with those that could be achieved by investing elsewhere, such as at border crossings.

- Determination of optimum timing: the project assessment process should ascertain the best possible time to bring new infrastructure on stream by comparing the costs and the benefits of postponement. This should also help determine the most appropriate timetable for phased implementation.

-- Calculation of a rate of return: as an essential factor in the choice of financing arrangements -- below a certain minimum level, private funding would be out of the question --, the calculation should consider how the proposed project would affect the operation and efficiency of transport systems as a whole. In particular, it should factor in any interaction between projects, since the completion of one might affect returns on another. It is important that the key parameters of economic analysis (e.g. the value of time) be calibrated correctly and that sensitivity studies be developed for factors crucial to profitability. Costs and benefits should be evaluated not only from an overall perspective (i.e. taking all relevant users and countries into account), but from a purely domestic standpoint as well; the findings are particularly important for financing arrangements.

c) Feasibility

The rating of each investment project must include an assessment of its institutional, economic, technical, environmental and financial viability.

Three elements warrant special attention:

-- Budget resources: apart from ascertaining that potential customers can afford to use it and that project financing is available, the analysis should also examine how well the proposed infrastructure could be maintained on the institutional, budgetary and technical levels.

-- The time factor: To be meaningful, any study of a proposed transport infrastructure project must include an accurate assessment of the time needed to complete the project; consideration must be given, for example, to how long it takes for negotiations between central and local authorities, to finalise financing and legal arrangements, assess environmental impact, acquire land and expropriate property, and deal with any litigation.

-- Available financing: Financial criteria are used to determine the chances for private funding and thus of collecting tolls or users' fees. They can be used to set terms for potential financing from various sources, such as private businesses, Financial Institutions and Government. Available financing is a decisive element in the go/no-go decision when a project cannot be funded by private capital alone. Given the relatively limited resources currently available at international level, private financing possibilities for projects of pan-European importance must not be overestimated. Financial constraints make selectivity unavoidable.

3.2 *Socio-economic return*

In drawing attention to the factors that warrant financial participation by the public authorities on the strength of the return to the community, this type of criterion should make it possible to define the degree and form of involvement by the public authorities in the funding arrangements for a project. Examples include:

a) Accessibility

Two types of criteria can be used to assess improvements in accessibility as a result of the construction of transport infrastructure:

-- Criteria relating to interregional links between major centres of activity: the use of maps and criteria of accessibility, such as those recently drawn up by certain institutions (Annex 12), can make an extremely relevant contribution to assessments for the choice of infrastructure projects in a pan-European context.

-- Criteria for access to enclosed areas and European integration: Criteria of this type relate to:

- integration of isolated or enclosed areas;
- integration of peripheral countries;
- extension of networks towards the countries of Central and Eastern Europe.

b) Regional development and more efficient use of land

The criteria used in this connection call for more detailed consideration from the standpoint of methodology, and a qualitative approach will frequently have to suffice:

-- Regional economy: "jobs created" would seem to be one of the simplest criteria to use to assess the benefits that an infrastructure project brings to a region. Moreover, since the building of infrastructure calls for labour, improvements to transport links can help to protect existing jobs or create new ones by facilitating the location of new enterprises and the exploitation of production factors that had previously been at a disadvantage owing to the inadequacy of interregional mobility.

-- Regional development: the use of relevant criteria to take account of the induced effects in terms of regional development is still a source of serious practical problems. The assessment method used in the context of Germany's plan for federal transport infrastructure employs three indicators (quality of links, advantage of location and economic backwardness) to rank the routes and introduce weightings on the basis of criteria for regional development.

Given all the types of funding mechanisms available, an analysis based on criteria relating to the financial and socio-economic return is therefore likely to facilitate decision-making with regard to:

-- funding sources: private, public;
-- funding levels: regional, national, international

and as regards the best way to combine them (mixed funding) if necessary.

4. Conclusion: an on-going Process to be Initiated

During an initial phase, the criteria listed above should be used as part of a pragmatic method to choose the projects most worthy of available financing. In line with what is being done within the European Communities, these criteria will make it possible, on the basis of certain minimum requirements, to draw up a list of projects that might be carried out in a pan-European context. It will then be necessary to resolve any conflicts between local, national and international priorities, between sectoral (modal) priorities and multimodal approaches, etc. This will be done using appropriate, essentially policy-based trade-off procedures.

Even though some of the criteria do not as yet have a fully operational content and can at present only take the form of minimum thresholds that are not to be exceeded, the evaluation process defined

in this way should be implemented promptly on bases that are harmonized as closely as possible so that it becomes an on-going process to be adjusted regularly in the light of new statistics and changes in:

- the content of the criteria;
- the relative importance assigned to each of them;
- knowledge of the criteria and of their valuation,

In any event, the establishment of a pan-European transport network will take a great deal more than building or improving infrastructure on the basis of criteria such as those listed here. It will require simultaneous transport policy measures that directly affect the efficiency of infrastructure investment, namely the development of truly competitive bidding, the restructuring of railways, the provision of budgetary resources for maintenance and for the upgrading of selected infrastructure, and action to make the roads safer.

ANNEXES

Annex 1

Criteria and Methods of Evaluation Used in a Number of Countries

Characterisation of Overall Approach to Project Comparison

Conventional Cost-Benefit Analysis	Broad Framework with Emphasis on Cost-Benefit Methods	Broad Framework with Emphasis on Multi-Criteria Methods	Mainly Multi-Criteria Analysis with limited Cost-Benefit Analysis
Denmark Greece Ireland Portugal Spain	Germany Italy United Kingdom	France	Belgium Netherlands

Source: EURET: Concerted Action 1.1 "Cost-benefit and multi-criteria analysis for new road construction -- Bruxelles 1992.

Methods of Evaluation Used in Europe

Country	Working Time	Non-Working Time	Vehicle Operating Costs	Accidents	Noise	Pollution	Comfort	Planning/ Regional Impacts
Belgium[a]	M	M	M	M	D	D	M	D
Denmark	M	M	M	M	M	M	-	D
France[a]	M	M	M	M	P	P	M	P/D
Germany	M	M	M	M	M	M	-	P/D
Greece	M	M	M	M	D	D	-	D
Ireland	M	M	M	P	D	D	-	D
Italy	M	M	M	M	D	D	-	D
Netherlands[ab]	M	P	M	M[d]	P	P	-	D
Portugal[c]	M	M/P	M	M	P	P	-	D
Spain	M	M	M	M	D	D	-	D
United Kingdom	M	M	M	M	P	P	-	D
Sweden	M	M	M	M	M	M	M	D
Finland	M	M	M	M	P	P	-	D

Key: M = money value, P = physical measures, D = description, - = not included

Notes:
(a) Belgium, France and the Netherlands include these money values as part of a multi-criteria analysis.
(b) Non-working time is not included as a value component of "Economic Activity" in the Netherlands. It is the Consultants' understanding that this factor is measured
(c) As a component of non-working time, only commuting time is given an economic value in the Portuguese framework.
(d) Safety is a part of the multi-criteria analysis in the Netherlands. Safety is measured in a ratio: *fatality/injury per invested* guilder.

GERMANY

Evaluation of Project Effects

1. Reduction of Transportation Costs (NB)
   - **1.1** Principles
   - **1.2** Vehicle Standing Costs (NB,)
   - **1.3** Vehicle Operating Costs (NB,)
   - **1.4** Avoidance of Modal Shifts (NB,)

2. Maintenance Costs of Traffic Routes (NW)
   - **2.1** Renewal Costs (NW_1)
   - **2.2** Periodical Maintenance Costs (NW_2)

3. Contribution to Traffic Safety (NS)

4. Improvement of Accessibility **(NE)**
   - **4.1** Basic Considerations on the Value of Time
   - **4.2** Procedure for the FTIP '92

5. Spatial Benefits (NR)
   - **5.1** Regional Economic Benefits (NR,, NR,)
     - **5.1.1** Employment Effects During Construction (NR,)
     - **5.1.2** Employment Effects During Operation (NR_2)
   - **5.2** Regional Structure Benefits (NR,)
   - 5.3 Promotion of International Relationships (NR_4)

6. Environmental Benefits (NU)
   - **6.1** Reduction of Traffic Noise (NU,)
   - **6.2** Reduction of Exhaust Fumes (NU,)
   - **6.3** Reduction of Separation Effects (NU,)
   - **6.4** Reduction of Impairment of Housing Quality and Communication (NU,)

7. Non-Traffic-Related Effects (NF)

8. Cost Elements (K)

Source: Macro-Economic Evaluation of Transport Infrastructure Investment - Evaluation Guidelines for the Federal Transport Investment Plan -- Published by the Federal Minister of Transport -- Bonn 1992.

BELGIUM

Objectives and Scope of Application

- Used to rank road projects at national, regional or sub-regional level,

Overall Approach to Project Comparison

- Multi-criteria approach including the result from a cost-benefit analysis as one of the criteria.

Range of Criteria Used

1. Safety
   - 1.1 Accident rate
   - 1.2 Road cross-section
   - 1.3 Curvature
   - 1.4 Gradient
   - 1.5 Routeing through built-up areas

2. Socio-Economic Aspects
   - 2.1 Benefit-Cost ratio (actually the ratio of NPV to budgetary cost)
   - 2.2 Investments already made
   - 2.3 Services for industrial, commercial, tourist or leisure areas
   - 2.4 Cost per kilometre
   - 2.5 Labour input
   - 2.6 Targeting of specific industries

3. Environmental and Human Factors
   - 3.1 Routeing through protected areas
   - 3.2 Nuisance to the population
   - 3.3 Proportion of heavy goods vehicles
   - 3.4 Number of compulsory purchases

Criteria:

4. Traffic
   - 4.1 Present level of use of the existing network
   - 4.2 Level of use in the medium term
   - 4.3 Estimated level of use with the new project
   - 4.4 Saturation at peak hours
   - 4.5 Gain in journey time

5. Urban Planning
   - 5.1 Conformity to sector plan
   - 5.2 Building permit
   - 5.3 Compulsory purchases
   - 5.4 Continuity of route

6. State of Existing Network
   - 6.1 Cracking
   - 6.2 Longitudinal evenness
   - 6.3 Cross-sectional evenness
   - 6.4 Roughness
   - 6.5a Bearing capacity for tarred roads
   - 6.5b Slab pumping for concrete roads

Method of Comparison

-- Project performance across different criteria compared in a single dimensioned indicator through the use of weights.

Value Indicators Used (Cost-Benefit Study)

-- Ratio of net present value to budgetary cost with costs and benefits discounted at a rate of 4 per cent.

Source : EURET, op. cit.

DENMARK

Objectives and Scope of Application

-- **Used** to rank large **pools of** state highway **projects.**

Overall Approach to Project Comparison

-- Monetary cost-benefit analysis in **which** all indicators are **given** a monetary value.

Range of Criteria and Type of Indicator Used

Criteria:	Type of Indicator			
	Described	Measured physically	Inputed Money Value	Money Changing Hands
1. Construction Costs				yes
2. Operation/Maintenance Costs				yes
3. Vehicle Operating Costs		yes		yes
4. Travel Time		yes	yes	
5. Accidents		yes	yes	
6. Noise Nuisance		yes	yes	
7. Air Pollution		yes	yes	
8. Perceived Barrier and Risk	yes	yes		

Method of Comparison

-- **All** indicators given either an inputed or an actual monetary value.

Value Indicators Used

-- First **year** rate of return (future **costs** discounted at **a** rate **of 7** per cent).

Source: EURET, op. cit.

SPAIN

Objectives and Scope of Application

-- The Ministry of Public Works and Transport produces a manual covering the economic analysis of road designs; Cost-Benefit analysis is used in the case of toll motorways, for other types of road all that is required is an analysis of the economic return.

Overall Approach to Project Comparison

-- Monetary cost-benefit analysis is used to derive an initial ranking of projects, other grounds (territorial, economic impact, etc) also influence the final decision.

Range of Criteria and Type of Indicator Used

Criteria:	Type of Indicator			
	Described	Measured physically	Inputed Money Value	Money Changing hands
1. Construction Costs				yes
2. Operating Maintenance Costs				yes
3. Vehicle Operating Costs		yes		yes
4. Travel Time		yes	yes	
5. Accidents	yes	yes	yes	

Method of Comparison

-- **All** indicators (1 to 5) are given either an inputed or an actual money value.

Value Indicators Used

-- Benefit-Cost Ratio
(A range of indicators may be calculated but the Benefit-Cost Ratio is usually chosen as being the most important. The analysis period is thirty years with a discount/re-evaluation rate of *6* per cent used where appropriate).

Source: EURET, **op.** cit.

FRANCE

Decision-Making Criteria for Highway Projects

A project's worth is judged according to ten criteria, not necessarily quantifiable, which reflect the operation's social and economic efficiency.

The process is based on: a) a micro-economic approach, assessing variations in the economic surplus accruing to users, government and contributing enterprises, and b) a macro-economic approach, taking into account national economic policy objectives relating to employment, the foreign account balance and regional development.

In addition to the cost-benefit criterion, presented in adjusted form, indicators are used to assess the project's impact in terms of the environment, energy, employment, local economic development and regional development, It is considered advisable, moreover, to treat safety as a criterion in its own right, to estimate the project's implications for other transport modes and to take note of certain exceptionally adverse factors existing prior to implementation.

Once the criteria have been assessed, a choice is made among variants of the same project, or among alternative operations, on the basis of a multi-criteria trade-off.

1. Economic and regional development • Economic development • Regional development	 Number **of** communes and inhabitants for, against, undecided Average rate of State subsidies (in FF)
2. Safety	No. accidents avoided annually No. fatalities avoided annually No. seriously injured avoided annually
3. Benefits to users	- Time: **...** hours saved and FF - Operating costs FF - Comfort FF - Tolls FF - Total FF
4. Environment	Beneficial, neutral, harmful (where reckonable)
5. Exceptionally adverse initial situation	- No. **traffic** jams - Traffic interruption risks - No. accident black spots - No. noise black spots
6. Impact on other modes	Alteration in income of competing modes
7, Employment	**No.** jobs **arising** from implementation of the project, maintenance and operation
8. Energy	Energy balance **(TOE)** Energy efficiency
9. Public authority financial outturn	Economic cost of investment FF Total economic cost FF Variation in discounted budget receipts FF
10. Cost-benefit calculable in monetary value	Total discounted benefit FF Project-only benefit (variation in the utility to the community) FF Discounted benefit FF Immediate rate of return **(1990)** FF

Source: Ministry for Infrastructure, Housing, Regional Development and Transport. Instructions (excerpts) by the Highway Department on the evaluation of road projects involving national highways **in** open country and motorways for lease, March **1986.**

NETHERLANDS

Objectives and Scope of Application

- Covers all road projects forming **part** of the national highway network.
- Used to determine priorities in relation to projects already under way **and** in relation to projects still requiring further study,

Overall Approach to Project Comparison

- **A** multi-criteria mixed (quantitative and qualitative) data analysis including a limited cost-benefit analysis as one of the criteria.

Criteria:	Type of Indicator			
	Described	Measured physically	Inputed Money Value	Money Changing Hands
1. Economic Activity		yes	some	some
2. Road Safety		yes		
3. Human Environment	yes	ordinal		
4. Transit Role	yes	ordinal		
5. Physical Planning	yes	ordinal		

Method of Comparison

- The five criteria are weighted **in** order to produce a single indicator for each alternative.

Value Indicators Used

- For the cost-benefit criterion, net benefits over a thirty year period (discounted at 5 per cent to the year 2000) are expressed as a proportion of construction costs.

Source: EURET, op. cit.

PORTUGAL

Objectives and Scope of Application

-- Applied to study the feasibility of alternative investments in new and improved inter-urban roads.

Overall Approach to Project Comparison

-- Cost-Benefit Analysis combined with the production of an environmental impact assessment.

Range of Criteria and Type of Indicator Used

Criteria:	Type of Indicator			
	Described	Measured Physically	Inputed Money Value	Money Changing Hands
1. Construction costs				yes
2. Operation/Maintenance Costs				yes
3. Vehicle Operating Costs		yes		yes
4. Travel Time		yes	yes	
5. Accidents		yes	yes	
6. Environmental Effects				
Noise	yes	yes		
Air Pollution	yes	yes		
Severance	yes			
Visual impact	yes			
Ecology	yes			
Cultural heritage	yes			

Method of Comparison

-- All "non-environmental" effects studied (1 to 5) given **a** monetary value.

Value Indicators Used

-- Net Present Value.
-- Internal Rate of Return.

Source: EURET, op. cit.

UNITED KINGDOM

Objectives and Scope of Application

-- The Department of Transport framework is used as the basis to assess road schemes throughout the United Kingdom.

Overall Approcah to Project Comparison

-- Monetary cost-benefit analysis within a broader framework including traffic, environmental and other considerations.

Range of Criteria and Type of Indicator Used

Criteria:	Type of Indicator			
	Described	Measured Physically	Inputed Money Value	Money Changing Hands
1. Construction Costs				yes
2. Operation/Maintenance Costs				yes
3. Vehicle Operating Costs		yes		yes
4. Travel Time		yes	yes	
5. Accidents		yes	yes	
6. Environmental Criteria including:				
Noise	yes	yes		
Air Pollution	yes	yes		
Severance	yes			
Visual impact	yes			
Ecology	yes			

Method of comparison

-- Indicators 1 to 5 given either an inputed or an actual monetary value.

-- Other indicators included in an Environmental Impact Statement.

Value Indicators Used

-- Net Present Value (Analysis period: 30 years; Discount rate: 8 per cent).

Source: EURET, op. cit.

Annex 2

The Master Plan for Infrastructure in Spain

The Plan now in course of preparation marks a radical change in the transport planning methods and process in Spain and is the first attempt at intermodal planning in this country, a major endeavour to achieve strategic planning of the infrastructure as a whole. If it is to be carried out successfully, it will be necessary to maintain the high level of investment already achieved in Spain in recent years.

The PDI covers all basic infrastructure that comes within the competence of central government: transport infrastructure (roads, railways, ports, airports, and combined transport), and urban, hydraulic and coastal infrastructure.

The Plan gives priority to improving the territorial structure of the country and the connections with networks of other European countries.

Three major categories of criteria are adopted to determine the projects to be carried out in the case of high-capacity roads:

-- Major traffic routes

This type of investment has two objectives: i) to resolve the existing problems of congestion and take preventive measures with respect to difficulties foreseeable during the course of the Plan; ii) to ensure that these major routes have uniform characteristics from end to end and provide high standards of service and safety.

A large proportion of the investment projects are located on routes already targeted in the previous General Road Plan (1984-1991) and the following are in addition to this: Solares - Marcenado (193 km), which corresponds to the extension of the Cantabrian region motorway as far as central Asturias; Zaragoza-Huesca (70 km) and Sagunto-Teruel (120 km) which is on part of the Levant-Zaragoza-France route via Somport; Bailen-Granada-Motril (198 km), which provides large-capacity road access to Eastern Andalusia from the centre of the Peninsula.

It is also planned to construct new motorways or expressways on other routes which already have a large-capacity road, the Mediterranean corridor being one example.

-- Routes designed to structure the network

This type of investment has three objectives: i) to give the network a more closely-meshed and more balanced structure, a departure from the existing excessively radial structure; ii) to provide better access to the less-developed regions, which are located on the periphery of the temtory or are poorly served; iii) to promote the cohesion of the temtory by ensuring proper standards of accessibility.

The major PDI road investment projects are concentrated in this sphere, such as: services to Galicia, including Benavente-Vigo and Benavente-Coruna (670 km) so as to promote activity in the North-West of the Peninsula; Zaragoza-Teruel (180 km) as already mentioned; Leon-Benavente-Caceres-Merida-Seville (670 km), which is the backbone of the western regions

whereby activity can be promoted in the regions on the frontier with Portugal and it also provides an alternative to the route through **Burgos-Madrid-Extremadura** and Burgos-Madrid-Seville for services from France and the North of Spain towards Extremadura and Andalusia; Ciudad Real-Levant motorway (170 km), which is a transversal axis between the Levant and Catalonia and Castile-La Mancha and Western Andalusia, which it **is** planned to extend as **a** connecting link to Merida; Cadix-Algeciras (108 km), extending the Mediterranean axis to Cadix, thus giving it motorway or expressway characteristics from the French frontier; Cordoba-Antequera (110 km) which will provide access by large-capacity road all the way from the centre **of** the Peninsula to the Costa del Sol and be **a** large-capacity axis structuring the Andalusian territory; Palencia-Aguilar de Campoo-Torrelavega (173 km), which provides access to the Cantabrian region **from** the Castilian plateau and will be linked up by a connecting road with Burgos and Aguilar de Campoo through the Ubierna region.

-- Routes linking up with the European networks

There **are** four main routes linking up with France: those from Irun and La Junquera which already have motorway characteristics; that from Zaragoza-Somport-Pau and that from Barcelona-Toulouse via Puymorens, the latter having autonomous status.

On the Zaragoza-Somport route, the PDI includes a project to convert the Zaragoza-Huesca section into motorway, **a** project that will be supplemented by **making** the Pyrenean barrier more "permeable" by means of other secondary axes.

Under the General Road Plan (1984-1991) the links with Portugal on the Vigo-Tui-frontier and Madrid-Badajoz-frontier routes were given motorway characteristics. Under the PDI, the following new large-capacity links are to be constructed: Tordesillas-Salamanca-Fuentes de Onoro (202 **km),** which will complete the route **linking** the frontiers at Irun and Fuentes de Onoro and give it motorway characteristics throughout; Huelva-Ayamonte (65 km), which gives access to the south of Portugal; Verin-frontier, which provides a new means of access to Northern Portugal by way of the South Galician motorway (Benavente-Vigo).

These **three** criteria are obviously not mutually exclusive, since a project may be warranted for a number of reasons. The above classification **is** designed solely to illustrate the main criterion governing the selection **of** each road investment project.

Source: Annex to Report on Trends in International Transport and Infrastructural Needs in Europe, ECMT, 1993,

Annex 3

European Agreement on Main International Railway Lines (AGC) - UN/ECE Geneva 1985

INFRASTRUCTURE PARAMETERS FOR MAIN INTERNATIONAL RAILWAY LINES

		A Existing lines which meet the infrastructure requirements and lines to be improved or reconstructed	B New lines	
			B_1 For passenger traffic only	B_2 For passenger and goods traffic
1.	Number of tracks	--	2	2
2.	Vehicle loading gauge	UIC* B	UIC C1	UIC C1
3.	Minimum distance between track centres	4.0 m	4.2 m	4.2 m
4.	Nominal minimum speed	160 km/h	300 km/h	250 km/h
5.	Authorised mass per axle:			
	Locomotives (≤ 200 km/h)	22.5 t	--	22.5 t
	Railcars and rail motor sets (≤ 200 km/h)	17 t	17 t	17 t
	Carriages	16 t	--	16 t
	Wagons ≤ 100 km/h	20 t	--	22.5 t
	≤ 120 km/h	20 t	--	20 t
	≤ 140 km/h	18 t	--	18 t
6.	Authorised mass per linear metre	8 t	--	8 t
7.	Test train (bridge design)	UIC 71	--	UIC 71
8.	Maximum gradient	--	35 mm/m	12.5 mm/m
9.	Minimum platform length in principal stations	400 m	400 m	400 m
10.	Minimum useful siding length	750 m	--	750 m
11.	Level crossings	None	None	None

*UIC: International Union of Railways.

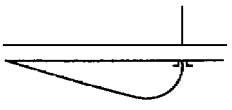
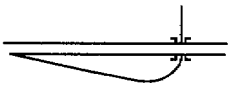
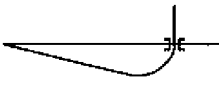
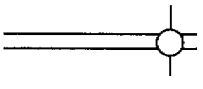
Annex **4**

Trans-European Networks
Towards a Master Plan for the Road Network and Road Traffic
Brussels/Luxembourg 1993

It appears to be desirable, therefore, to reinforce the typology of trunk roads with a view to increasing the continuity of layout characteristics of international routes, although some degree of flexibility may be needed to accommodate environmental constraints.

Such a reinforcement seems all the more useful for the trans-European network, since this will be quite substantially upgraded in the next decade: over 40 000 km of major routes will be upgraded to motorway or near motorway standards, as set out in the trans-European road network plan.

Moreover, defining Community standards would help promote the adoption of more uniform standards in a wider European context (one might even seek to reinforce the recommendations of the 1975 AGR Agreement in the long term). At a time when expanding links with the Community's partners, and developing modern transport networks in Central and Eastern Europe **in** particular, are on the agenda, this would obviously be advantageous.

	ROAD STANDARDS AND QUALITY OF SERVICE			
	Types **of** Roads	Range of Traffic Flow	Existing Standards	Possible improvements of inter-operability
	Motorway	10 000 to 100 000 Veh/Day	European Agreement of Geneva (AGR) for Geometrical Features	•Routes Signing *Service for Users
	Motorway with Reduced Features	10 000 to 100 000 Veh/Day	Not Completely in Accordance with AGR Agreement	•Fitted Routes Signing
	Highways with Limited Access, Single Carriageway, No at Grade Junction	5 000 to 10 000 Veh/Day	No International Agreement	If **this** type of road **is to be** applied in many areas: astandard is required
	Highways with Limited Access, Dual Carriageway, Roundabout	Limited **by** Junctions	No International Agreement	If this type of road is to be applied in many areas: astandard is required
	Ordinary Roads	Limited by Junctions	AGR Agreement	Should not concern Trans-European Network

European Agreement on Main International Traffic Arteries (AGR) - Geneva 1975

A. In accordance with the AGR Agreement, International Roads (E roads) are classified as follows:

1. Motorways

"Motorway" means a road specially designed and built for motor traffic, which does not serve properties bordering on it, and which:

i) is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic, separated from each other by a dividing strip not intended for traffic or, exceptionally, by other means;
ii) does not cross at level with any road, railway or tramway track, or footpath; and
iii) is specially sign-posted as a motorway.

2. Express roads

An express road is a road reserved for motor traffic accessible only from interchanges or controlled junctions and on which, in particular, stopping and parking are prohibited on the running carriageway(s).

3. Ordinary roads

An ordinary road is one open to all categories of users and vehicles, It may have a single carriageway or separate carriageways,

International roads should preferably be motorways or express roads.

B. The technical characteristics to be met by International Roads, laid down in the AGR Agreement :

1. The range of the recommended design speeds in km/h[1]

Motorways	x	80[2]	100	120	140
Express roads	60[2]	80	100	120[3]	x
Ordinary roads	60[2]	80	100	x	x

1. The design speed is that speed which in a scheme for the improvement or construction of road is chosen to determine geometric characteristics permitting isolated vehicles to travel at this speed in safety.

2. The lowest design speeds may be applied on highly restrictive sections,

3. Design speeds of over 100 km/h should not be selected unless the carriageways are separated and the layout of intersections so permits.

2. ***The recommended minimum values for the parameters of the horizontal and vertical alignment***

Design speed (in km/h)		60	80	100	120	140
Minimum radii in plane (corresponding to maximum superelevation 7 per cent (in m)		120	240	425	650	1000
Maximum gradient (percentage not to be exceeded)		8	7	6	5	4
Minimum radii at the highest point of the vertical alignment (in m)	One-way	1 500	3 000	6 000	10 000	18 000
	Two-way	1 600	4 500	10 000	-	-
Minimum radii at the lowest point of the vertical alignment (in m)		1 500	2 000	3 000	4 200	6 000

3. The recommended minimum values for the parameters of the cross sections

Minimum width of traffic lanes on a straight alignment (in m)		3.50[1]
Minimum width of supplementary lanes on gradients (in m)		3.00
Minimum width of shoulders (in m)	on ordinary roads	2.50
	motorways	3.75
Minimum width of emergency stopping strips on motorways (in m)		2.50[2]
Minimum width of the central reserve on motorway and roads with separate carriageway (in m)		3.00[3]

1. **Extra** width shall be provided in small radius curves *so* as to make room for the largest aut horised vehicles.

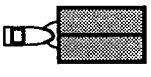
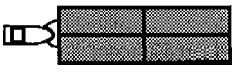
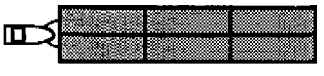
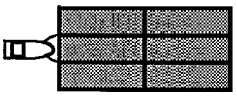
2. 3 metres if heavy vehicle traffic *so* justifies.

3. This minimum width may be reduced in highly restrictive areas, although an adequate widt h must be maintained **for** the installation of safety fences.

Annex 5

New Classification of European Inland Waterways
CEMT/CM(92)6/Final

Type des voies navigables Type of inland waterways	Classes de voies navigables Classes of navigable waterways	Automoteurs et chalands Motor vessels and barges				
		Type de bateaux : caractéristiques générales Type of vessel: general characteristics				
		Dénomination Designation	Longueur Length	Largeur Beam	Tirant d'eau Draught	Tonnage Tonnage
	(1)		m	m	m (2)	T (3)
D'INTÉRÊT RÉGIONAL OF REGIONAL IMPORTANCE	I	Péniche Barge	38.50	5.05	1.80-2.20	250-400
	II	Kast-Campinois Campine-Barge	50-55	6.60	2.50	400-650
	III	Gustav Koenigs	67-80	8.20	2.50	650-1000
	I	Grosse Finow	41	4.70	1.40	180
	II	Barka Motorowa 500	57	7.50-9.00	1.60	500- 630
	III	(5)	67-70	8.20-9.00	1.60-2.00	470- 700
D'INTÉRÊT INTERNATIONAL OF INTERNATIONAL IMPORTANCE	IV	Johann Welker	80-85	9.50	2.50	1000-1500
	V a	Grands Rhénans Large Rhine Vessels	95-110	11.40	2.50-2.80	1500-3000
	V b					
	VI a					
	VI b	(8)	140	15.00	3.90	
	VI c					
	VII (9)					

Convois poussts Pushed convoys					minimale sous les ponts Minimum height under bridges	graphiques sur les cartes Graphical symbols on maps
	Longueur Length	Largeur Beam	Tirant d'eau Draught	Tonnage Tonnage		
	m	m	m (2)	T (3)	m (4)	
					4.00-5.00	
					4.00-5.00 **4.00-5.00**	
					3.00	
					3.00	
	118-132	**8.20-9.00**	1.60-2.00	1 000- **1200**	4.00	
	85	9.50	2.50-2.80	1 250- 1 450	5.25 ou/or 7.00 (6)	
	95-110 *(7)*	**11.40**	2.50-4.50	**1** 600- 3 000	**5.25 odor** *7.00* ou/or **9.10 (6)**	
	**172-185** *(7)*	11.40	2.50-4.50	3 200- **6** 000		
	**95-110** *(7)*	**22.80**	**2.50-4.50**	3 200- 6 000	**7.00 odor** **9.10 (6)**	
	**185-195 (7)**	**122.80**	2.50-4.50	**6** 400- **12** 000	*7.00* odor **9.10** ***(6)***	
 	**270-280 (7)** **193-200** *(7)*	**22.80** **33.00-34.20** (7)	2.50-4.50 **2.50-4.50**	**9** 600- **18** 000 9 600- **18** 000	**9.10** (6)	
	**195-285** *(7)*	**33.00-34.20** (7)	2.50-4.50	**14** 500- **27** 000	**9.10**	

Notes

1. The class of **a** waterway is determined by the horizontal dimensions of the vessels or pushed units, especially by their width.

2. The draught of an inland waterway must be specified with reference to local conditions.

3. Characteristic tonnage for each class according to dimensions and draughts indicated.

4. Takes into account a security clearance of **30** cm between the highest point of the vessel or its load and the height under the bridge.

5. Vessels used in the Oder region and on waterways between the Oder and Elbe.

6. Adapted for container transport:

-- 5.25 metres for vessels carrying two layers of containers;
-- 7.00 metres for vessels carrying three layers of containers;
-- 9.10 metres for vessels carrying four layers of containers;

50 per cent of the containers may be empty, otherwise ballast must be used.

7. The first figure relates to existing situations and the second to future developments or, in some cases, also existing situations.

8. Takes account of the dimensions of motor vessels proposed for ro-ro transport and shipments of containers; the dimensions given are approximate.

9. Relates to pushed units on the Danube which often consist of more than nine barges.

Annex *6*

European Agreement on Important International Combined Transport Lines and Related Installations (AGTC) - UN/ECE Geneva 1991

Minimum Standards for Combined Transport Installations Terminals

Average train formation time

AGTC target value: maximum 60 minutes.

The AGTC maximum average time of 60 minutes is met by 11 countries: Austria, Belgium (between 30-90 minutes), Bulgaria, The Czech Republic (with the exception of one line), Denmark, Finland, Ireland, Luxembourg, the Netherlands, the Slovak Republic, Spain, Switzerland and Turkey.

Train formation times in Germany vary from **30** to 45 minutes in some terminals up to 1 to 3 hours in others. Romania's average is 90 minutes, Portugal's **2** hours and Poland has times ranging from 2 up to 8 hours **and,** in one case, up to 12 hours.

Average waiting time for lorries

AGTC target value: maximum 20 minutes.

The AGTC maximum average waiting time for lorries of **20** minutes is met by **12** countries: Austria, Belgium, Bulgaria, Denmark, Finland, Germany {except two terminals), Ireland, Italy, Luxembourg, the Netherlands, Spain and Switzerland. Three other countries, Portugal, Romania and Turkey are close to the standard with an average time of 30 minutes. Waiting times in the Czech Republic and in the Slovak Republic vary between 30 and 60 minutes.

Accessibility by road

AGTC target value: good accessibility.

Road access to terminals in Germany is generally good except for three terminals where it is unsatisfactory. Hungary and the Slovak Republic have good accessibility except for one terminal. In the Netherlands **good** access to two of its three terminals is available. In Austria four terminals have good accessibility by **road** and the other two are unsatisfactory. In the Czech Republic just seven of its 11 terminals have good access, for the other four accessibility is unsatisfactory.

All terminals in the other 12 countries have satisfactory or good access **by** road.

Accessibility by rail

AGTC target value: good accessibility.

Rail access to terminals is considered satisfactory or good in nearly all countries, Austria, the Czech Republic and Germany each having one terminal where access is difficult. All four terminals in Portugal are difficult to access by rail.

Capacity bottlenecks

AGTC target value: seldom.

There do not seem to be major problems with bottlenecks in terminals in Bulgaria, the Czech Republic, Denmark, Finland, Hungary, Italy, the Netherlands, Poland, the Slovak Republic, Switzerland and Turkey. The situation in Germany varies with just under half of the 38 terminals having bottlenecks, either sometimes or frequently. One of the eleven terminals in Belgium is facing frequent bottlenecks. The same holds true for four of the six terminals in Austria. All terminals in Luxembourg have occasional bottlenecks and all four terminals in Portugal encounter frequent bottlenecks.

Border Crossing Points

Average length of stop

AGTC target value: maximum 30 minutes.

The questionnaires show considerable differences in border crossing times in different parts of Europe.

Bulgaria, Luxembourg, Portugal, Spain, Switzerland and the United Kingdom report all times which meet the AGTC standard of 30 minutes.

Three of the four border crossing points in the Netherlands require times between 40 to 50 minutes, in spite of the fact that two of these are joint border stations. Belgium (no joint stations) records times of up to one hour or longer on some crossings. In Denmark, only Padborg requires stops of less than 30 minutes, whilst the other three crossing points have times which range from two to five hours. Italy has joint border stations, but only two crossings meet the AGTC standard and five have times ranging from 60 to 90 minutes. Austria has joint stations, but only four border crossings are in line with the AGTC standard, five have times between 1 and 3½ hours. Finland's border crossing points, take 4 hours. Poland has joint border stations and, although four of them meet the AGTC standard, four have times of 1 to 2 hours and one between 1 and 12 hours. Only three of the eleven border crossings in the Czech Republic are joint stations and the times for all of them range from 90 minutes up to 3 hours. The Slovak Republic reports times between 2 and 3½ hours. All crossings into Romania take 2 hours and into Turkey 90 minutes.

Axle Gauge Interchange Stations

Duration of interchange

AGTC target value: as short as possible. The AGTC Agreement does not specify a maximum requirement for the duration of interchange, but it notes that it should be as short as possible.

The times indicated by each country concerned are: Finland 5-8 hours, the Slovak Republic 5 hours, Romania 2 hours and Spain 1 hour,

Ferry Links/Ports

Average duration of ro-ro operation

AGTC target value: maximum 60 minutes.

The AGTC maximum average time of 60 minutes is met by Turkey, Italy (these two countries have no coordinated ferry/rail timetables), Bulgaria and Denmark (the latter having times that are better than the standard: 30 to 40 minutes).

In Germany the situation is mixed with three of its ferry/link ports below the standard and the other three above the standard (between 1½ and 4 hours). In the United Kingdom coordinated ferry/rail timetables exist and ro-ro operations take on average 2 hours and 20 minutes. Poland too seems to have problems in reaching the AGTC target, its operating times vary between 8 and 12 hours.

Source: AGTC, "Inventory of existing AGTC standards and parameters"

Annex 7

COUNCIL DIRECTIVE
of 27 June 1985
on the assessment of the effects of certain public and private projects on the environment

(85/337/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, **and** in particular Articles 100 **and** 235 thereof,

Having regard to the proposal from the Commission ([1]),

Having regard to the opinion of the European Parliament ([2]),

Having regard to the opinion of the Economic and social Committee ([3]),

Whereas the 1973 ([4]) and 1977 ([5]) action programmes of the European Communities on the environment, as well **as** the 1983 ([6]) action programme, the main outlines of the European Communities and the representatives of the Governments of the Member States, stress that the best environmental policy consists in preventing the creation of pollution or nuisances at source, rather than subsequently trying to counteract their effects ; whereas they affirm the need to take effects on the environment into account at the earliest possible stage in all the technical planning and decision-making processes ; whereas to that end, they provide for the implementation of procedures to evaluate such effects ;

Whereas the disparities between the laws in force in the various Member States with regard to the assessment of the environmental effects **of** public and private projects may create unfavourable competitive conditions and thereby directly affect the functioning of the common market ; whereas, therefore, it is necessary to approximate national laws in this field pursuant to Article 100 of the Treaty ;

Whereas, in addition, it is necessary to achieve one of the Community's objectives in the sphere of the protection of the environment **and** the quality of life ;

whereas, since the Treaty **has** not provided the powers required for this end, recourse should be had to Article 235 of the Treaty ;

Whereas general principles for the assessment of environmental effects should be introduced with a view to supplementing and coordinating development consent procedures governing public and private projects likely to have a major effect on the environment ;

Whereas development consent for public **and** private projects which are likely to have significant effects on the environment should be granted only after prior assessment of the likely significant environmental effects of these projects has been carried out ; whereas this assessment must be conducted on the basis of the appropriate information supplied **by** the developer, which may be supplemented by the project in question ;

Whereas **the** principles of the assessment of environmental effects should be harmonized, in particular with reference to the projects which should be subject to assessment, the main obligations of the developers **and** the content of the assessment ;

Whereas projects belonging to certain types have significant effects on the environment and these projects must be subject to systematic assessment ;

Whereas projects of other types may not have significant effects on the environment in every case **and** whereas these projects should be assessed where the Member States consider that their characteristics so require ;

Whereas, for projects which are subject to assessment, a certain minimal amount of information must be supplied, concerning the project and its effects ;

Whereas the effects of a project on the environment must be assessed in order to take account of concerns to protect human health, to contribute by means of **a** better environment to the quality of life, to ensure maintenance of the diversity **of** species **and** to maintain the reproductive capacity of the ecosystem as a basic resource for life ;

---

(1) JO n° *C* 169, 9.7.1980, **p.** 14.
(2) JO n° C 66, 15.3.1982, p. 89.
(3) JO n° C 185, 27.7.1981, p. 8.
(4) JO n° C 112, 20.12.1973, p. 1.
(5) **JO** n° C 139, 13.6.1977, p.1.
(6) JO n° C 46, 17.2.1983, p. 1.

Whereas, however, this Directive should not be applied to projects the details of which are adopted by a specific acto of national legislation, since the objectives of this Directive, including that of supplying information, are achieved through the legislative process ;

Whereas, furthermore, it may be appropriate in exceptional cases to exempt a specific project from the assessment procedures laid down by this Directive, subject to appropriate informatian being supplied to the Commission,

HAS ADOPTED **THIS** DIRECTIVE :

Article 1

1. This Directive shall apply to the assessment of the environmental effects of those public and private projects which are likely to have significant effects on the environment.

2, **For** the purposes of this Directive :

'project' means :

-- the execution **of** construction works or of other installations or schemes,
-- other interventions in the natural surroundings and landscape including those involving the extraction **of** mineral sources ;

'developer' means :

the applicant for authorization for a private project or the public authority which initiates a project ;

'development consent' means :

the decision of the competent authority or authorities which entitles the developer to proceed with the project.

3. The competent authority or authorities shall be that or those which the Member States designate **as** responsible for performing the duties arising from this Directive.

4. Projects serving national defence purposes are not covered by this Directive.

5. This Directive shall not apply to projects the details of which are adopted by a specific act of national legislation, since the objectives of this Directive, including that of supplying information, *are* achieved through the legislative process.

***Article* 2**

1. Member States shall adopt all measures necessary to ensure that, before consent is **given,** projects likely to have significant effects on the environment by virtue ***inter alia***, of their nature, size or location are made subject to an assessment with regard to their effects.

These projects are defined in Article 4.

2. The environmental impact assessment may be integrated into the existing procedures for consent to projects in the Member States, or, failing this, into other procedures or into procedures to be established to comply with the aims of this Directive.

3. Member States may, in exceptional cases, exempt **a** specific project in whole or in part from the provisions laid down in this Directive.

In **this event,** the Member States shall :

(a) consider whether another form of assessment would be appropriate and whether the information thus collected should be made available to the public ;
(b) make available to **the** public concerned the information relating to the exemption **and** the reasons for granting this ;
(c) inform the Commission, prior to granting consent, of the reasons justifying the exemption granted, **and** provide it with the information made available, where appropriate, to their own nationals.

The Commission shall immediately forward the documents received to the other Member States.

The Commission shall report annually to the Council on the application of this paragraph.

***Article* 3**

The environmental impact assessment will identify, describe and assess in an appropriate manner, in **the** light of each individual case and in accordance with the Articles **4** to 11, the indirect **and** indirect effects of a project on the following factors :

-- human beings, fauna **and** flora,
-- soil, water, air, climate **and** landscape,
-- the interaction between the factors mentioned in the first and second indents,
-- material assets **and** the cultural heritage.

Article 4

1. Subject to Article **2** (3), projects **of** the classes listed in Annex 1 shall be made subject to **an** assessment in accordance with **Articles** *5 to* 10.

2. Projects **of** the **classes** listed in Annex II shall **be** made subject to **an** assessment, in accordance with Articles 5 to 10, where Member States consider that their characteristics so require.

To **this** end Member States may ***inter alia*** specify certain types of projects as being subject to **an** assessment or may establish the criteria and/or thresholds necessary to

determine which of the projects of the classes listed in Annex II are subject to an assessment in accordance with Articles **5** to 10.

Article 5

1. In the case of projects which, pursuant to Article **4,** must be subjected to an environmental impact assessment in accordance with Articles 5 to 10, ensure that the developer supplies in an appropriate form the information specified in Annex III inasmuch as :

(a) the Member States consider that the information is relevant to **a** given stage of the consent procedure and to the specific characteristics of a particular project or type of project and of the environmental features likely to be affected ;

(b) the Member States consider that a developer may reasonably be required to compile this information having regard *inter alia* to current knowledge **and** methods of assessment.

2. The information to be provided by the developer in accordance with paragraph 1 shall include at least :

- a description **of** the project comprising information on the site, design and size of the project,
- a description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects,
- the data required to identify and assess the main effects which the project is likely to have on the environment,
- a non-technical summary of the information mentioned in indents 1 to **3.**

3. Where they consider it necessary, Member States shall ensure that **any** authorities with relevant information in their possession make this information available to the developer.

Article 6

1. Member States shall take the measures necessary to ensure that the authorities likely to be concerned by the project by reason of their specific environmental responsibilities are given an opportunity to express their opinion on the request for development consent. Member States shall designate the authorities to be consulted for this purpose in general terms or in each case when the request for consent is made. The information gathered pursuant to Article 5 shall be forwarded to these authorities. Detailed arrangements for consultation shall be laid down by the Member States.

2. Member States shall ensure that :

- any requests for development consent and any information gathered pursuant to Article **5** are made available to the public,
- the public concerned is given the opportunity to express **an** opinion before the project is initiated.

3. The detailed arrangements for such information **and** consultation shall be determined by the Member States, which may in particular, depending on the particular characteristics of the projects or sites concerned :

- determine the public concerned,
- specify the places where the information can be consulted,
- specify the way in which the public may be informed, for example by bill-posting within a certain radius, publication in local newspapers, organization of exhibitions with plans, drawings, tables, graphs, models,
- determine the manner in which the **public is** to be consulted, for example, by written submissions, by public enquiry,
- fix appropriate time for the various stages of the procedures in order to ensure that a decision is taken within a reasonable period.

Article 7

Where a Member State is aware that **a** project is likely to have significant effects on the environment in another Member State or where a Member State likely to be significantly affected so requests, the Member State is whose territory the project is intended to be carried out shall forward the information gathered pursuant to Article **5** to the other Member State at the same time as it makes it available to its own nationals. Such information shall serve as a basis for any consultations necessary in the framework of the bilateral relations between two Member States on a reciprocal and equivalent basis.

Article 8

Information gathered pursuant to Articles 5, 6 and **7** must be taken into consideration in the development consent procedure.

Article 9

When a decision has been taken, the competent authority or authorities shall inform the public concerned of :

- the content of the decision and any conditions attached thereto,
- the reasons and considerations on which the decision is based where the Member States' legislation so provided.

The arrangements of this information shall **be** determined by the Member States.

If another Member State has been informed pursuant to Article **7,** it will also be informed of the decision in question.

Article 10

The provisions of this Directive shall not affect the obligation of the competent authorities to respect the limitations imposed by national regulations and administrative provisions and accepted legal practices with regard to industrial and commercial secrecy and the safeguarding of public interest.

Where Article 7 applies, the transmission of information to another Member State and the reception of information by another Member State shall be subject to the limitations in force in the Member State in which the project is proposed.

Article 11

1. The Member States and the Commission shall exchange information on the experience gained in applying this Directive.

2. In particular, Member States shall inform the Commission of any criteria and/or thresholds adopted for the selection of the projects in question, in accordance with Article 4 (2), or of the types of projects concerned which, pursuant to Article 4 (2), are subject to assessment in accordance with Articles 5 to 10.

3. Five years after notification of this Directive, the Commission shall send the European Parliament and the Council a report on its application and effectiveness. The report shall be based *on* the aforementioned exchange of information.

4. On the basis of this exchange of information, the Commission shall submit to the Council additional proposals, should it be necessary, the Directive being applied in a sufficiently coordinated manner.

Article 12

1. Member States shall take the measures necessary to comply with this Directive within three years of its notification (1).

2. Member States shall communicate to the Commission the texts of the provisions of national law which they adopt in the field covered by this Directive.

Article 13

The provisions of this Directive shall not affect the right of Member States to lay down stricter rules regarding scope and procedures when assessing environmental effects,

Article 14

This Directive is addressed to the Member States.

Done at Luxembourg, 27 June 1985.

For the Council

The President

A. BIONDI

(1) This Directive was notified to the Member States on 3 July 1985.

Evaluation of Environmental Impacts

Table of Indicators
(by way of illustration -- to be tested in actual situations)

Definition	Unit	Possibility of monetary valuation
I_1 -- CO2 and the greenhouse effect	C tonnes/year	Yes
I_1bis -- Oil consumption	C t/year	Yes
I_2 -- NOx	NOx t/year	**Yes**
I_3 -- **Primary** energy consumption	kW/year	Yes
I_4 -- Surface **area** covered	km^2	NO
I_5 -- Total linear distance	**km**	No
I_6 -- Samples from specific **areas**	km^2	Sometimes
I_7 -- **Specific** linear **distances**	**km**	??
I^* -- Sound print (urban area, etc.)	km^2	Yes
I_8 -- Local duration **of** work site **(day,** night)	**Months**	??
I_9 -- Volume of earth moved	m^3	??
I_{10} -- Exposure to CO	m^2	??

SELECTIVE EFFECTS OF THE MAIN MODES OF TRANSPORT ON THE ENVLRONMENT

EFFECTS / *MODES OF TRANSPORT*	*Air pollution*	*Water resources*	*Land resources*	*Noise*	*Severance effects and effects on the natural environment*	*Solid waste*	*Accidents, risks*
RAIL			Use of land for tracks and stations Abandonment of installations	Noise and vibration around stations and along railway lines	Severance effects and degradation of inhabited areas, agricultural land, etc.	Abandoned railway tracks, equipment and rolling stock	The derailment or collision of trains carrying dangerous goods
ROAD	Local pollution (CO, HC, NOx, particles, etc.) Regional pollution NOx, ozone Global pollution (CO2, CFC)	Pollution of surface and groundwater by runoff Modification of hydraulic systems during road construction	Use of land for infrastructure Quarrying of construction materials for roadbuilding	Noise and vibration produced by cars, motorcycles and lorries in towns and along roads	Severance effects and damage to plant and wildlife Destruction of natural habitats	Abandoned depots and demolition materials from roadworks Road vehicles withdrawn from service Waste oil	Fatalities and bodily injuries or material damage caused by road accidents Carriage of dangerous goods
INLAND WATERWAYS		Modification of hydraulic systems during canal cutting and dredging	Land acquired for ports and canals Abandonment of port installations and canals			Vessels and buildings withdrawn from service	Carriage of fuel and dangerous goods

Source: "Infrastructure de transport et environnement", Rapport final, Conseil Général des Ponts et Chaussées, December 1991.

METHODS OF ASSESSING THE ENVIRONMENTAL EFFECTS OF ROAD PROJECTS AND OF PLACING **A** MONEY VALUE ON **THESE** EFFECTS

Effects on the environment	**Techniques of monetary valuation**					
	Existing analysis	*Indirect valuation*	*Contingent valuation*	*Hedonistic price*	*Cost of journey*	*Outlook for future application*
***Use of** land*	Quantified money value	Cost of substitution	For **leisure areas**		For leisure areas	No change
Noise	Quantified	Cost of screen and soundproofing of facades	Problems of perception of noise **impact**	Sensitive to **use** in practice		Contingent valuation to be developed
Air ***pollution***	Quantified	**Degree** of exposure/response relationship: effects on health, materials and buildings	Problems of perception of pollution impact	Problems of perception of pollution impact		Indirect method to be developed
Visual obstruction ***Visual intrusion***	Quantified Descriptive					Contingent valuation to be developed
Severance effects	Qualitative/descriptive					Willingness to pay
Effects on agriculture	Money value Market price Compensation	Degree of exposure/response (impact of air pollution of crops)				
Built-up environment	Descriptive	Costs of bypass	For well-defined high-value sites		For well-defined high-value sites	
Ecological sites	**Descriptive**	Expenditure on protection, relocation, bypass	For important sites		For natural reserves	
Impacts on ***pedestrians*** *and cyclists*	Descriptive		For the value of time **and** disamenities			Contingent valuation to be developed

Source : "Transport and Environment, **Economics** Aspects", J. Lambert, ENPC, **1993.**

Annex 9

Criteria to Assess Improvements in Road Safety as a Result of Infrastructural Work

Planned investment measures for **the** transport infrastructure may lead to a reduction of macro-economic accident costs **by** improving the degree of safety of traffic routes, diverting traffic to safer routes of the same mode and shifting traffic to safer modes.

The evaluation of such contributions to traffic **safety** is carried out based on a forecast of changes of the number and the severeness of accidents as a consequence of the project implementation and their multiplication **with** average accident cost rates. Accident cost rates (costs in DM per accident type) depend on the **kind** and the severeness of accidents. They include the macro-economic value of production losses, welfare costs because of disability, losses of recreation time, costs for stationary and ambulant treatment, material costs, lawyer costs and police costs.

Source: "Macro-Economic Evaluation of Transport Infrastructure Investment", Bonn, op.cit.

Accident Costs

The Table below compares the per person accident values used in various European frameworks. Columns one, two and three show respectively the country values for a fatality, **a serious** and a slight injury, expressed in 1990 Ecu. The data in the following columns were obtained by inflating the **original** country values to 1990 values (using national currency consumer price indices) and then converted to Ecu at the 1990 exchange rate. In this respect they cannot be regarded as true 1990 values. Column four of the table gives the year in which the country values were most recently revised,

Accident Costs per Person Expressed in 1990 Ecu

Country	Value **per** Fatality	Value per **Serious** Injury	Value **per Slight** Injury	Original Value Year[a]
Denmark	628 147	--	--	1990
France	269 129	**24** 390	1 598	1985
Germany	406 **672**	43 611	4 089	1985
Greece[b]	48 879	6 429	656	1987
Netherlands[c]	79 310	15 948	--	1992
Portugal[b]	78 230	***6*** 543	475	1990
Spain[d]	100 529	*25* 519	--	1990
United Kingdom	935 149	26 **357**	529	1988
Finland[e]	1 414 200	897 081	9 473	1990
Sweden	984 940	139 755	*9 370*	1990

Notes: **a)** Original Value Year refers to the date that the country value in question **was** most recently revised.

b) The Greek and the Portuguese values represent study findings and cannot be regarded as "official values".

c) The Dutch figures are used in the "Road Priority Determination System". They cover loss of production and identified costs only. Suffering and distress are not included.

d) The Spanish value quoted for **a** serious injury is actually used for **a** "casualty" in the Spanish framework.

e) The Finnish values quoted for serious and slight injuries are actually used for permanent and temporary disabilities in the Finnish framework.

It should be noted that the precise definition of what constitutes a fatality, a serious or **a** slight injury most probably differs between the framework studied. Where possible, such differences have been noted but in general it has not proved feasible to obtain the precise definitions of the terms used in each framework, The differences between frameworks are probably more significant in the case of injury accidents than in the case of fatalities.

In a number of the frameworks studied, accident values are derived on the basis of three types of cost:

- direct financial costs to those concerned;
- loss of output to those killed or injured and
- costs associated with the "pain, grief and suffering" resulting from death or injury.

The latter type of cost is most often valued on the basis of people's willingness-to-gay to avoid (the probability of) an accident. This general approach to accident valuation is used to a greater or lesser extent in some of the countries listed in the table presented above: Denmark, Finland, Sweden and the United Kingdom. It may readily be seen that the figures for a fatality for the United Kingdom, Finland, Sweden and to a lesser extent Denmark are of roughly the same order of magnitude. The French values are based on the "pretium vivendi"' (price for life) approach and are derived from implied values of time in accordance with their socio-economic groupings. Expressed in 1990 Ecu they appear much lower than the others. One possible explanation for this lies in the fact that the original French values date back to 1985. A more plausible explanation could stem from the fact that road safety also appears as a separate criterion in its own right within the French multi-criteria approach.

Up until 1987 the UK Department of Transport used an approach to the valuation of accidents based upon the costs of foregone production (human capital). Recently a new value for fatalities has been derived based partly upon a willingness-to-pay approach. The new value is shown in the table above along with the old values for serious and slight injuries. The latter are still based on the losses of human capital approach. The accident values used in Finland are solely based on public willingness-to-pay to avoid accidents.

The accident values used in the German, Greek, Portuguese and Spanish frameworks do not include any willingness-to-pay element to avoid the mental and physical suffering associated with a death or serious injury. The Greek values represent study findings and cannot be regarded as official values. They are based solely on an estimate of the costs of foregone future production and also include no element for direct financial costs. The Portuguese values do include both direct financial costs and the costs of lost future output. The Spanish values, on the other hand, do not include any element for the loss of future production and are presumably therefore based solely on the direct financial costs of an accident in terms of legal, medical and repair costs.

It is worth making a final remark in this section relating to the accident values used in the Dutch "Road Priority Determination System". This multi-criteria framework includes a limited cost-benefit analysis as one of the criteria to be considered and, as with the French and Belgian multi-criteria approaches, road safety is also included as a separate criterion in its own right. The following per person values, expressed in rough 1990 terms (1992 prices converted at a rate of 1 Ecu = 2.32 Guilders), are used for accidents within the cost-benefit calculations:

Damage claim (damage only)	1 681 Ecu
Slight injury	20 259 Ecu
Extra damage claim, serious injury	15 948 Ecu
Extra damage claim, fatality	79 310 Ecu

These values are based on the direct financial costs and the loss of future production associated with an accident but no element is included for the costs of pain, grief and suffering,

Source: EURET, op. cit.

Annex 10

Example of Networks Maps Superimposition

Source: Maps distributed by the German Delegation to the TTI Group.

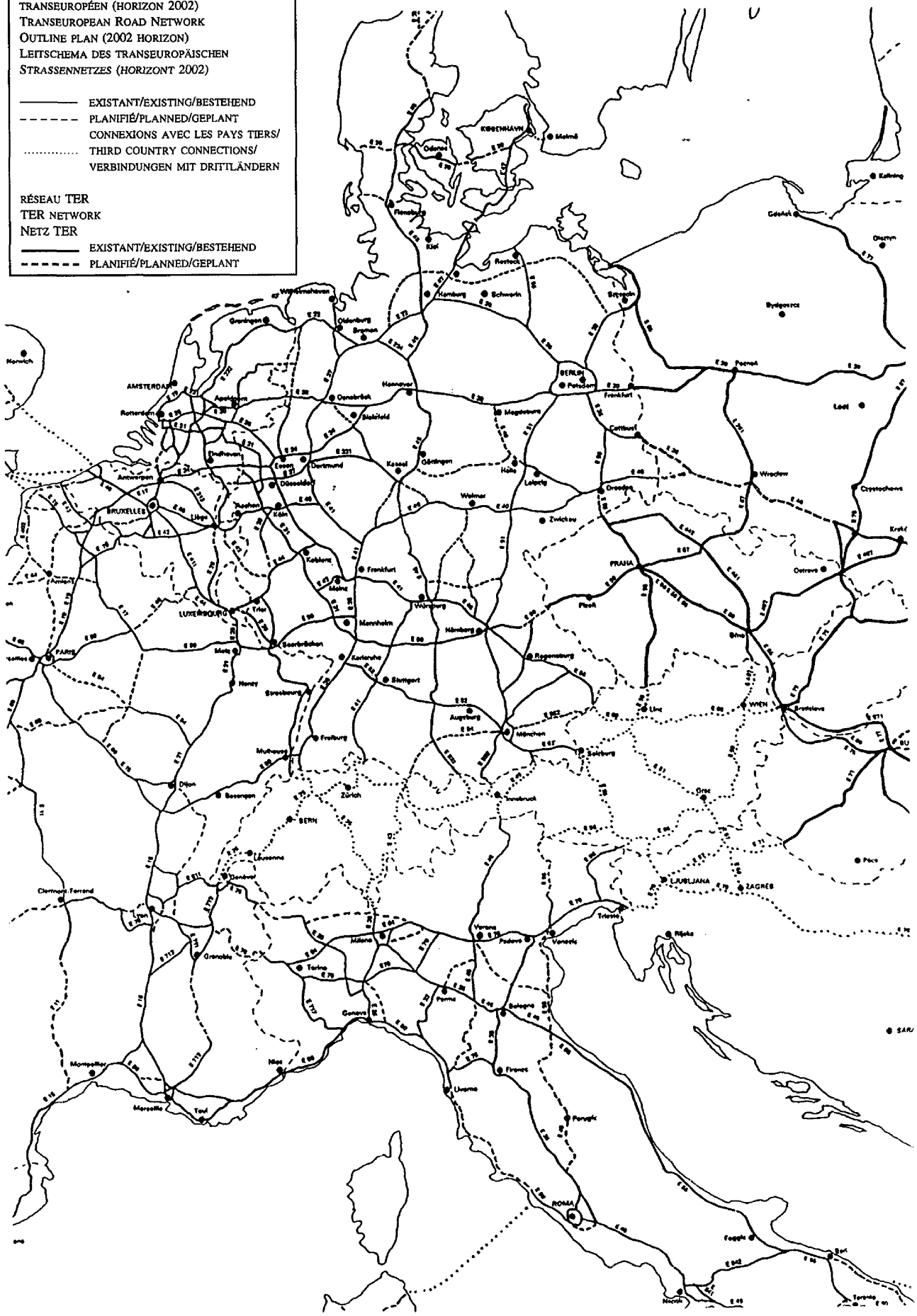
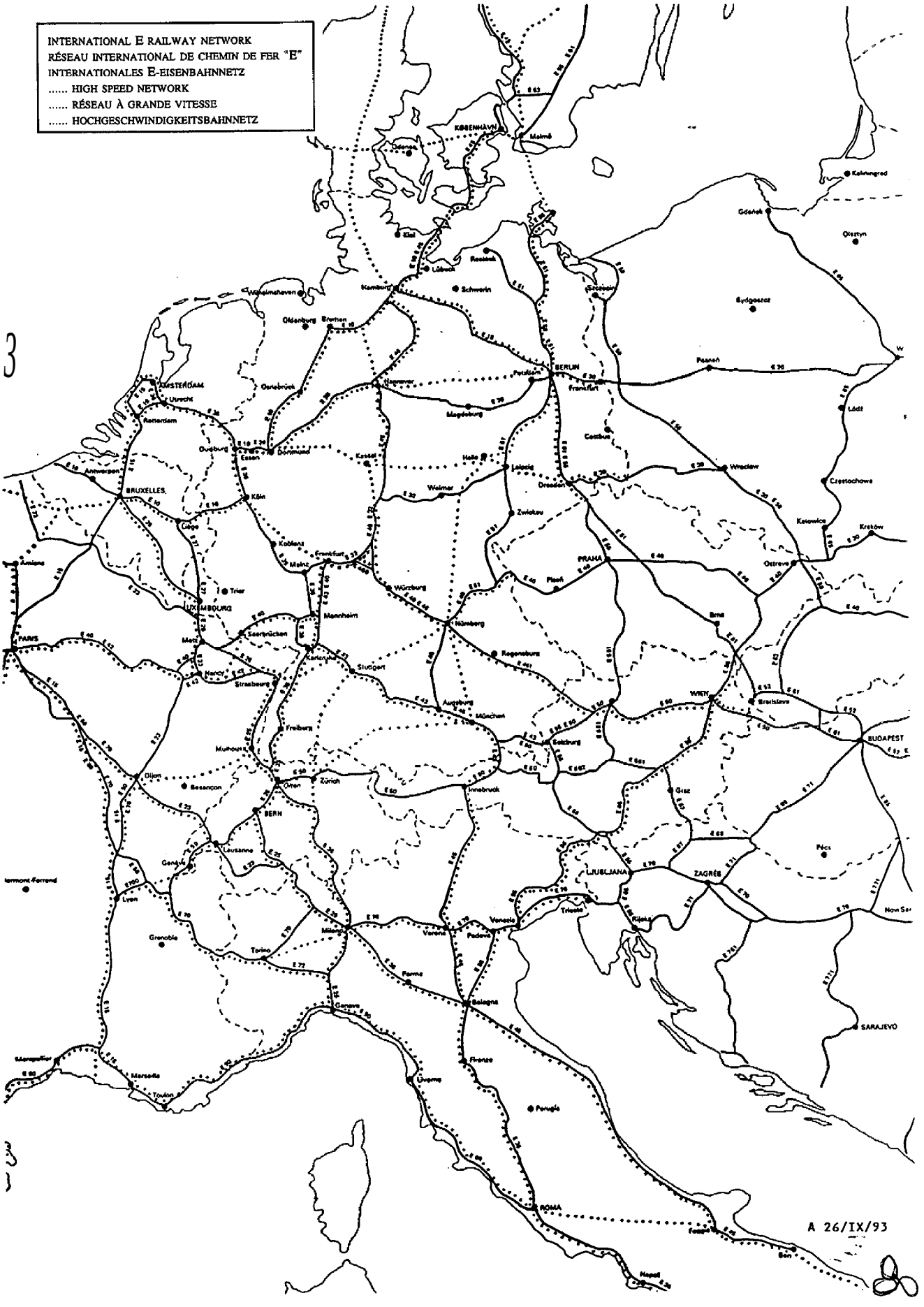


SCHÉMA DIRECTEUR DU RÉSEAU ROUTIER TRANSEUROPÉEN (HORIZON 2002)
TRANSEUROPEAN ROAD NETWORK OUTLINE PLAN (2002 HORIZON)
LEITSCHEMA DES TRANSEUROPÄISCHEN STRASSENNETZES (HORIZONT 2002)
EXISTANT/EXISTING/BESTEHEND
PLANIFIÉ/PLANNED/GEPLANT
CONNEXIONS AVEC LES PAYS TIERS/ THIRD COUNTRY CONNECTIONS/ VERBINDUNGEN MIT DRITTLÄNDERN
RÉSEAU TER
TER NETWORK
NETZ TER
EXISTANT/EXISTING/BESTEHEND
PLANIFIÉ/PLANNED/GEPLANT
AMSTERDAM
BRUXELLES
LUXEMBOURG
PARIS
BERLIN
PRAHA
WIEN
BERN
LJUBLJANA
ZAGREB
ROMA


INTERNATIONAL E RAILWAY NETWORK
RÉSEAU INTERNATIONAL DE CHEMIN DE FER "E"
INTERNATIONALES E-EISENBAHNNETZ
..... HIGH SPEED NETWORK
..... RÉSEAU À GRANDE VITESSE
..... HOCHGESCHWINDIGKEITSBAHNNETZ
KØBENHAVN
BERLIN
PRAHA
WIEN
BUDAPEST
BRUXELLES
PARIS
LUXEMBOURG
ZAGREB
LJUBLJANA
SARAJEVO
ROMA
A 26/IX/93

Annex 11

Evaluation of the International Importance of a Project

Promotion of International Relationships (NR4)

The improvement of transport infrastructure crossing national borders can contribute to promote international division of work. **As** the development since 1945 has shown, such integration effects and the improvement of factor allocation on an international level can contribute significantly to macro-economic development of an economy which relies heavily on international trade. For this reason, the extension **of** international transport connections has been preferenciated by the benefit component NR4. Preferenciation has been given correspondingly to:

-- investment measures forming part of existing or of planned international connections, and

-- connections improving the hinterland transportation of German sea ports.

The importance of measures to improve international transport can be measured depending on the improvement of circulation conditions on such routes. Measures to be preferenciated receive a bonus which has been quantified as **up** to 10 per cent of the benefits from NB,, NB,, NB,, NE. The specific value within this margin depends on the proportion of international traffic in the total traffic load or such routes.

Source: "Macro-Economic Evaluation of Transport Infrastructure Investment", op.cit.

Annex 12

Definition of Accessibility Indicators

A, PASSENGER TRANSPORT IN EUROPE

1. Definitions of Accessibility

1.1 Location, accessibility, transport and land use

From the standpoint of economic and human geography, any given place is defined with reference to other places and to the activities in those places. For example, the location of a French town is described with reference to the sea coast, frontiers and Paris, or even the main regional centres of activity.

The aim of regional development is to try to develop harmonious relations between places. For example, by selecting a given location for a particular activity or adapting a transport system which can satisfactorily handle movements from one place to the other.

The concept of accessibility refers: first, to a given place and, secondly, to other places and their potential activities. **A** yardstick of accessibility indicates the quality of the relationship between these two complexes. While a French town on the Belgian border has only an average position in terms of access to the major centres of activity in France, it enjoys very considerable access to the major centres of activity in the European Community.

An accessibility indicator can be used to evaluate scenarios for land use, as in the case of scenarios for the development of a transport network, for instance.

1.2 Access to what, for whom? A relative definition

a) To what? An object to be qualified:

Access to a place is sought with a view to finding there:

- human or social relations (a number of potential contacts);
- services: university facilities, businesses, etc.
- economic opportunities: production units and consumer markets.

It is necessary to fiid **a** value which reflects the potential of the corresponding activities:

-- population, if there is nothing else;
-- economic potential: preferably the GDPs?

b) **A** *geographical reference*

A geographical framework should be established: access to activities located where? In each study it is necessary to select relevant areas so **as** to avoid any ambiguity.

Accordingly, where passenger transport in Europe is concerned, *25* reference areas are selected.

c) What subject requires access?

If one takes an individual request for access, i.e. for a "statistical person" located in **a** primary area, the question arises as to "subject" aggregation. The indicator is local in such a case.

In order to establish **an** overall indicator, more particularly to take note of the comprehensive value offered by a transport infrastructure project, the local indices have **to** be aggregated, weighting them by means of the "local demand potentialities" which are to be seen in terms of "origin potentialities" whereas the potential activity corresponds to a "destination potentiality".

Populations, if there is nothing else.

d) Yardsticks of accessibility are relative in most cases

Given **the** different **factors** of relativity: selection of weightings for **the** object **and** subject, choice of areas for spatial aggregation, etc., the absolute level of the indices does not necessarily provide much information.

It is useful to determine the relations between local indices and a mean.

1.3 Quantifying accessibility: requirements

a) Measuring an impedance

The impedance broadens the concept of distance with a view to also taking account of other expenditure incurred during a journey: time, costs, etc. **It** represents the obstacle erected by space to contact between persons and activities. **If** the impedance is to be measured, it must be defined precisely. For the *sake* of simplicity the generalised cost or generalised time can be adopted.

b) The natural bias of the geographical layout and the need for an indicator of speed

Irrespective of its characteristics, a transport network will never entirely eliminate the obstacle of distance, nor the spatial diversity (inequality?) which results from the geographical layout of places.

An impedance indicator reflects both the performance of the transport network and this layout in space. If accessibility is measured in relation to **a** group of places, the central areas will be seen to be more accessible than the peripheral areas.

A clearer picture can be obtained of the specific quality of the transport network by determining a yardstick for speed in the form of the ratio of the "acquired" impedance (generalised time) to the "innate" impedance (the distance on the network or as the crow flies). The accessibility calculated for central or peripheral areas will thus be comparable.

c) Aggregation and weighting

While aggregation and weighting are relatively simple matters for a local impedance indicator for a single mode once the aspects (social, economic, touristic, etc.) of the indicator have been made clear, they become more difficult for a local speed indicator or for an overall or multimodal indicator,

In the case of a speed indicator, the ratio between the overall impedance and overall distance would seem to be more significant than an aggregation of the ratios between local impedance and local distance.

d) Accessibility and social equity

What categories of population are directly concerned by the development of a transport network, due consideration being given to the real position of this network in terms of the practice of mobility?

An initial means of assessing the social character of an infrastructure is to measure two impedances in generalised time for the same single-mode network, the first for a high value of time and the second for a low value. A comparison of these two impedances will show any inequalities of access.

2. Accessibility Indicators

2.1 It is essential to have databases

In order to calculate accessibility indicators it is necessary to have: on the one hand, data on populations and on activities (for weightings) and, on the other, data on the transport services offered (times, distances and travel costs between origin/destination pairs for the different modal networks).

The precision of the data depends on how fine the analysis is to be: for small areas, a detailed network is required.

The point-to-point impedances can be summarised by means of an allocative model which reconstructs the paths followed in the network.

Where passenger transport in Europe is concerned, the impedances are calculated by means of the MATISSE model.

2.2 A simple single-mode indicator

The term "abstract mode" is to be taken to mean "a specific way of using the network of a particular mode". For example, "fast road mode" refers to the use of the road network with a high time value, thus implying a preference for rapidity and motorways, even when tolled.

The definition of abstract mode calls for a definition of the paths followed in the modal network. Once this path is known, account can be taken of the monetary and temporal expenditure incurred in order to calculate the point-to-point impedance.

In order to express the proposed indicator, let:

r = a point of "origin" index (subject reference)
s = a point of "destination" index (object reference)
S = a sub-set of destinations (spatial reference for the object)
m = an abstract mode index
h = a time horizon or, more generally, a supply scenario
$X^m_{rs}(h)$ = point-to-point impedance between r and s for the h scenario by m mode. Let X be time T, or generalised time, or cost C, or even the distance on the D network
$P_r(h)$ = the weight of area r at horizon h, the population for example.

The local indicator at point r in relation to the "complex S activities" will be:

$$I^m_r(h) = \frac{\sum_{s \in S} P_s(h) X^m_{rs}(h)}{\sum_{s \in S} P_s(h)}$$

An absolute value for this can be shown on the map, but it is more significant to express it as a ratio of the mean value of distribution.

The corresponding overall indicator will be:

$$I^m_G(h) = \frac{\sum_r P_r(h) I^m_r(h)}{\sum_r P_r(h)}$$

and can be used to assess a scenario.

3. The Case of Passenger Transport in Europe

3.1 Context for application

The INRETS tested the proposed indicators in the case of European passenger transport by road and rail, using the area-to-area impedances calculated by means of the MATISSE model (developed by O. MORELLET at the INRETS).

3.2 Some results

Consideration is given to the access of each European area coded in the MATISSE (i.e. 197 areas to be referred to in terms of the origin of travel) to 25 major areas in the European Community which are selected for the 12 countries (to be referred to in terms of destinations). The weighting is by population at the destination.

Map 1 shows 25 destination areas (in red) and the boundaries of the 197 areas of origin.

Two types of indicator -- for the road and rail networks in 1988 -- were calculated.

1. The journey time indicator, the modal impedance being the best journey time for a high time value (in other words, the traveller takes motorways even when tolled in the case of road, or uses the TGV in the case of rail). Map 2 covers the road mode and map 3 the rail mode'. The value of having a central geographical location in relation to the 25 areas can be seen. The rail map shows that France's South-East TGV puts Lyon among the most accessible areas.

2. The kilometres/time indicator (map 4 for the road mode and map 5 for the rail mode) reduces the role played by centrality and lays particular stress on the quality of the modal network available in order to ensure accessibility. In the case of the road sector, the best equipped areas are located around a Lille/Berlin axis, while the results for the rail sector are much less consistent and tend to show advantageous locations more within the national networks (Paris, Rome, Hamburg) and spread effects for Lyon and Marseille.

The five maps mentioned in this section can be obtained from:

INRETS, 2 Avenue du Général Malleret-Joinville, 94114 Arcueil cedex (France)

---

1. The scale indices are calculated from the ratio between the area of origin impedance and the mean impedance for the areas of origin as a whole.

B. TRANSPORT IN CENTRAL EUROPE

Extracts are as follows:

Transport supply

The Central European networks are not geared to the requirements **of** current demand in terms of speed and quality of service, **as** evidenced by the speeds that can be reached on the main transport axes and **at** frontier crossings:

- International road network **map** of the Central European countries (Poland, **Hungary, the** Czech Republic, the Slovak Republic);
- International rail network map of the Central European countries (Poland, Hungary, the Czech Republic, the Slovak Republic);
- Map showing mean waiting times at frontiers (estimates for lorries).

Demand **for** *international transport*

Demand for transport between the EEC countries and the countries of Central and Eastern Europe expanded **sharply** from 1989 to 1991 and subsequently levelled off. In 1991 the main countries involved were Germany to the West and **CIS** to the East, **as** established **by** the COMEXT base which compiles data on the EEC's external trade with each country in the world. The illustrations show the main CEEC/EEC traffic in value **and** in tonnage in 1991:

- five maps.

Accessibility indicators: a comparison between Central Europe and Western Europe

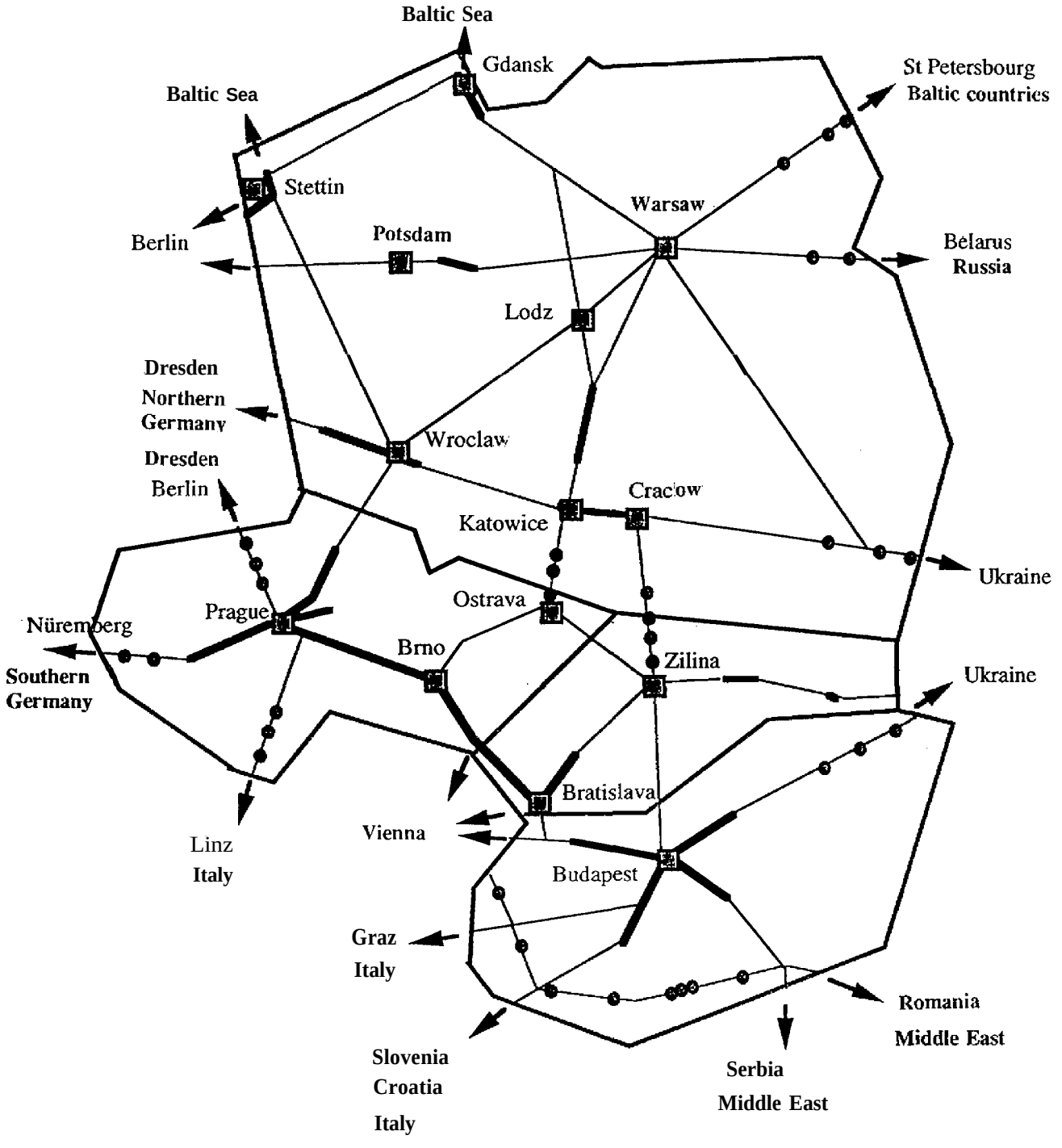
Extracts from the report on the temporal accessibility model for the main destinations in Central Europe **as** compared with destinations in Western Europe. These comparisons provide means of producing maps which **are** distorted with reference to the speed at which these destinations can be reached from a number of central points:

- Description of the model
- Ten **maps**
- Method of producing **a** map

Source: Extracts from the report "Transport in Central Europe", G. Chatelus -- INRETS, Sept. 1993. The complete report **was** published at the end of 1993 **as part** of **the** series Paradigme, by the publisher Paradigme, Caen, INRETS/DEST.

Road Networks of the countries of Central Europe

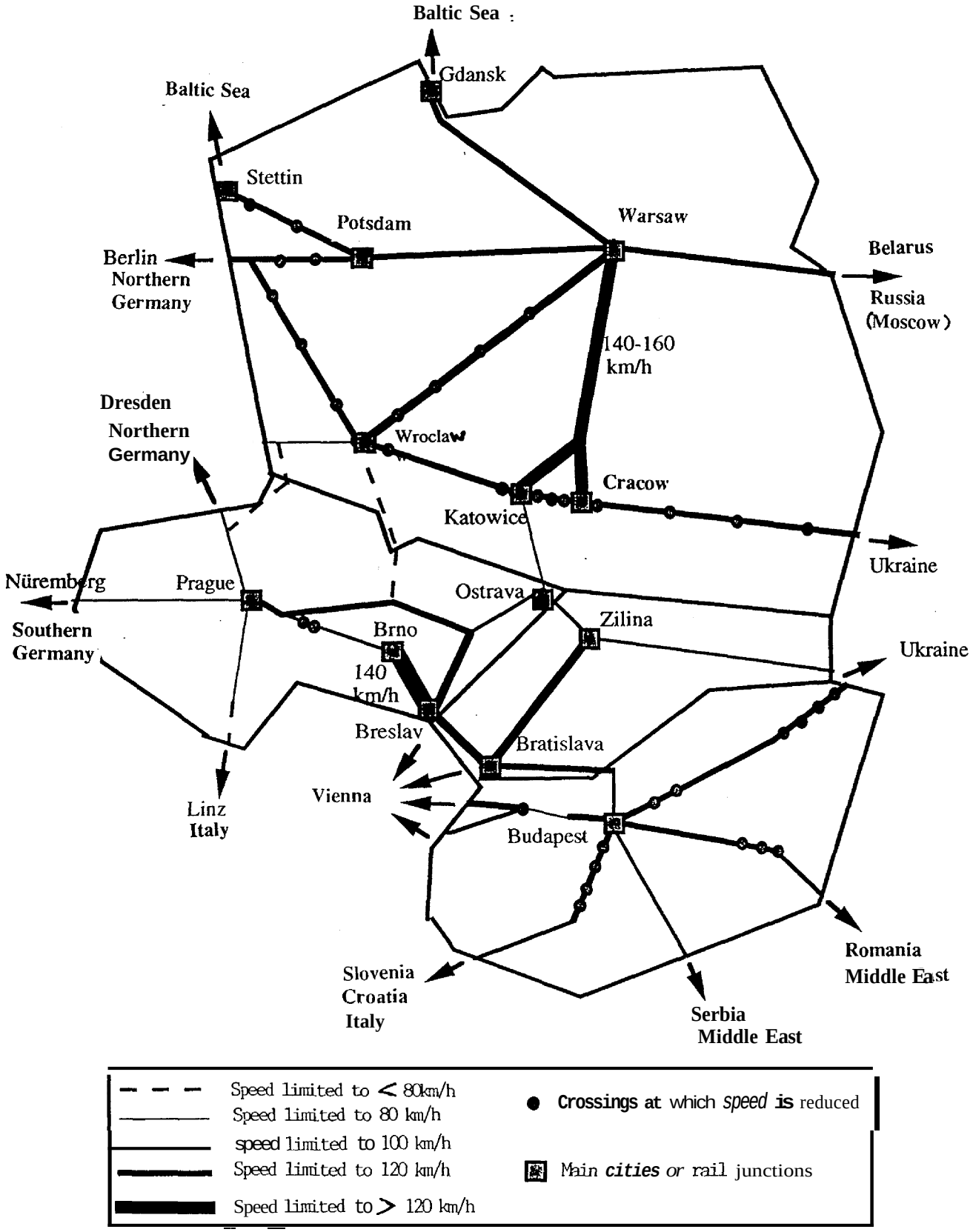
Types of Roads on international Links



Source: G.Chatelus-INRETS: "Les transports en Europe Centrale"

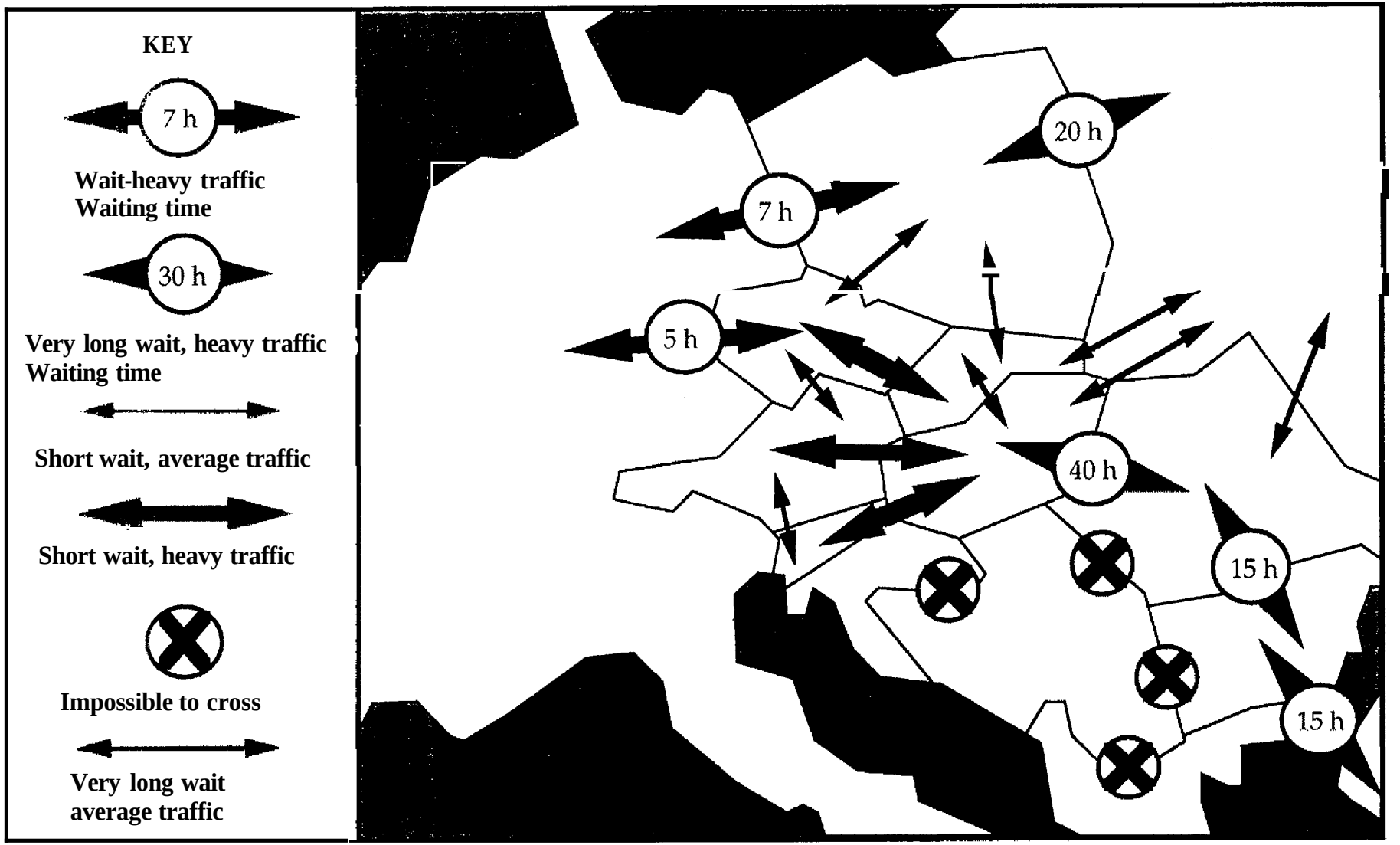
Rail Networks of the countries of Central Europe

Maximum Speeds on International Links



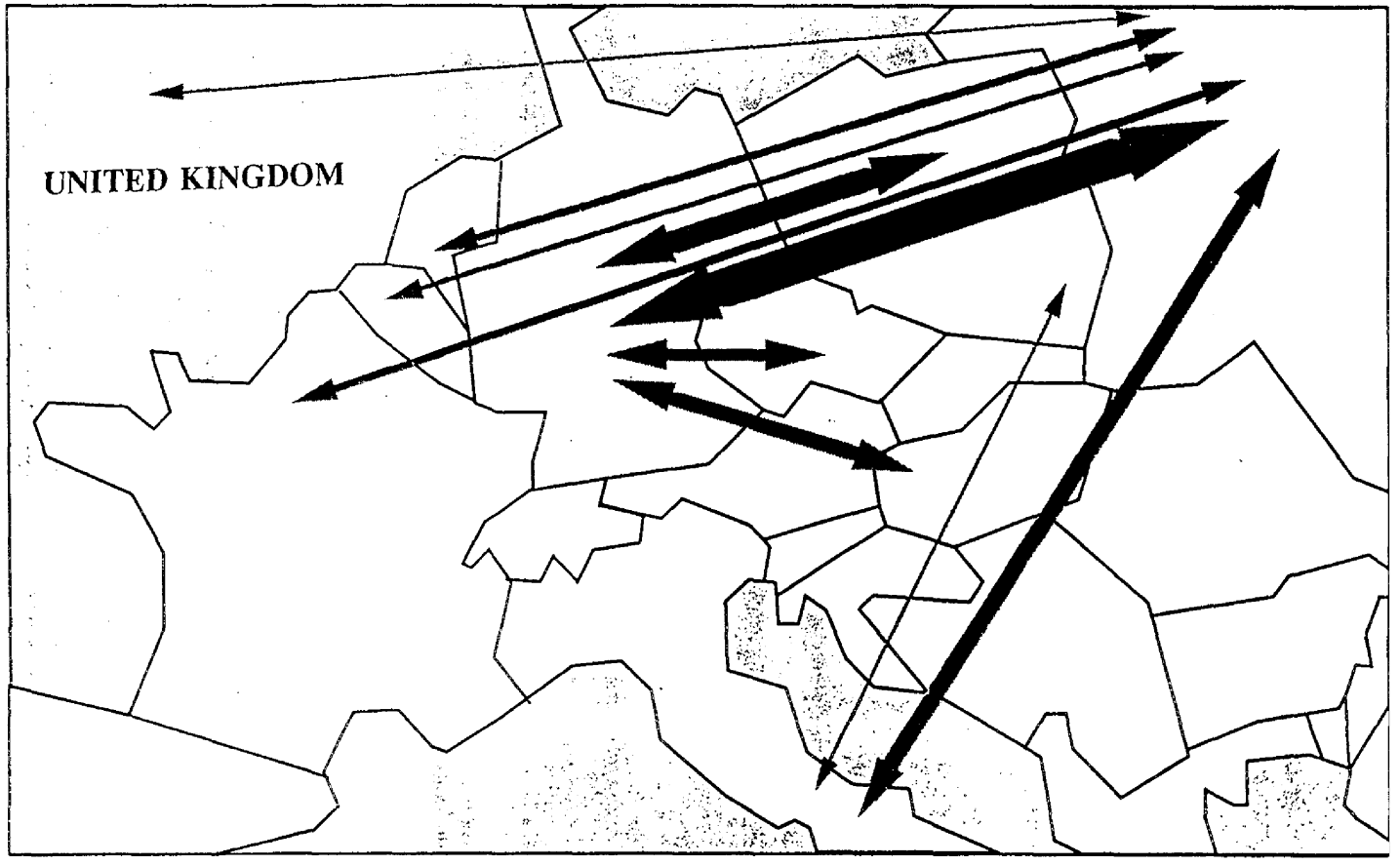
Source: G.Chatelus-INRETS: "Les transports en Europe Centrale"

Maximum waiting time at frontiers of countries of Central Europe (estimate for lorries)



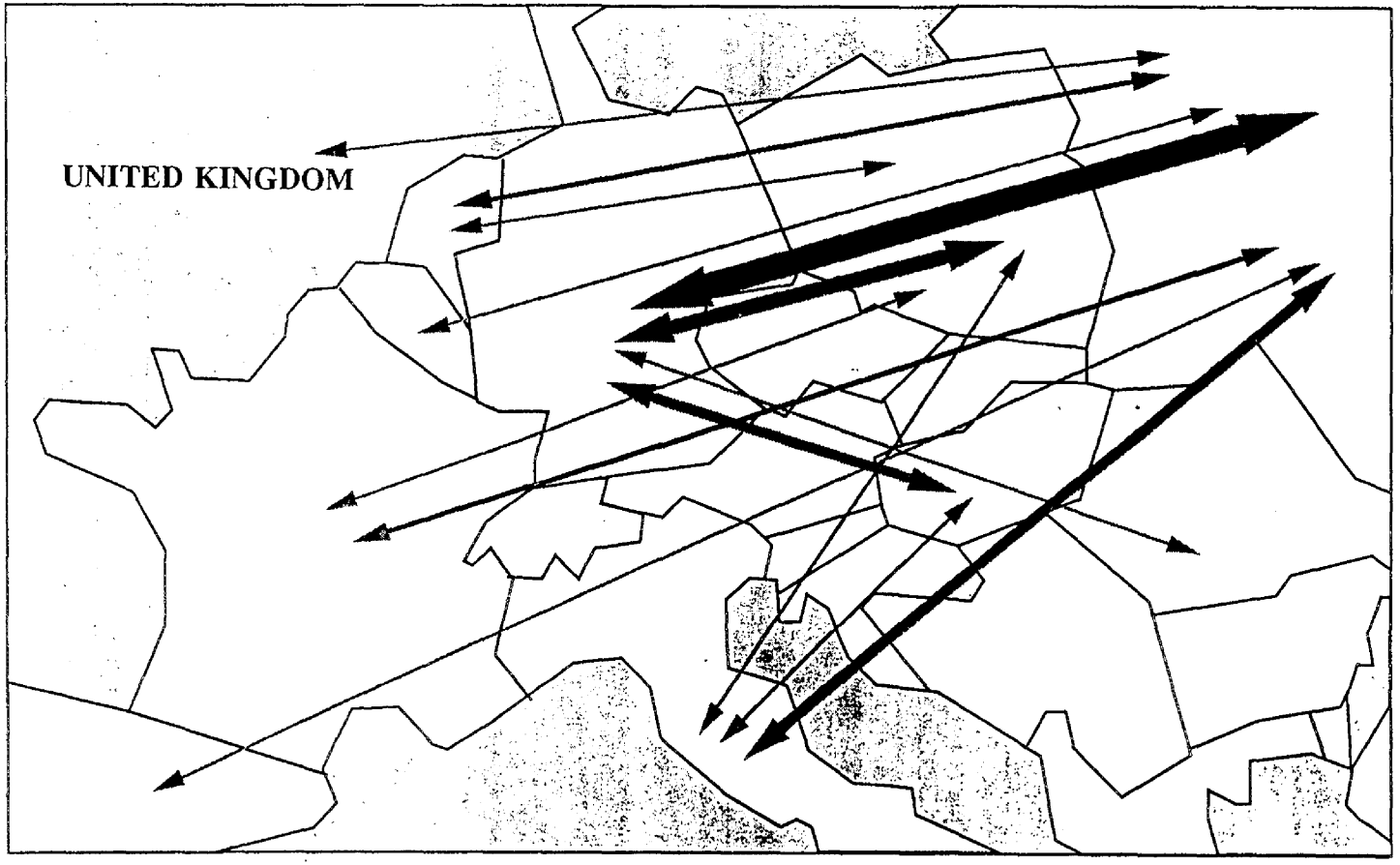
Source: G. Chatelus - **INRETS:** "Les **transports en Europe Centrale..**"

10 Main CEEC/EEC Trade Routes in 1991, total flows (value)

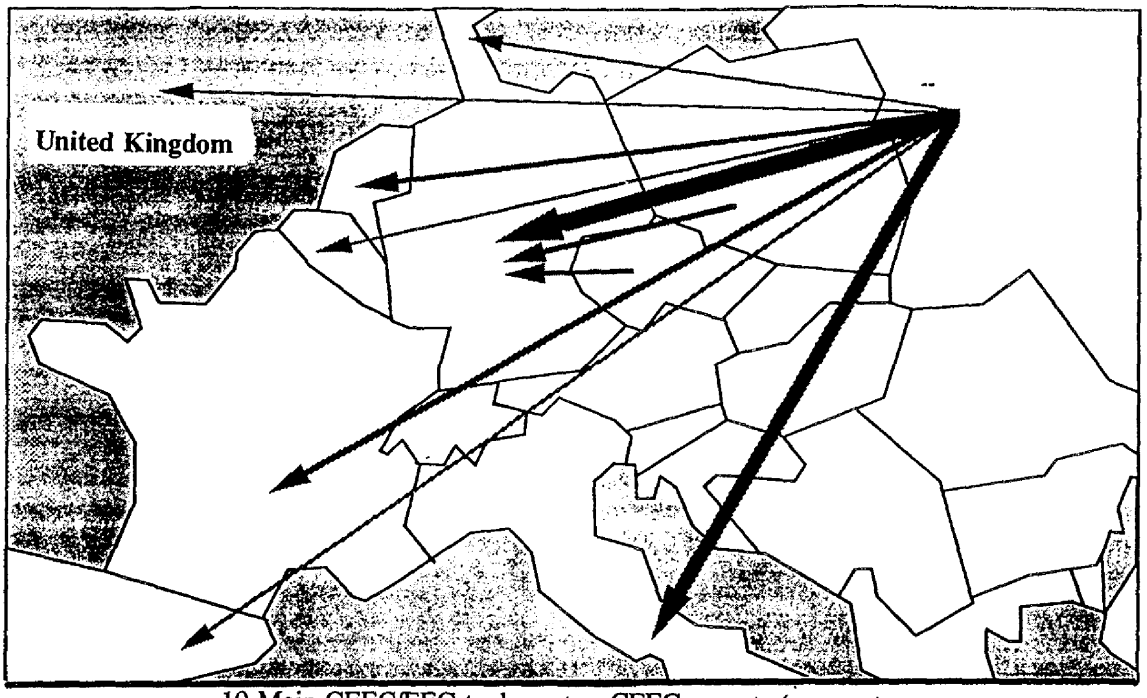


Source: Data obtained from COMEXT base by G. Chatelus-INRETS

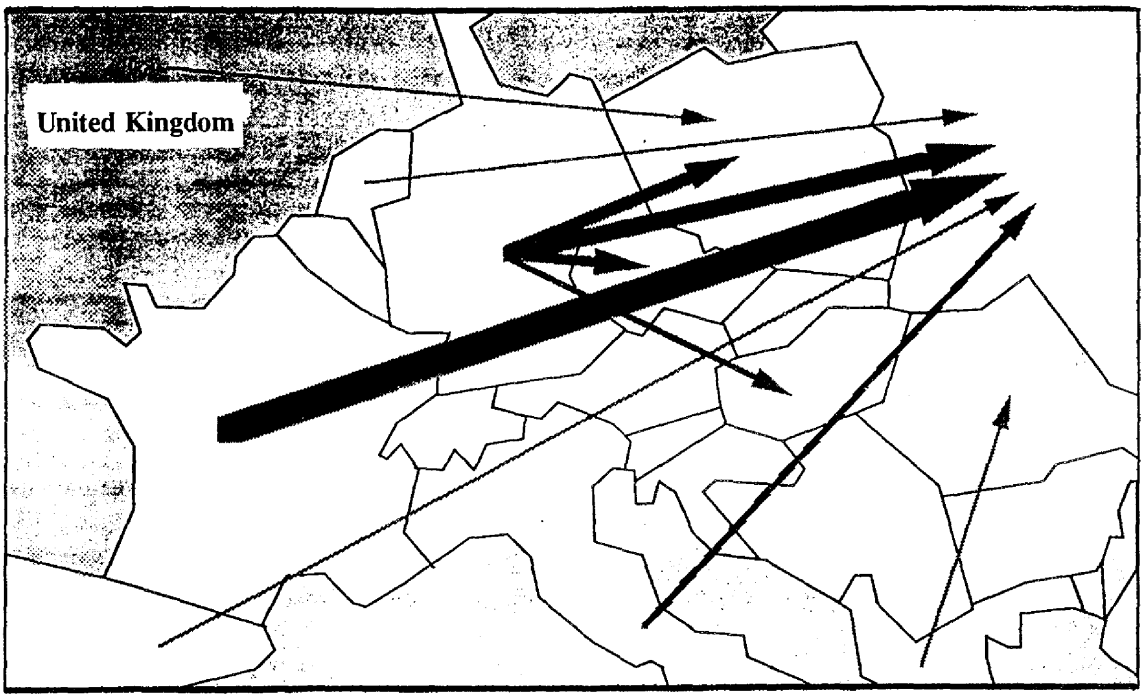
15 Main CEEC/EEC Trade Routes in 1991, total flows (value)



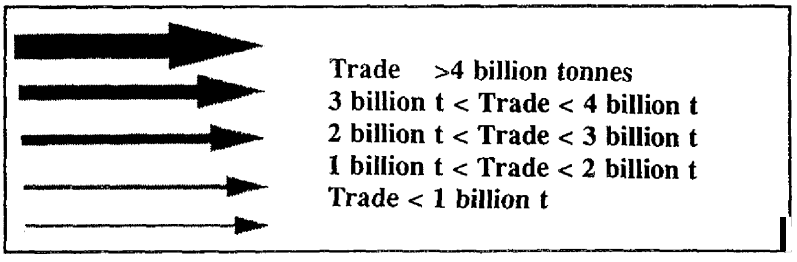
Source: Data obtained from COMEXT base by G. Chatelus-INRETS



10 Main CEEC/EEC trade routes, CEEC exports (tonnage)

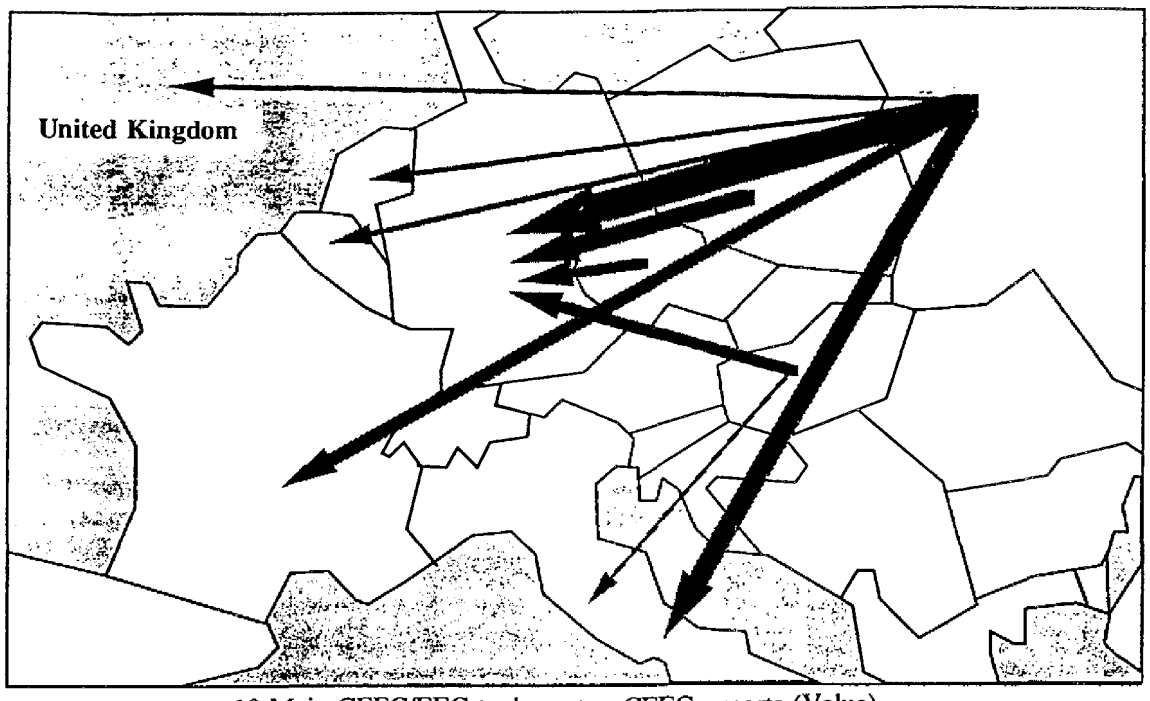


10 Main CEEC/EEC trade routes, CEEC imports (tonnage)

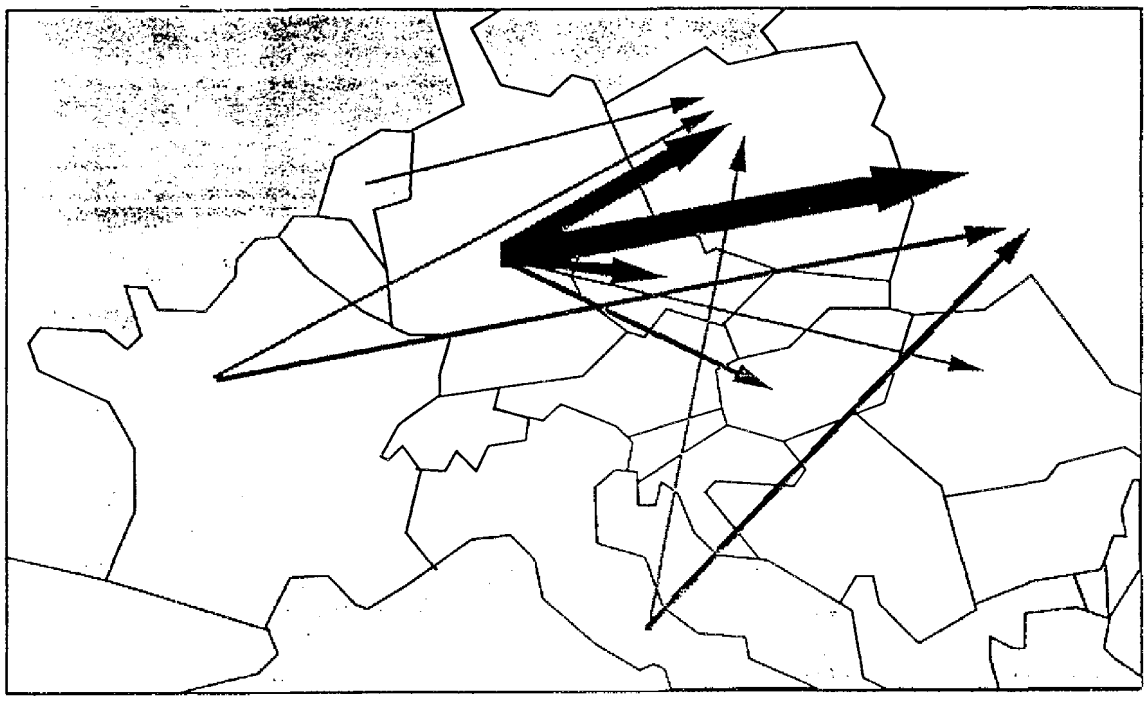


Source: Data obtained from COMEXT base by G. Chatelus-INRETS

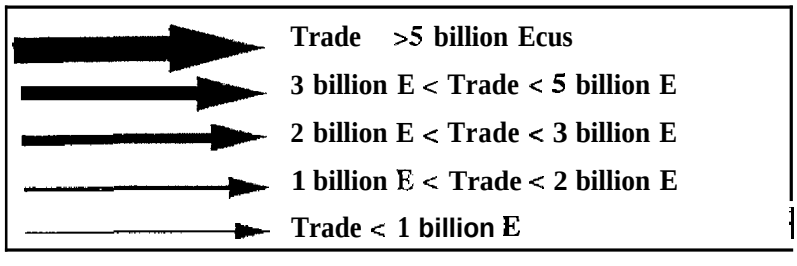
Trade in value in 1991



10 Main CEEC/EEC trade routes, CEEC exports (Value)



10 Main CEEC/EEC trade routes, CEEC imports (tonnage)



Source: Data obtained from COMEXT base by G. Chatelus-INRETS

Deficiencies in the Transport Sector in Central Europe: a Model for Assessing Accessibility

In order to assess the shortcomings of transport supply in the context of a wider Europe, a model has been constructed of accessibility in passenger transport to compare supply in Western and in Central Europe. "Generalised cost" is the best criterion to be used for such studies since it takes account of all the direct and indirect costs that may be incurred by the traveller. However, the problem experienced in the West -- namely that of determining precisely all these costs, particularly the indirect ones such as time -- is much more complex in countries in a process of economic and behavioural transition. It therefore seemed advisable to assess accessibility solely in journey time and average speed, other things being equal. That amounts to comparing accessibilities for passengers who attach prime importance to time (placing a very high value on time), such as businessmen in the West. It should be noted that only accessibility for passengers is assessed.

Calculation of access times: measurement of distances and journey times

The evaluation of train journey times has never been a source of any particular difficulties, since it has sufficed to take the fastest services on the routes in question given in the European rail timetables of Cook's agency. Where roads are concerned, however, journey times have to be evaluated in the light of the types of road used. Consideration was given solely to transport by private car (and not to public transport). The average speeds taken into account here are those obtained with the INRETS' **MATISSE** model and are therefore essentially for western roads. These speeds are the averages for total journey time, including the essential pauses, entering and leaving motorways, crossing urban areas, at traffic lights, periods of road congestion, roadworks, etc. Here, too, the values do in fact differ according to the type of journey, the areas travelled through, local speed limits, time of day and the period in the year. This average is quite reliable however. The speeds adopted are 86 km/h for motorways, 71 km/h for dual carriageways and 57 km/h for ordinary roads.

In order to take some account of the poor quality of road infrastructure in Central Europe, it was also necessary to establish an average speed for second-category roads, or roads considered as such in those countries. This speed allows for the poor condition of the carriageway and surfacing, narrow mountain passes in which it is difficult to overtake and roads heavily congested with lorry traffic which is particularly slow in the countries in question. It also takes account of the many particularly dangerous routes through villages where there are a lot of agricultural vehicles using either mechanical or animal traction. The speed in this case was estimated to be 40 km/h and, as in the case of the rating of second-category road, was not determined on the basis of in situ statistical surveys but individual estimates based on local experience and interviews with specialists in Central Europe.

A study focused on the major transport axes

Only the routes between the main towns or crossing frontiers on major international axes were taken into consideration. No account is taken of the population at destinations or the time allocated to reach the actual final destination, and it is only the town-centre to town-centre (or station to station) routes that are used in the calculations. Another factor that may have a role in accessibility indices -- but was not included -- is the frequency of train services, since only the fastest was taken into account. The study was extended to examine the impact of the war in the former Yugoslavia and the closure of Serbia's frontiers where the main South-East/West Central Europe motorway is found.

Choice of graphic presentation: maps distorted with reference to access speeds

Two types of comparison between the two parts of Europe were carried out for this study, this first comparing the accessibility of the main towns or frontiers of a country from its capital or economic centre. Such a comparison was made for Poland (centred on Warsaw) and Hungary (Budapest) in relation to Germany (Frankfurt) and especially France (Paris), the latter being the most clear-cut comparison. The second comparison was made between the centre of Europe with reference to speeds in reaching the main towns in the East or in the West from three central points: Vienna, Munich, and the frontiers of Germany.

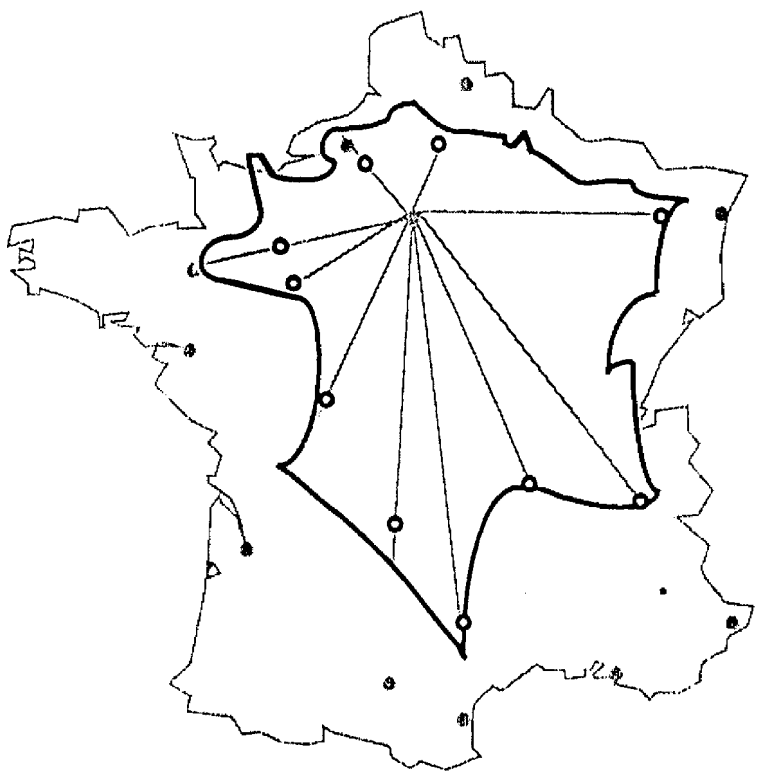
The journey times for each set of routes have been calculated on the basis of the above criteria, so two types of distance are taken into account: the distance as the crow flies -- which expresses direct accessibility and provides for a real comparison of possibilities of reaching different points in light of the size of the country -- and the distance in terms of the kilometres actually travelled on the fastest run (road distances taken from Michelin road mags and rail distances given by Cook's timetable). These distances weight accessibility with reference to natural obstacles (mountains calling for a detour) and offer a means of making a better assessment of operating performances on the routes taken by infrastructure, especially for railway undertakings.

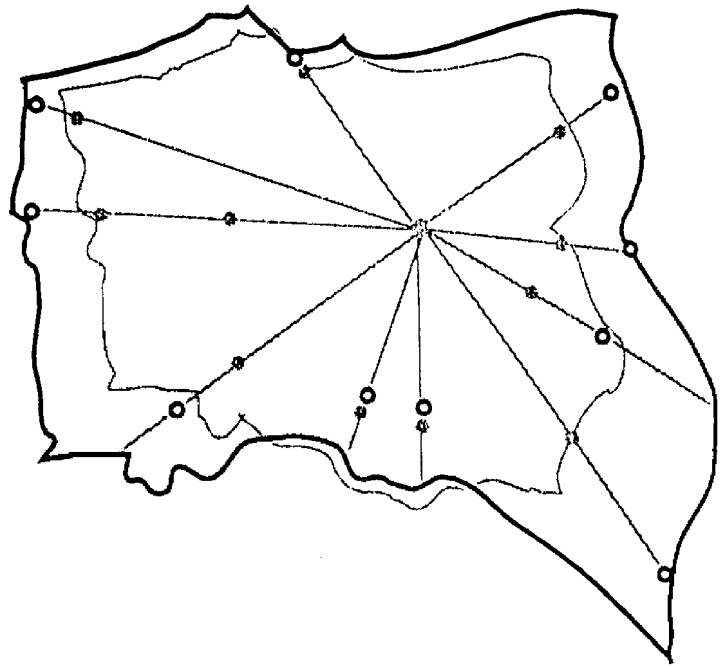
For every comparison, average speeds on each route were calculated and then an overall mean was determined. An accessibility index for the destination town in relation to the central point in question was then established simply on the basis of the ratio between the speed on the route and the calculated average speed used for reference. The accessibility index was subsequently used for the accessibility maps.

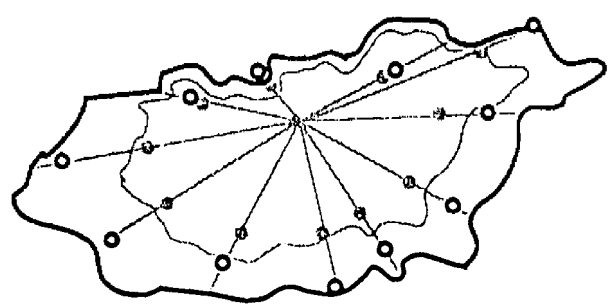
Taking an ordinary map as the basis, all the meridians are drawn in from the centre concerned, running through the destination town and reaching the frontier or edge of the map (see stages in the construction of a map). The meridians are then lengthened or shortened by a factor equal to the accessibility index for the route. Lastly, once all the distances have been recalculated, a new distorted map is drawn through the ends of the lengthened or shortened meridians, thus representing the accessibility of the area. The map is not a full representation of the real accessibility of each point in the territory but an extrapolation from the main transport axes. The maps should not therefore be regarded as being highly accurate but simply as a useful visual representation of the problems associated with deficiencies in regard to transport infrastructure.

Rail accessibility
Index 1 = speed of 112 km/h

Comparison of the accessibility of Poland, Hungary and France



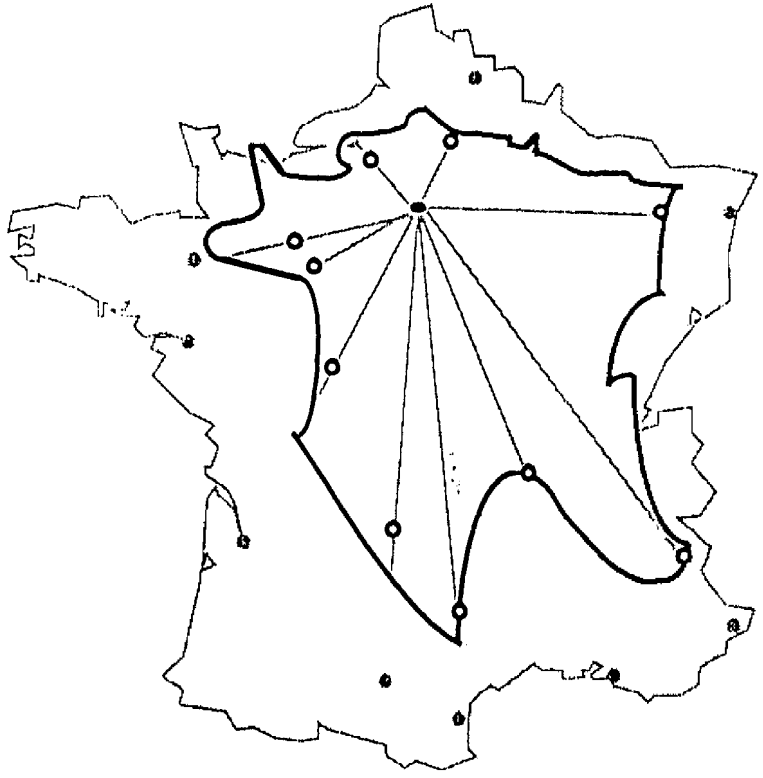


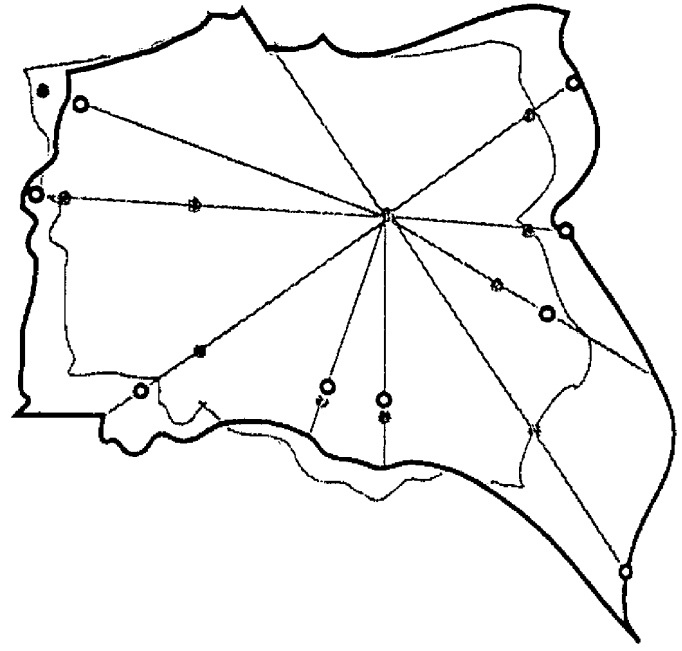


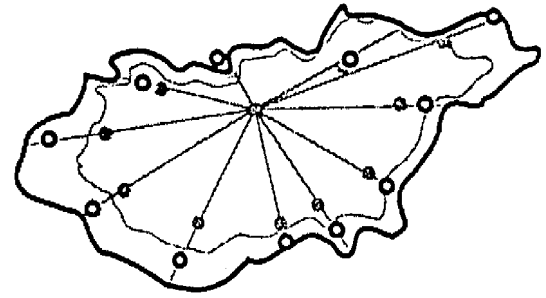
Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

Rail accessibility (distances as the crow flies)
Index 1 = speed of 80 km/h

Comparison of the accessibility of Poland, Hungary and France

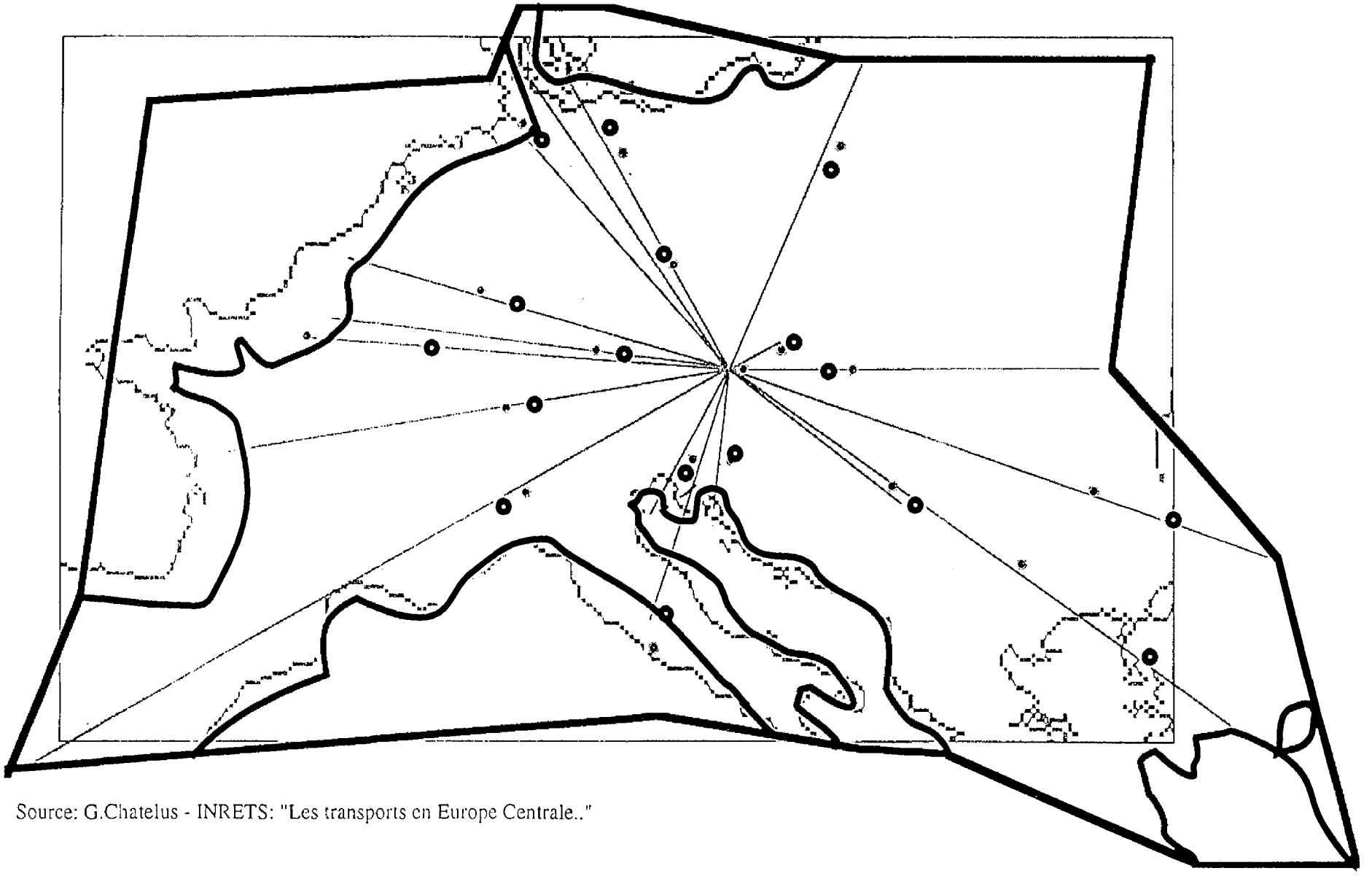






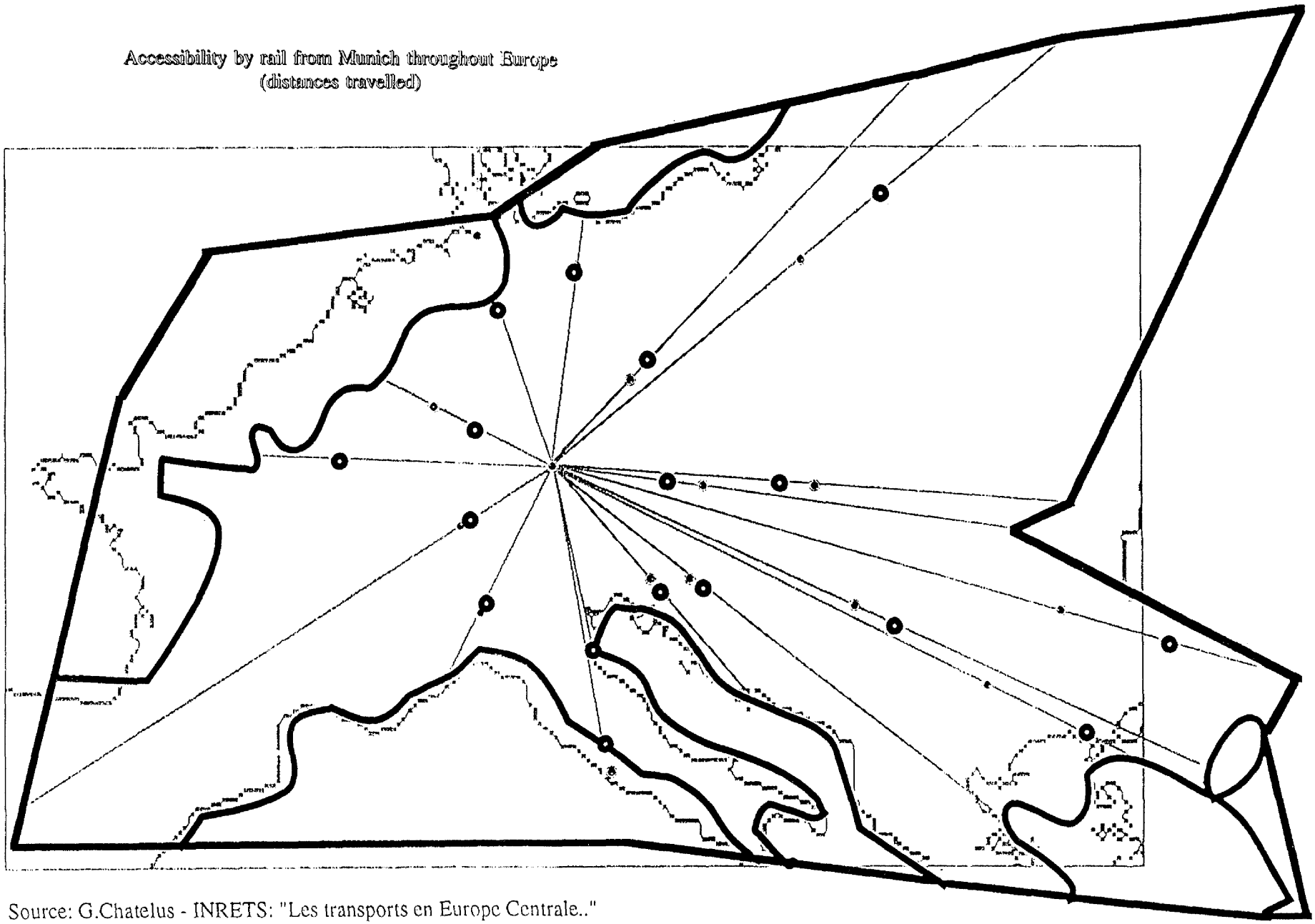
Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

Accessibility by rail from Vienna throughout Europe
(distances travelled)



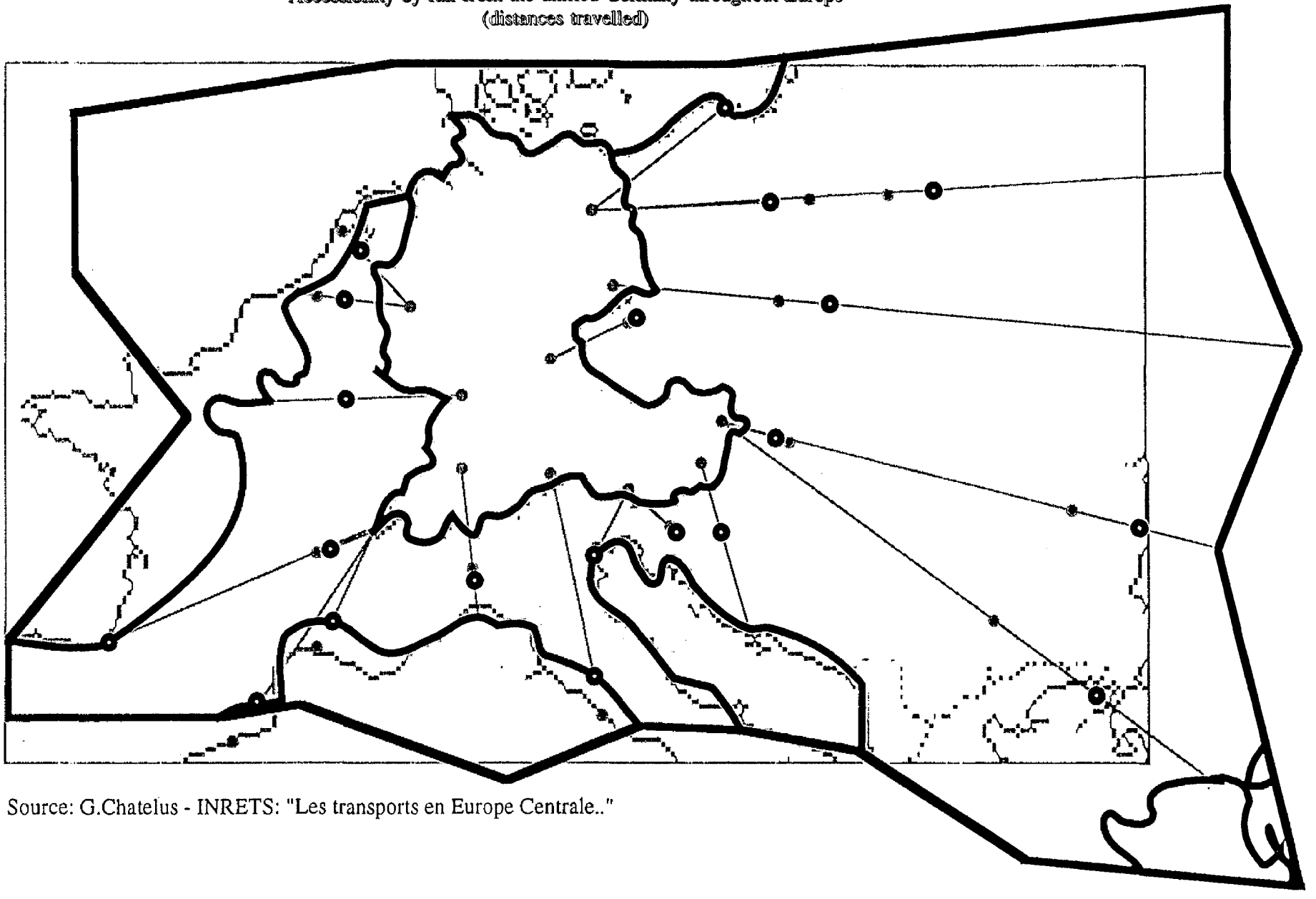
Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

Accessibility by rail from Munich throughout Europe
(distances travelled)



Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

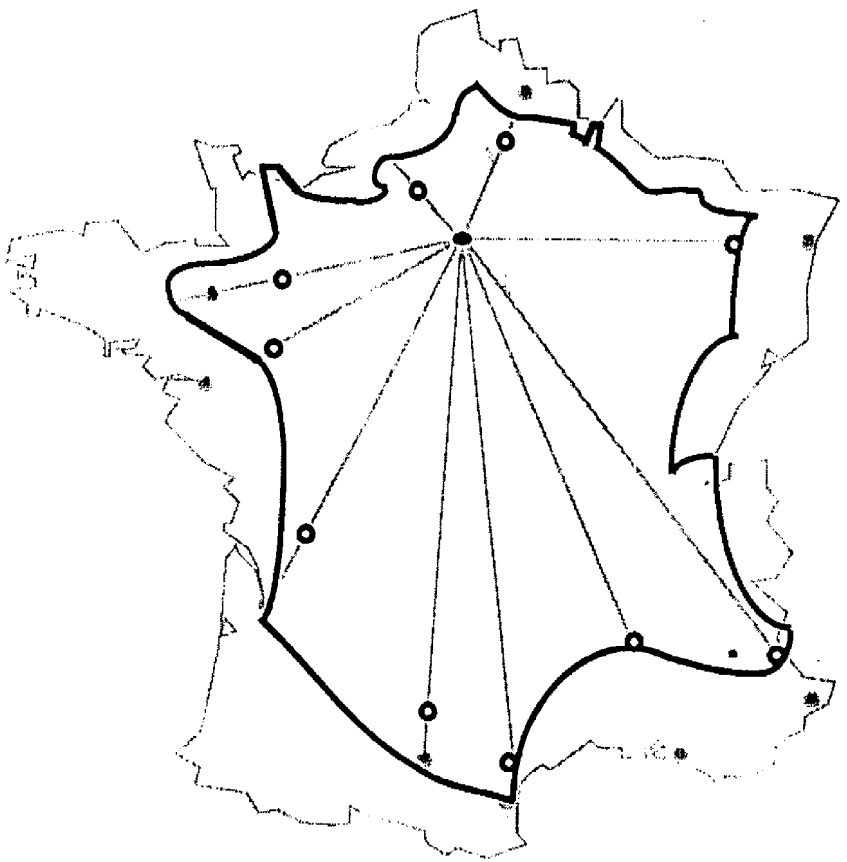
Accessibility by rail from the unified Germany throughout Europe
(distances travelled)



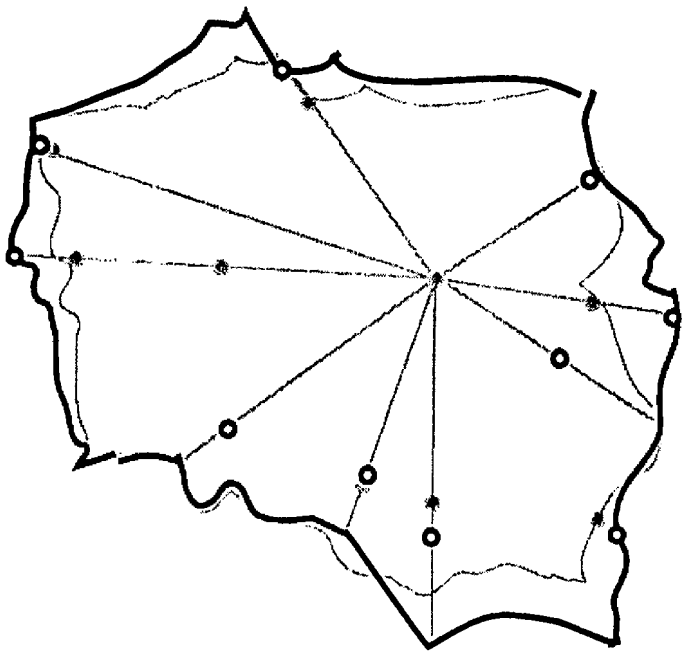
Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

Accessibility by road (distances as the crow flies)
Index 1 = speed of 50 km/h

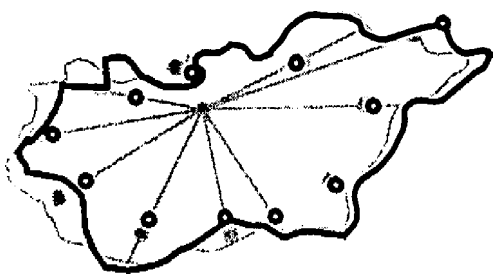
Comparison of Poland, Hungary and France



FRANCE



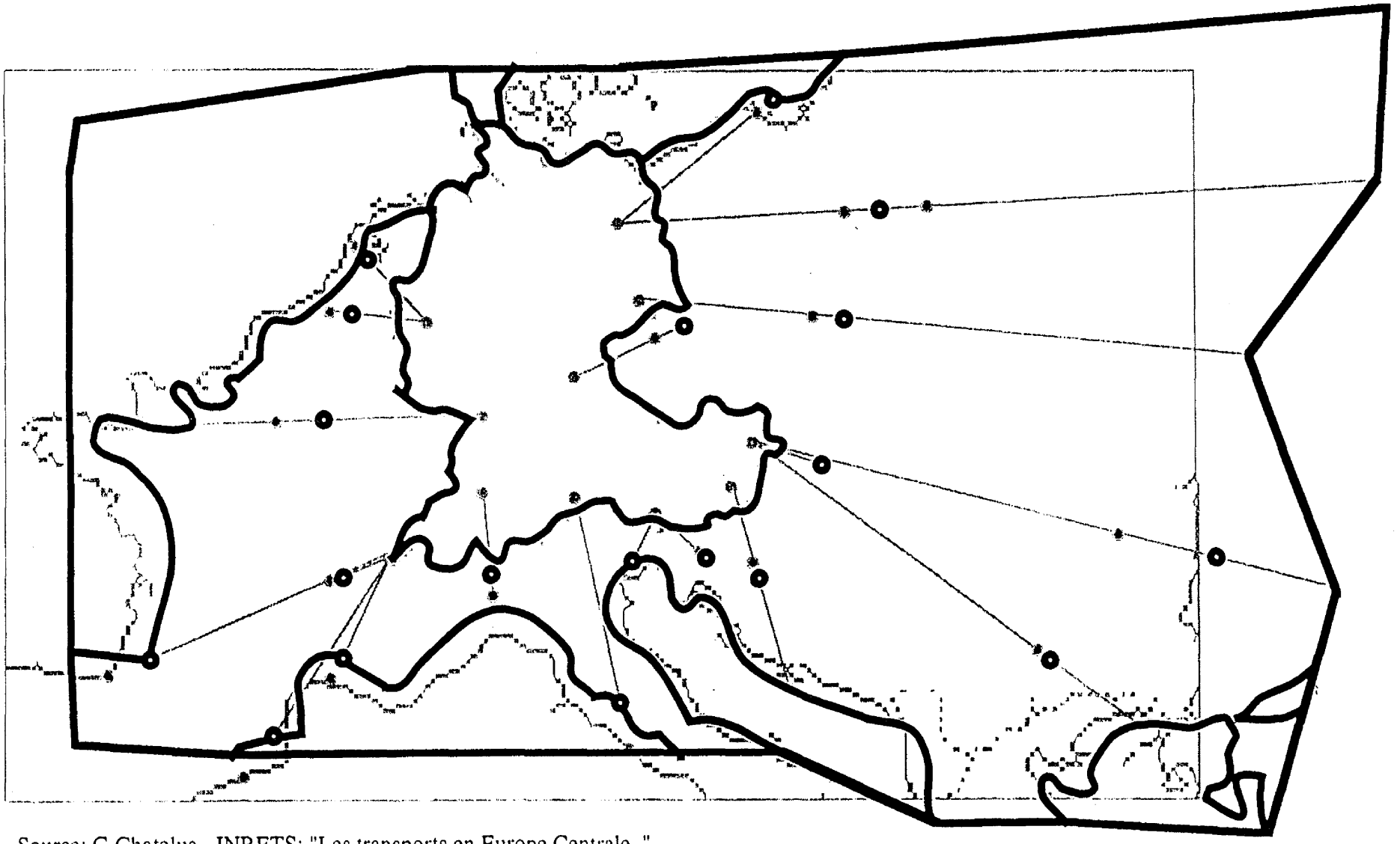
POLAND



HUNGARY

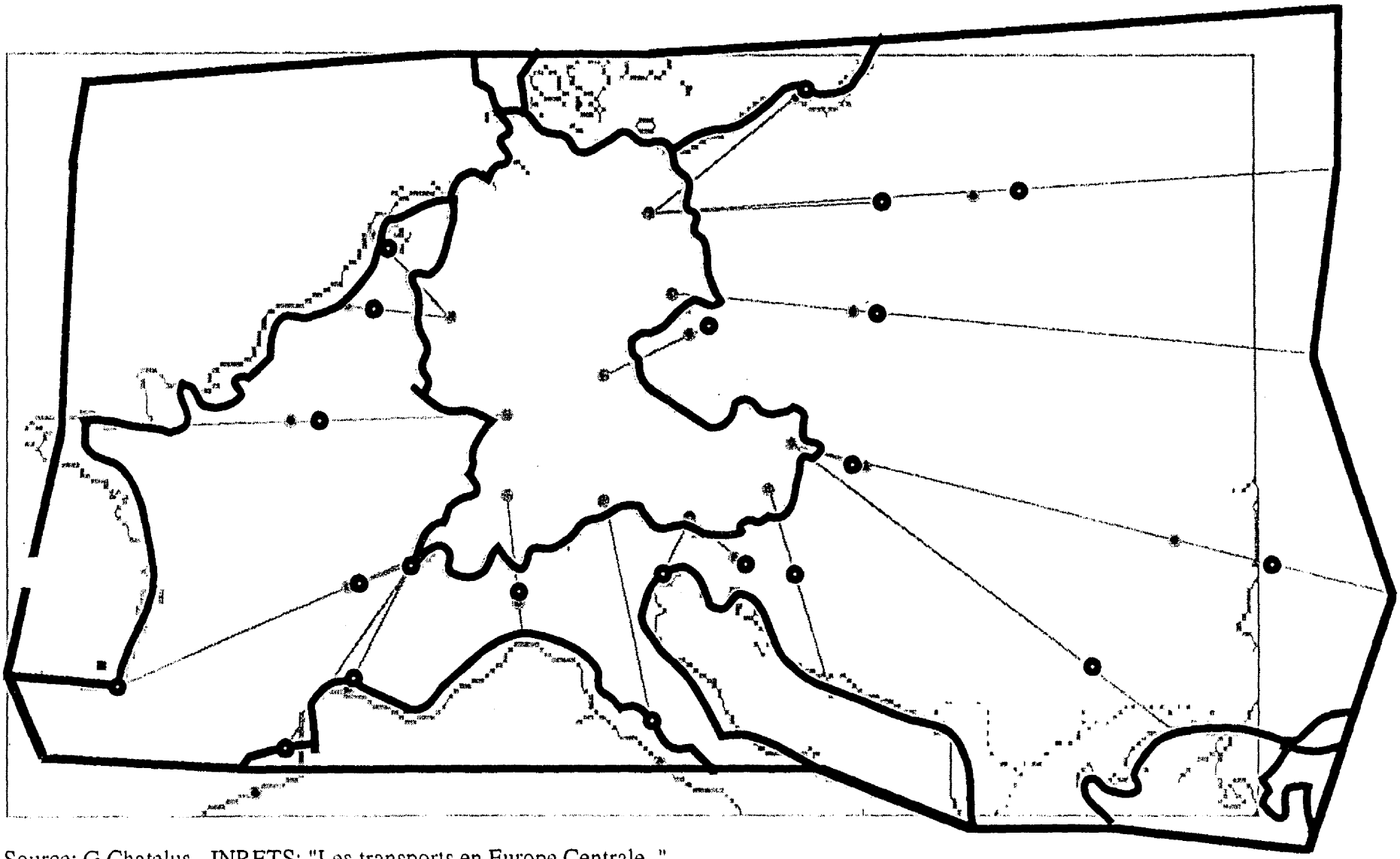
Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

Accessibility by road from the unified Germany throughout Europe
(distances travelled)



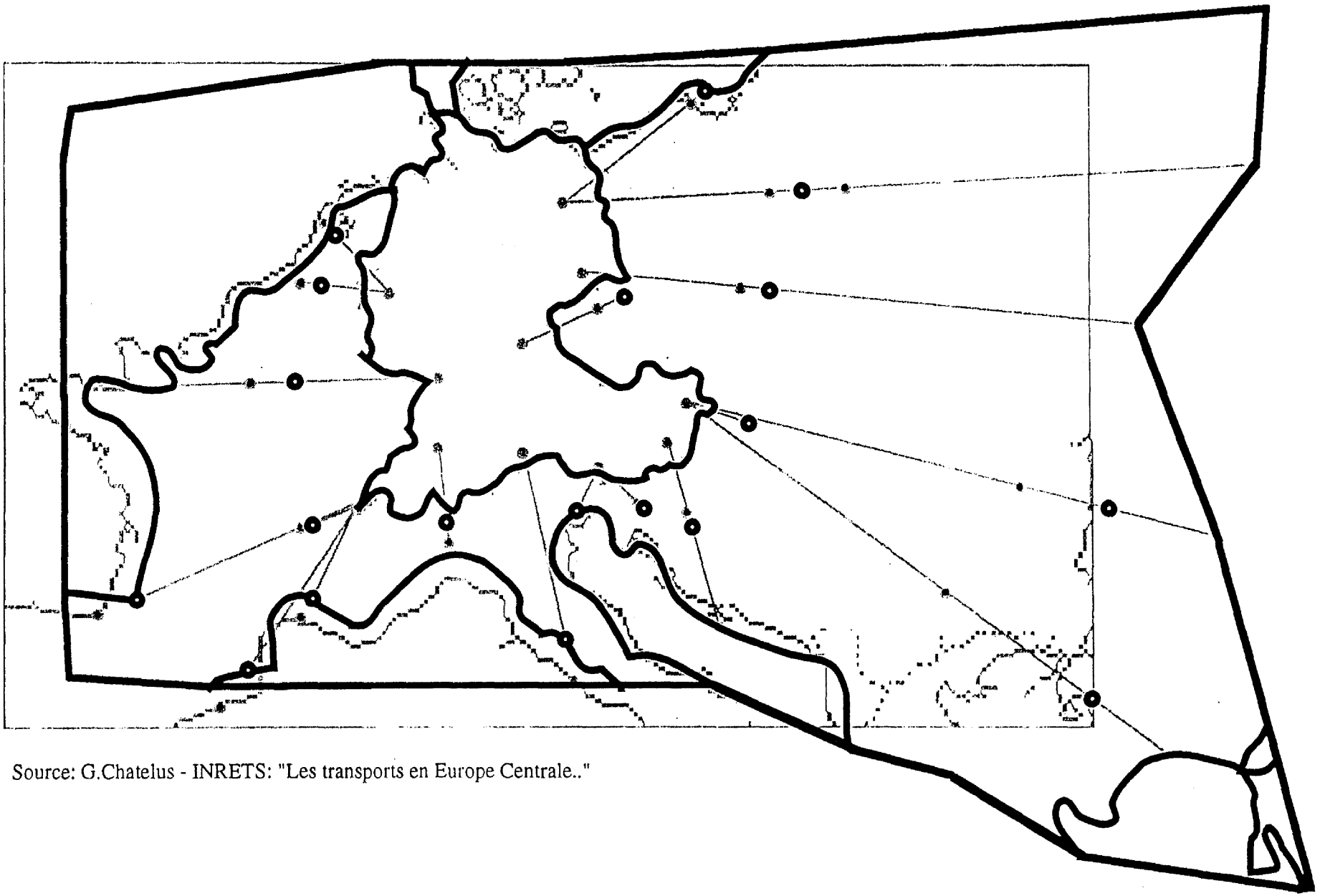
Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

Accessibility by road from the unified Germany throughout Europe
(distances as the crow flies)



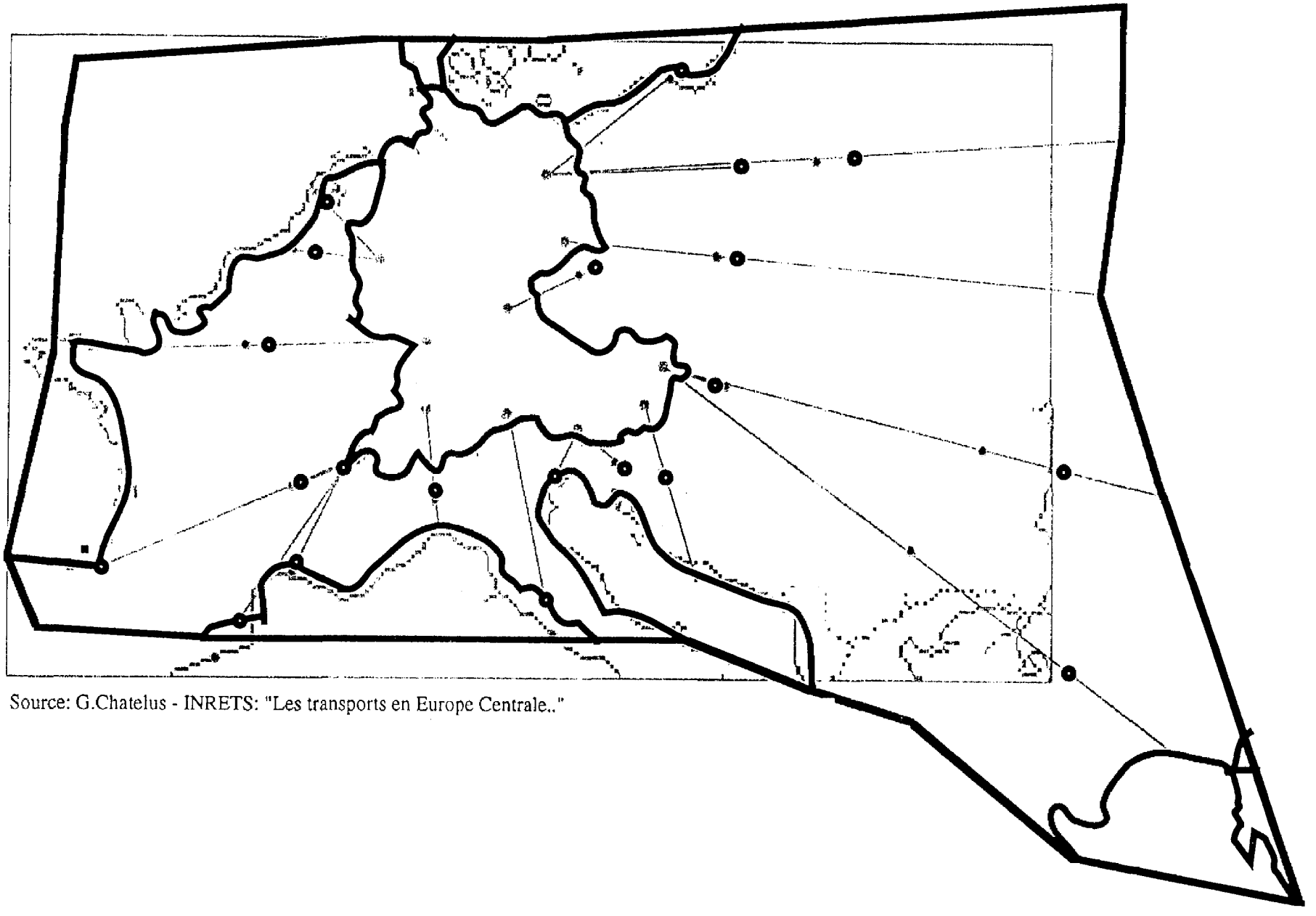
Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

Accessibility by road from the unified Germany throughout Europe
(distances travelled) -- Taking account of the embargo on Serbia



Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

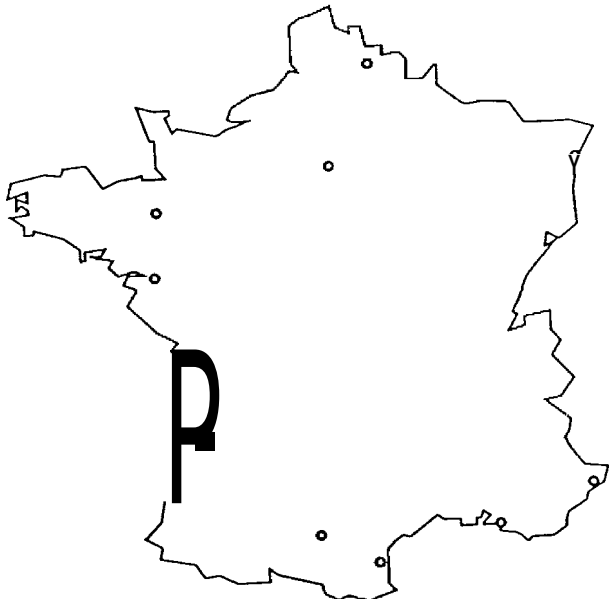
Accessibility by road from the unified Germany throughout Europe
(distances as the crow flies) -- Taking account of the embargo on Serbia



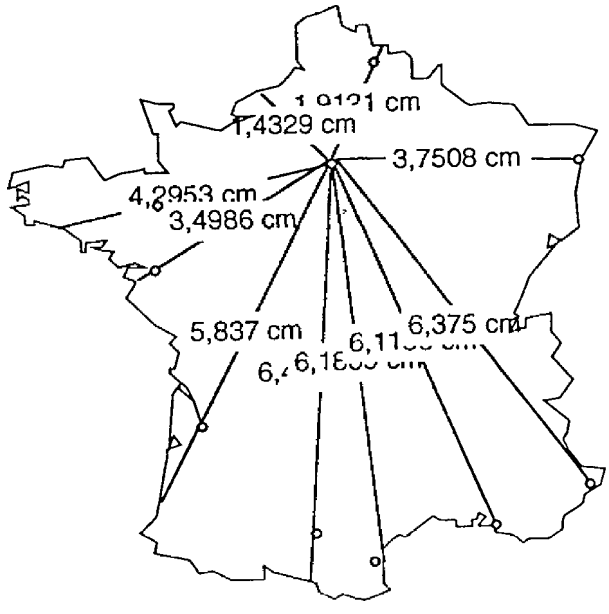
Source: G.Chatelus - INRETS: "Les transports en Europe Centrale.."

Annex

Drawing up a map which is distorted with reference to accessibility: Example of French roads with distances as the crow flies



First stage: Specification of destinations from the centre of the country - Selection of **major** cities on the periphery or international frontier stations



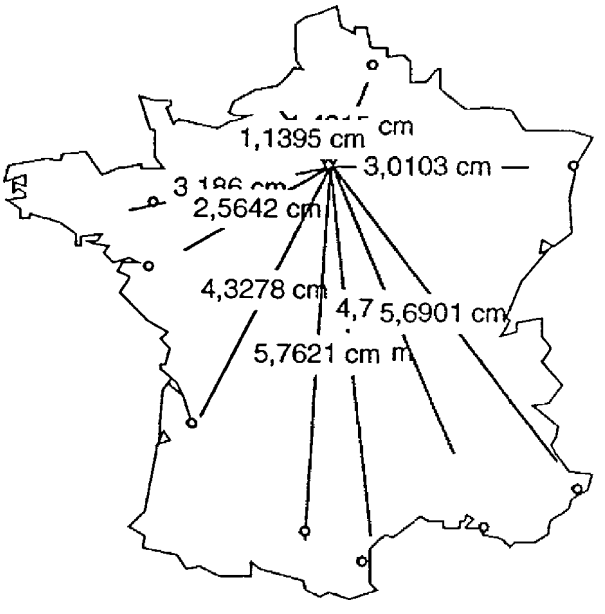
Second stage: Lines drawn from the capital to frontiers **via** the selected destinations

Indices of speeds calculated:

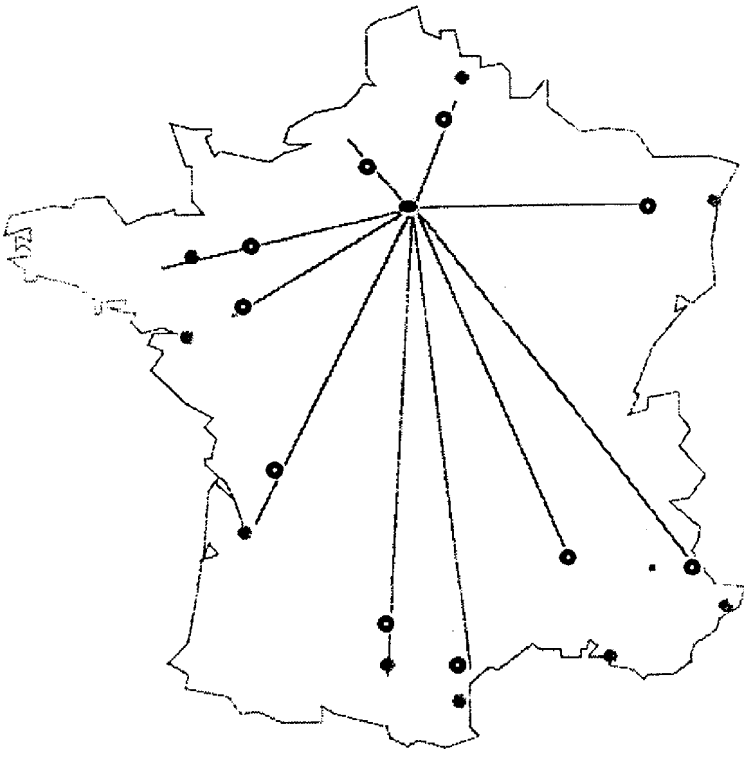
French roads, accessibility as the crow flies

	1992	Lille	Rouen	Rennes	Nantes	Bordeaux	Toulouse
PARIS	Distance Time	200 173	115 105	300 268	340 302	495 448	*590* 634
	Speed	69.36	65.71	67.16	67.49	66.29	55.84
	Index	0.72	0.76	0.74	0.74	0.75	0.9

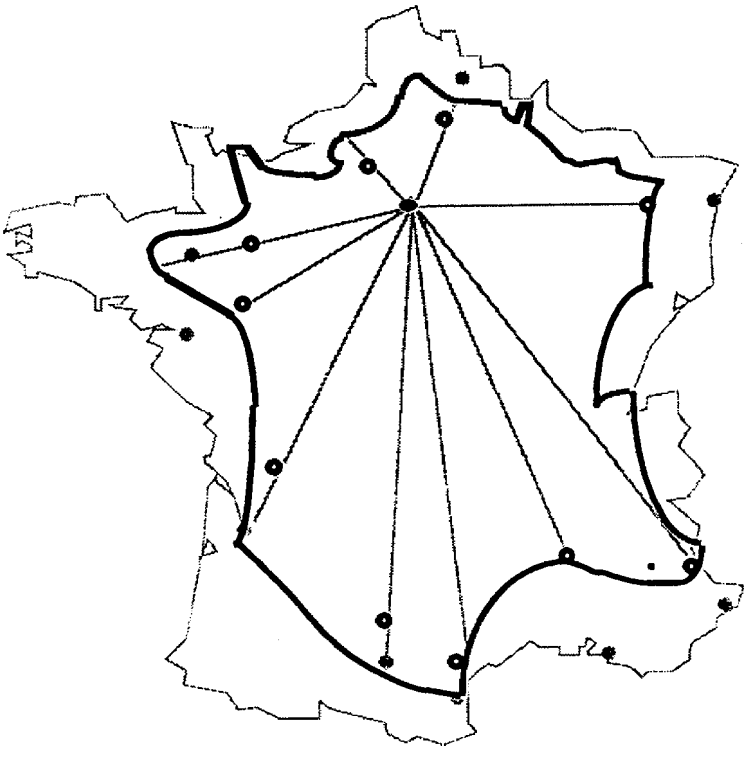
PARIS	1992	Perpignan	Marseille	Nice	Strasbourg	TOTAL
	Distance Time	635 707	650 602	675 723	390 369	4 390 4 331
	Speed	53.89	64.78	56.02	63.41	60.81
	Index	0.93	0.77	0.89	0.79	0.82



Third stage: Lines shortened according to the indices calculated for each link



Fourth stage: Location of the destination cities according to the indices calculated



Fifth **stage:** Manual outline of new frontiers **obtained**

PART II

FINANCING INFRASTRUCTURES AND TRANSPORT SYSTEMS INCENTRALANDEASTERNEUROPE

TERMS OF REFERENCE OF THE STUDY*

The study is concerned with the financing of transport needs (not only infrastructures) in Central and Eastern Europe.

It seeks to clarify the requirements for:

- new investments;
- modernisation of existing installations;
- merely maintaining existing installations.

A suitable procedure for establishing priorities is considered both for national and for international levels. It is based in particular on a "Master Plan" approach as opposed to a case-by-case study of individual projects.

The study also examines:

- the various sources of funding and the conditions on which funds are granted or loaned (guarantees, interest rates, application procedures, environmental impact evaluation procedures);

- the role of the various parties concerned: project promoters, Ministers of Transport, other Government Departments;

- competitive international calls for tender and possible rules regarding local preference.

The study also provides information about project selection and ranking methods and about modal choice evaluation criteria.

It then considers funding methods -- both public and private.

Lastly, the study seeks to identify the bottlenecks and difficulties being encountered in implementing existing funding arrangements.

---

* This report was written by Mr. **B.** Gerardin for the ECMT. The views are those of the author.

GENERAL INTRODUCTION

The modernisation of infrastructures in Central and Eastern Europe is crucial for the region's present and future economic development and for its economic and political integration into Europe as a whole.

The first striking aspect is the enormous mismatch between the scale of the region's requirements and the difficulties it encounters in trying to mobilise even the resources it needs merely to maintain existing infrastructures.

So funding is a crucial issue, since without it, it will not be possible to gradually reduce this mismatch between supply and demand.

The aim of this study is to assemble the relevant information and offer suggestions to help Ministers of Transport in ECMT Member countries prepare the decisions for which they are responsible.

It is easy to get carried away by grandiose geo-strategic schemes or by the long-term possibilities opened up by technology, high-speed trains, modern motorways, etc.

But a realistic appraisal of the present situation, and of what resources are actually available, induces a more pragmatic approach. What scope can there be for major new projects when the situation seems to argue that repair and maintenance are the urgent priorities. How can a medium and long-term vision be reconciled with the requirements of the transition to the market economy?

Now that the Iron Curtain has come down, reviving nationalism as individual countries seek out their own cultural identities, will it be realistic to count on genuine international co-operation at a Pan-European level?

Managing the many opposing forces which this new situation has brought into play will certainly be the greatest challenge for the present period. The region must contrive simultaneously to meet its most pressing needs without compromising future options, and to establish some clear directions for responding to the changes in demand which are under way.

As part of the general upheaval, the pattern of market organisation which the CMEA had put in place collapsed within a few months. The result was a very rapid decline in bulk traffics carried by rail, while East-West flows, essentially by road, have gathered momentum. Traditional reference points are fast disappearing and local conflicts, some of alarming proportions, are building up. These are obstructing some of the natural routes, diverting to substantial flows of passengers and freight. Against such a background any forecasting exercise can only be tentative at best, however refined the forecasting techniques may be.

This unpredictable outlook must account for the present reluctance of investors and financiers to commit themselves for the longer term.

When econometric models can no longer produce reliable answers and econometricians run up against the limits of their forecasting techniques, they can only stand back and try to identify the historical and geographical invariants.

This is the approach taken here in establishing a basis on which to work out what the financing requirements will be. It should be regarded as an initial assessment, whose aim can only be to determine some orders of magnitude.

Too many uncertainties still remain for any detailed catalogue of needs to be possible, but the analysis does provide a methodical basis for selecting, ranking and quantifying certain major priority programmes.

From those we can estimate what the most urgent funding requirements will be. Different ways of meeting these requirements are then considered and analysed. This report reviews the various possible financing packages and ways in which different agencies, institutions etc. in the public and private sectors, both national and international, may be able to participate.

The emphasis is on analysing shortcomings in existing financing systems.

Lastly, it presents and discusses some suggestions for improvement.

1. Analysis of Funding Requirements

Funding requirements for the modernisation of infrastructures and transport systems can be analysed in a logical, three-stage approach:

i) First, recent trends in the transport market and its medium-term prospects are analysed. Two aspects have to be considered:

   -- possible future traffic trends and flow patterns for passengers and freight;

   -- existing infrastructure networks and the operation of existing transport systems, together with a survey of foreseeable developments already under way.

ii) The second stage is to compare supply and demand in order to identify the requirements for:

   -- new investments (in infrastructures and operating systems);
   -- modernisation of existing installations;
   -- repair and maintenance;
   -- improvement of operating, management and organisation procedures.

iii) Once these investment requirements have been estimated they have to be ranked in view of the severe financing constraints. Choice of priorities reflects:

   -- the degree of urgency of the investments;
   -- their socio-economic profitability;
   -- national investment programmes;
   -- master plans and guidelines established at European level.

It is thus possible to evaluate:

- first, a hard core of projects requiring urgent funding;
- second, a priority programme for the medium term.

1.1 Prospective trends in transport demand

The baseline situation prior to 1989

Until 1989, trade flows in Central and Eastern Europe largely reflected the way in which industrial production was organised by the Council for Mutual Economic Assistance (CMEA or COMECON) under the leadership of the Soviet Union. This centralised planning system gave priority to basic industries and the rail transport mode.

In the former Soviet Union, rail accounted for 84 per cent of land freight transport in **1988.** This figure ranged from **47** per cent to *76* per cent in the other European CMEA countries (1).

Bulk rail freight transit traffic was in the order of 20 million tonnes **a** year for the Czech and Slovak Republics, Hungary, the GDR and Poland. The total tonnages carried **by** these networks were greater than those carried by the FRG and France (2), reflecting the predominance of heavy industry.

Traffic was for the most part low value-added goods, much of it being hauled over long distances. In Central Europe the transport volume per unit of GDP was about five times that of Western Europe (1.8 t-km/Ecu as against 0.36) **(3).**

Passenger transport was dominated by urban public transport. Overall mobility **was** about half that seen in Western Europe, i.e. 4 000 to 7 000 km **a** year, because of the low car ownership rate. This resulted however in a public transport ridership rate about twice as high as in Western Europe.

Inter-urban trips accounted for less **than** half of total travel in terms of passenger-kilometres (40 to **45** per cent), whereas in Western Europe they account for about two-thirds. Two modes predominated: train and coach.

Table 1. **Freight traffic modal split 1988**
(percentage of total t-km)

With) Maritime Without) traffic	RAIL	ROAD	INLAND WATERWAY	SEA	TOTAL
Former Soviet Union	**74** **84**	3 **11**	**5** **5**	**19**	100 100
German Democratic **Republic**	**38** **76**	5 21	1 3	**55**	100 100
Poland	**34** 75	3 24	0 1	63	100 100
Czech and Slovak Republics	70 72	13 23	5 5	11	100 100
Hungary	50 58	17 36	5 6	28	100 100
Romania	84	16	n.a.	n.a.	100
	19 47	11 47	2 6	68	100 100
former **Yugoslavia**	8 40	7 **46**	1 14	84	100 100

n.a.= not available

Source: UN-EC

Air **transport** occupied a significant place only in the Soviet Union, where it amounted to about half the rail passenger traffic. In Central Europe air transport amounted to only 10 per cent of rail traffic, **as** compared with about 80 per cent in France.

These **few** figures clearly show the enormous **gap** which separated the two Europes, due to the Iron Curtain and the different economic **systems.**

A break with the past in two stages

Once the Berlin Wall had come down and the Iron Curtain had disappeared, the picture was transformed in less than three years.

The transformation took place in two stages:

i) First, the countries of Central Europe regained their independence and embarked on transition to the market economy;

ii) second, the Soviet Union fell apart and subsequently the CIS **was** established at a **pace** which took **all** observers by surprise.

In one year trade flows between the Central European countries and the Soviet Union fell by over one-third, while exports from these countries to Western Europe increased by 23 per cent in 1990. This trend continued at the same rate in 1991 (+ 25 per cent). In two years, trade between the countries of Central Europe and those of the EEC reached a level of 60 per cent, comparable to that seen within the Single Market of the European Community, This transition, achieved by means of "shock therapies", was far from painless **(4).**

There was a general decline in industrial production. It has been estimated for the two years 1990 and 1991 at 23 per cent for the Czech and Slovak Republics, 28 per cent for Hungary and **37** per cent for Poland. Certain heavy industries have been even harder hit, with production down by over 50 per cent.

All the trading patterns which the CMEA had built up have been disrupted. The result has been a drastic decline in the volume of bulk goods carried by the railways.

These changes have greatly benefited **road** transport, which was able to demonstrate its capacities for adaptation and flexibility to meet **an** increase in the transport of consumer goods and finished products over East West links (5), both between **East** European and EU countries and between the CIS and the EU, bringing about a surge in transit traffic (41). The trend is towards exports of heavy products to the EU, with imports of higher value-added products into Central and Eastern Europe; Central Europe is thus increasingly acting as **a** hub for European inland transport.

Many small private enterprises have been created, while the public conglomerates have had to restructure to form small units. Tariffs are being liberalised throughout the freight transport sector. Certain former State monopolies since privatised are now competing on international road transport markets. For this they have equipped themselves with modem trucks made in Western Europe. Examples are HUNGARO CAMION in Hungary and SOMAT in Bulgaria.

By contrast, the railway companies, because of their rigid and highly centralised organisation, and the large amount of artificial financial support they receive, are having difficulty in adapting to the changes.

Passenger transport has also changed very quickly: the initial increase in mobility and car ownership was very spectacular, the private **car** symbolising the refound freedom.

However, runaway inflation and costlier motor fuels then curbed this explosive trend in individual mobility. But this situation is likely to be short-lived; a return to growth after the phase of transition to the market economy will probably speed up the process again.

At the same time, Western Europe was rediscovering how close Central European countries are. All the Central European capitals can be reached from Western Europe in two hours by air, and most of them by an overnight train journey (1)(2).

In the opposite direction, tourist flows from Central Europe to the West have increased spectacularly, rising from some 5 million in 1986 to over **30** million in 1992. International coach transport has been the main beneficiary of this explosive market growth.

The pattern of air transport flows has completely changed. East-West traffic has grown by almost 50 per cent in three years, while the number of passengers on lines to the former Soviet Union has

fallen by almost two thirds. These trends still persist, though at a rather slower rate which is difficult to estimate precisely due to a lack of adequate statistical tools.

Can these trends, and the new trading patterns they generate, be expected to last? This is a key question in evaluating requirements for the modernisation of infrastructure networks and operating systems.

***Medium-term** demand trends*

Freight transport

Various attempts have been made to simulate the development of trade between Eastern and Western Europe.

First, a study by the PROGNOS Institute (6), whose findings were presented at an ECMT Seminar in December 1990, foresees a tenfold rise in the value of Western imports from Eastern Europe by the year 2000 and a thirteen-fold increase in the value of Western exports to Eastern Europe.

Per capita exports by East European countries would thus be comparable, by the year 2000, with Western Europe's per capita exports in 1980. In terms of transport volumes, East-West trade would be multiplied by **4.4,** or an average annual increase of **14** per cent over the period 1989-2000.

Two scenarios were envisaged:

-- the first (unlikely) scenario in which the modal split would be maintained, led to a multiplication of tonnages by *5.7* in road transport, **4.4** on the railways and 3.1 on the waterways between 1989 and 2000;

-- the second scenario envisaged an alignment of the rail/road modal split on that seen in Western Europe, while the waterways would maintain their market share. This results in the following modal split:

road	63 per cent
rail	21 per cent
waterways	16 per cent.

Tonnages carried by rail between East and **West** increase by 60 per cent, while those carried by road increase by a factor **of 13.** This second scenario more or less corresponds with the trend actually seen over the past three years.

Other studies have since been carried out by various institutes. They do not shed any really new light because of the great uncertainties which remain, especially about how long the transition period will take and what medium-term GDP growth rates are likely to be achieved.

However, attention should be drawn to the particular case of the East German Länder **(7);** a normative method was used to assess the impact of German reunification, assuming that the aim of catching up economically and approaching the productive structure of the old Länder by horizon 2010 would be achieved (8).

Road transport, with an increase in traffic **of** 81 per cent, is the main beneficiary of reunification, with the waterways increasing their volume of traffic by 25 per cent. But rail tonnage falls by 13 per cent.

All studies show that bottlenecks occur at frontier crossing points because of:

-- fierce increase in international East-West trade **flows;**
-- inadequate infrastructures.

A study carried out for the Polish Roads Department forecasts a fourfold increase in international East-West road traffic crossing Polish frontiers between 1990 and 2020 (9).

These forecasts are consistent with those made by the Japanese International Cooperation Agency -- JICA -- in 1992 (10).

Without intervention in the way the freight **transport** market operates, this increase **in** traffic will be accompanied by **a** significant change in modal split, W. Rothengatter (7) foresees a sharp **fall** in rail's share even if the quality of the rail infrastructure is improved. This major trend could have adverse consequences, given the present state of the road network.

Table 2. Forecast long-distance freight traffic modal split in Germany Reference scenario (million tonnes)

Transport mode	1988	2010	Growth rate
RAIL			
Old Länder	283	367	30 %
New Länder (incl. Berlin)	310	90	- 71 %
Between old and new Länder	12	70	483 %
Total	605	527	- 13 %
ROAD			
Old Länder	419	591	41 %
New Länder (incl. Berlin)	28	140	400 %
Between old and new Länder	11	101	818 %
Total	458	832	81 %
INLAND WATERWAYS			
Old Länder	222	263	18 %
New Länder (incl. Berlin)	24	46	92 %
Between old and new Länder	21	26	24 %
Total	267	335	25 %

Source; "Transportation Infrastructure Planning" Colloquium, 1993.

Passenger transport

How passenger traffic evolves depends very largely on changes in lifestyles and car ownership rates. The relationship between income level and car ownership is not stable.

We can nevertheless expect a significant increase in car ownership rates in the medium term. Information supplied by ECMT Member countries during **a** recent survey (11) shows that:

Private car ownership rates are expected to increase **as** follows:

- from **22.4** per cent in 1988 to 51.3 per cent in 2010, in Eastern Germany;
- from 14 per cent in 1990 to 26 per cent in 2000, in Poland;
- from under 20 per cent on average in 1988 to 45 per cent in 2010 for the combined Eastern European countries.

A study carried out by INTRAPLAN (12) for the Community of European Railways, covering all passenger traffic over distances of more than 80 km in the European area (excluding the CIS) foresees

a total increase in traffic volume (passenger-kilometres) of 40 per cent between 1988 and 2010, The increase for individual modes is expected to be 37 per cent for roads, 18 per cent for rail and 85 per cent for air transport. The increases in Central Europe will be greater and will be very sensitive to improvements in supply.

We need to examine all these evaluations carefully. Shortcomings in the statistics available in fact greatly complicate forecasting and can lead to.

Thus, in **a** study published in 1992 (12), the United Nations Economic Commission for Europe forecast for Poland, in a strong economic growth scenario, a demand for international trips amounting to 100 million passengers in the year 2000. In fact this figure was already exceeded as early **as** 1991 (13).

It is not the aim of this report to analyse the **reasons** for these errors in **detail,** but two common pitfalls deserve mention because they can affect the profitability and feasibility of certain types of funding arrangements:

i) The difficulty of fixing a reference situation **in** such an unstable context. This is **why** "normative" approaches, though apparently arbitrary, often seem to **be** more relevant than conventional econometric modelling;

ii) The inadequacy and lack of reliability of the statistical sources available. Actual outcomes are known only after long delays and sometimes even then only roughly and with wide margins of error.

Recent efforts to develop the COMEXT base (14) should improve this situation, but the sheer size of the task means that it will take time and perseverance. What is more, regardless of these methodological questions about statistical quality and reliability, it is very uncertain how successful the new economic policies will be.

1.2 Present state of infrastructures and transport systems

These prospects for traffic growth, both freight and passenger, naturally raise the question of how well existing infrastructures and transport systems can cope with such an increase in demand.

The road network

The present situation as regards the road network in Central **Europe** differs considerably from that in the former Soviet Union where the road density **is** extremely low, even in relation to population density. The motorway network is virtually non-existent and highways serve only the main conurbations, while most roads in rural areas are not paved and are highly sensitive to weather conditions.

By contrast, the road network in Central Europe is dense, although of very uneven quality and comparable in density to the EU network. The **total** length of the network in the **six** countries of this region is 704 170 km, of which 206 280 **km** (29 per cent) highways.

Except in Eastern Germany, which benefited from the Third Reich's large scale commitment to building autobahns, Central Europe has very few motorways.

The greater part of the existing network is in a poor, if not very poor, state. A World Bank survey in 1991 (15) found that 82 per cent of the existing road network required substantial renovation, reconstruction, rehabilitation and/or resurfacing.

Many local roads are not paved (60 per cent of the local network in Poland). Very few towns have bypasses, so transit traffic has to pass through town centres. This already precarious situation was further aggravated during the 80s by very serious under-investment.

World Bank data indicate that very rapid action is required on 41 per cent of the network. Renovation and reinforcement of carriageways over the major axes are essential. The associated civil engineering structures also require a considerable renovation effort.

Most main roads are not frost-proof, which can lead to disastrous consequences entailing very high costs in harsh winters (15). The present road network cannot cope with strong traffic growth.

Rapid growth in road freight transport flows needs to be controlled; if not, there will be a rapid deterioration in roads, bridges and other infrastructure. It is essential to act now in order to avoid substantial additional costs in the medium and longer term and intolerable pollution.

Vehicle stocks

In the former Soviet Union, the priority given to rail transport partly explains the small truck stock. Poor maintenance aggravates the situation by immobilising many vehicles. Low tonnage distribution vehicles required for interurban rail freight traffic terminal hauls are in very short supply.

In Central Europe the situation is better, but still not satisfactory, notably in Poland, Hungary and the Czech and Slovak Republics. Here the problems are more a matter of vehicle quality and maintenance than any quantitative shortage. For international road haulage, which constitutes an important source of hard currencies, the problem has been solved by importing substantial fleets from the West, but the problem of maintenance and repair remains crucial **(15).**

Regarding public passenger transport, the very great relative importance of public transport has not led to the provision of vehicles that can satisfactorily meet this demand.

The situation is very bad in the former Soviet Union, while it appears more balanced in Central Europe, at least in terms of quantity.

The rail network

Existing rail networks are too extensive and inadequately equipped; only 16 per cent of the lines in Hungary are double track, and only 18 per cent in Bulgaria.

In the former Soviet Union, railways practically constituted a State within the State. A highly centralised Ministry of Communications employed 2.4 million people, i.e. more than all 14 networks in the Community of European Railways combined.

For Central European networks the picture was not quite as bad as that, but it was comparable, though a few networks had managed to achieve a certain degree of autonomy vis-à-vis the State.

This was the case in Poland and the Czech and Slovak Republics, permitting a certain minimum of flexibility in management and commercial policy.

On the infrastructure side, the situation is generally poor, 25 per cent of the lines being in an unsatisfactory technical condition. Rail networks, like road networks, have suffered drastic cuts in resources earmarked for maintenance, which amount to only about 20 per cent of maintenance resources in the West European networks. A shortage of spare parts and lack of maintenance explain the low availability rate for rolling stock (16).

Table 3. **Existing road and rail infrastructures (length and density)**

COUNTRY	ROAD NETWORK km	ROAD NETWORK km/km²	ROAD NETWORK km	ROAD NETWORK km/km²
BELARUS	48 902	0.24	9 800	0.047
ESTONIA	14 811	0.33	1 026	0.023
LATVIA	20 688	0.32	2 397	0.037
LITHUANIA	40 565	0.62	2 672	0.041
POLAND	231 700	0.74	26 550	0.085
UKRAINE	180 000	0.30	18 100	0.030
HUNGARY	29 700	0.32	7 875	0.085
ROMANIA	72 800	0.31	11 275	0.048
CZECH REPUBLIC	55 887	0.70	9 454	0.119
SLOVAK REPUBLIC	17 600	0.50	3 400	0.100
BULGARIA	36 900	**0.33**	**4** 300	0.039
FORMER GDR	47 200	0.44	14 024	0.129

Sources: **VIATEK** (Finland) Study carried out for the UN-ECE (1993) (18),
IRF Statistical Yearbook (1989),
SEV Statistical Yearbook (COMECON, 1989)

On top of this there are problems of commercial and personnel management, a lack of computer resources, excessively low fares for passenger transport, etc. (17). These also result in frequent breakdowns and consequent disruption of services. Only 9 per cent of lines are equipped with automatic sections and 40 per cent with remote point switching.

Border crossing formalities are another problem; the time railways waste on them far exceeds any time savings they could make by improving commercial speeds. But, in this respect, rail is no worse off than road transport, since lorries also have to wait a long time at borders.

Despite this very unfavourable context, a determination to modernise is evident in certain Central European networks (in Poland, for example). The requirements for technical, management and logistical training are therefore at least as important as the requirements for the modernisation of infrastructures and rolling stock.

The air transport network

The general remarks made above also apply to the air transport sector. Airlines were closely linked to Civil Aviation Ministries.

Fleets consist mainly of technologically obsolete Soviet-built aircraft with high fuel consumption and high noise levels. Maintenance costs are high and overhauls frequent, relatively long and costly. Airports are sufficient in number but most air traffic control systems are inadequate. Many airports are at present controlled by the military and the infrastructures offer more than adequate scope for development.

So priority needs in the airline sector are modernisation of fleets together with traffic management and control systems.

Inland waterways

In the former Soviet Union, the main freight transport flows do not correspond with the river and waterway routes. On top of that, its harsh climate makes most navigable waterways unusable for over half the year. For this reason waterway traffic represents only 3 per cent of total tonne-kilometres in this region. The situation is similar in the non-Danube countries of Central Europe.

In the Danube States on the other hand, waterway transport occupies a significant place. In former Yugoslavia, waterways carried traffic equivalent to that of rail and road together (in terms of t-km).

The coming into service of the Rhine-Main-Danube broad gauge corridor in 1992 made it possible to link the North Sea ports directly with the Danube States and the Black Sea. This 3 500 km Pan-European waterway serves 13 countries, with a total population *226* million.

The Danube river ports are likely to develop substantially provided that the political situation stabilises in the Balkans. At present these ports have inadequate facilities, while poor road and rail connections prevent them from serving hinterlands satisfactorily.

Inland waterway companies manage fleets with excess capacities and craft unsuitable for modern conditions. They have ample bulk cargo capacities but very few specialised craft. The situation is particularly critical in Romania.

Maritime transport

In the former Soviet Union, maritime transport was organised in much the same way as rail transport. It was controlled by the Ministry for the Merchant Navy, MINMORFLOT, which closely supervised the activities of 17 companies based in the Baltic, Black Sea and Pacific ports.

The quality of the former Soviet merchant fleet is fairly good compared with that **of** other modes. On the other hand, ports require major upgrading.

Maritime transport occupies a more modest glace in the Central European countries.

As trade **flows** evolve, **in** terms of both cargo and geographical trading patterns, ports will require extensive upgrading.

Overall, the countries **of** Central and Eastern Europe have substantial transport infrastructures, but conspicuous failure to modernise them or even maintain them, especially over the past 15 years, has resulted in a very poor general standard. For equipment **and** operating systems the situation **is** even more critical (19).

Transport systems are extremely rigid in their organisation because they have been stifled by centralisation. Economic and financial management are made very difficult by artificial pricing systems which do not reflect actual costs.

1.3 Comparison of prospective trends in medium-term supply and demand

From **a** mode-by-mode comparison of the transport needs which foreseeable demand trends will generate in the medium term, and in the light of the present state of affairs as set out above, we can identify a number of critical situations and major malfunctions.

At this stage, attention will simply be drawn to certain conclusions that are important for analysing funding requirements:

i) Conventional approaches almost exclusively lay stress on what is most visible: the physical transport infrastructures. There are admittedly very substantial infrastructural requirements which urgently need to be met (for example, in upgrading and maintaining the major national and international road axes).

But the above analysis, together with several recent studies by very diverse bodies **(3)** (5) (17) (19), show how little purpose it would serve to modernise existing infrastructures or build new ones without considerable efforts at the same time to:

-- modernise equipment and operating systems;

-- introduce or develop today's information technologies (computer systems, data transmission, aids to operation and traffic management, etc.);

-- introduce powerful management tools;

-- thoroughly overhaul the existing organisation by decentralising structures and allocating responsibilities;

-- simplify frontier formalities so as to facilitate transfers and transit.

This suggests that investment in "software" will be at least as important, if not more so, than conventional investment in "hardware". It would be wrong, though, to go from one extreme to the other: instead, investment needs must be evaluated according to the operating requirements of transport systems as a whole. They must, too, be evaluated with an eye to efficiency and economy, since available resources will be so scarce and the task so enormous.

ii) Market forces, if left to themselves, might foster rapid growth in road transport to the detriment of other modes, especially rail transport.

This applies both to freight and to passenger transport. The flexibility of road haulage, together with households' desire to acquire a car, symbol of freedom, explains this dominant demand trend, whose strength must not be underestimated. In fact it almost amounts to a tidal wave.

But existing road networks could not handle uncontrolled growth in road traffic without serious damage. Roads, bridges etc. would probably deteriorate rapidly, while the lack of adequate signs, signals and road safety equipment would cause a disturbing increase in road accidents, with their inevitable toll of deaths and injuries.

The studies show that any effort to modernise the railways will have only a slight effect on this trend unless the transport market conditions are significantly changed.

The most credible response, though it will not be enough by itself, is to develop combined transport. If this option is adopted, which is desirable on grounds of environmental protection, road safety and reducing congestion, we need to measure its cost-effectiveness and then devise appropriate funding schemes.

Combined transport in fact requires not only specific infrastructures -- gantries, transfer terminals, special facilities -- but also an efficient logistical organisation, today only embryonic or even non-existent in certain countries.

So the challenge will be to design an appropriate logistical organisation that is attractive and efficient enough to compete with road haulage. If the Ministers responsible for transport confirm their interest in combined transport, it would appear desirable to proceed rapidly to technical and economic feasibility studies, especially for the major East-West axes.

This debate is in fact not limited to rail/road competition, but also directly concerns the future of waterway and maritime transport.

iii) Attention was drawn above to bottlenecks at frontier crossing points. These are bound to worsen as international East-West traffic grows rapidly (17).

For almost half a century European infrastructure networks integrated the fact of the East-West divide, born of the cold war and the strict control of international travel (systematic use of visas).

There are therefore a substantial number of "missing links" threatening to impede the growth of trade unless priority investments are made to fill them in.

These few examples demonstrate the interrelated nature of the problems, how urgent it is to modernise transport systems rapidly, and as a whole (not only infrastructures), they also demonstrate the need to programme investments in the context of what must be called, even though the concept has been debased and has a negative connotation in these countries: an overall plan.

Market logic is blind: it can lead to dead ends and serious malfunctions.

iv) The structure of flows has changed radically in three years, and this trend is likely to continue unless some political mishap disrupts the process of European integration.

So it is not a matter of renovating the entire existing infrastructures and systems which are a product of the past, reflecting a bygone pattern of economic organisation. Instead, modernisation investments must be selected to reflect current trends and geographical reorganisation of flows. This implies choices and trade-offs, many of them hard to make in view of their social repercussions.

1.4 Ranking of choices and investment priorities

How can these countries systematically assess their funding requirements with an eye to economic efficiency and productivity, without calling into question their commitment to the market economy?

This raises the whole problem of ranking investment decisions and priorities. This exercise should be guided by two principles:

- decisions should be consistent with European master plans and agreements for transport network planning;

- they should aim at efficiency, which means maximising the productivity of investments,

The difficulty lies in the fact that while short-term financial profitability is not a sufficient criterion, it would be unreasonable to waste the scarce resources available by spending too many of them on environmental protection or social considerations.

But what are the procedures required to put these principles into practice?

Does Europe really have any master plans for priority corridors on which there is a sufficient consensus to serve as a working basis?

How can the concept of efficiency be reconciled with a multicriteria approach?

These fundamental questions are central to the method of ranking funding requirements presented here.

The planning of European transport systems

On 31 October 1991, representatives of European governments and parliaments and certain international organisations adopted a declaration on a "Pan-European Transport Policy", which has become known as the PRAGUE Declaration.

This is not a planning exercise as such, but a statement of certain broad principles to be respected. It is based on a limited number of objectives:

- an international approach to infrastructure projects to permit "spatial integration";
- integration of environmental impact studies and socio-economic evaluations;
- multimodal integration based on analysing transport chains and seeking the overall efficiency of transport systems.

Transport network renovation thus has to take account of operating conditions and demand.

On the basis of the principles set out in the Prague Declaration, three levels can be distinguished in the organisation of transport systems **(20):**

- the **support network,** which includes infrastructures and fixed installations;
- the **forwarding network,** consisting of the equipment necessary for traffic management and for organising transfers and transhipments;
- the **services network** created by real trade flows, which determine the structure of transport supply.

It is also worth stressing the importance of mechanisms for regulating the integrated European transport system. These can operate at three levels:

- "**regulation through the market**", based on decentralised decisions and initiatives;
- "**institutional regulation**", whose aim is to ensure the rights of local, regional, national and international authorities to make decisions within their respective competence;
- "**transport system regulation**", favouring multimodal coordination and the more efficient organisation of transport chains.

The planning exercise envisaged here consists precisely of combining these different levels of regulation. For this purpose, the most appropriate way for the various decision-making authorities to link up is by entering into contracts with one another.

At first sight, this may seem too general, and perhaps too theoretical, a way to set about ranking the system's funding requirements. But the author is convinced that it is a much better method than simply drawing links on a map or writing them into a master plan.

It would be wrong, even so, to underestimate the UN-ECE's earlier achievements, against a more difficult political background, in devising European master plans and agreements on:

- trunk lines of communication (AGR);
- international railway lines (AGC);
- international combined transport lines (AGTC);
- the carriage of dangerous goods;
- anti-pollution standards.

The UN-ECE is also leading international cooperation on certain priority **links:** North-South motorways and railway lines **(TEM** and TER).

Even so, all these master plans do now need to be reconsidered in the light of the Prague Declaration principles, taking account of the financial constraint. It may be misleading to publish such glans if the financial resources necessary to implement them do not exist.

The sums involved are indeed considerable. According to the World Bank, the upgrading of major road axes in the six Central European countries would cost some 18 billion Ecu.

The EBRD estimates that establishing a motorway network in Central and Eastern Europe consistent with the master plans would cost **45** billion Ecu (21).

The renovation and modernisation of the major rail axes, again according to the EBRD, would cost about Ecu **30** billion, without allowing for any high-speed lines **that** might be constructed.

The EBRD estimates the cost of modernising the road transport infrastructures, other than motorways, of the Central and Eastern European countries (excluding the CIS) at some 30 billion Ecu.

The order of magnitude for the financing of all these projects is thus over 100 billion Ecu, or the equivalent of more than ten years' investment in the transport sector (all modes together) in the whole of the EU.

These few figures may be compared with annual transport infrastructure investment in the **EU,** which is in the order of 9 billion Ecu.

They should also be compared in scale with the amount of loans and subsidies disbursed by international organisations every year -- some Ecu 1 to 2 billion. These estimates may be open to discussion, since they are very approximate, but they do establish an order of magnitude which confirms how important the financial constraint will be in any planning exercise and the time scale necessary for effective implementation **of** such a programme.

The economic and social efficiency of the projects

Alongside this broad, macroeconomic programming approach, planners will have to allow for requirements at microeconomic and project level.

This can best be done on a basis of cost-effectiveness.

In addition to the costs and benefits normally taken into account by the operator in his profitability calculation, accessibility criteria should be allowed for **(41).** It is also necessary to internalise any negative (and positive) environmental impacts, the social costs to the community as **a** whole and congestion-related costs.

Transport investment projects often also have a positive impact on related activities, notably around trading centres. This results in capital gains, positive externalities which should be included in the economic calculations. Of relevance here has been Japan's experience after it privatised the Japanese National Railways. A valuation exercise was undertaken to include the projects and the associated real estate and commercial operations. Similar experiments in France and the United States provide further examples.

For valuation purposes, the planner must calculate or estimate:

- an internal rate of return to the operator for each of these projects;
- an economic and social rate of return;
- gains and losses of accessibility;
- the value of certain indicators which are quantifiable in physical terms, but not monetary.
- costs of environmental protection measures to reduce any pollution the project would generate.

Ranking the priorities

The multidimensional and multicriteria nature of this evaluation process means that it is not possible to arrive at a definitive ranking of projects immediately.

Successive iterations, linked in particular with the establishment of contractual procedures between the different decision levels (institutional regulation), should gradually lead to the emergence of a consensus, provided that the financial constraint does not nip the entire exercise in the bud.

The map of priority multimodal corridors

The Resolution on infrastructure in a Pan-European context adopted by the ECMT Council of Ministers at its Noordwijk meeting on **26** and **27** May 1993 calls for "a **small** number of priority transport infrastructure corridors to be identified for development in a Pan-European context".

The outcome of this work is to be presented to the second All-European Transport Conference scheduled for March 1994.

The working paper presented below was prepared as part of this exercise, in accordance with the decisions taken **by** the Group on Trends in International Traffic on 8 September 1993.

The purpose of the proposed corridors would be to ensure that the EU's "Trans-European" networks interconnect satisfactorily with transport infrastructures in other ECMT countries.

The aim is not to identify specific lines or routes, but to indicate the main transport links in a Pan-European context. The proposed corridors would thus be broad strips 100 or even 200 kilometres wide on either side of an axis.

They would be multimodal and in no way presuppose which mode would actually serve **a** particular route. **A** route could be served **by** one or several modes in competition with, or complementing, one another (combined transport).

They would carry both passenger and/or freight traffic.

New infrastructure, and thus major investments, would not be systematically required. Most of these corridors are already equipped with infrastructure that might require only minor modifications at certain points.

These corridors would be multimodal, but in no way presuppose systematic modernisation over the entire length of the axis, the road link and the rail link. Combined transport experiments could be tried over certain major axes, as could innovations in managing traffic information flows and the organisation of traffic systems.

Some modes will be in a favourable geographical position affording them growth potential which they can exploit by introducing multimodal freight terminals and trade centres.

Budapest, Berlin and Prague could thus capitalise on their traditional historical role as trading centres.

These priority links and nodes could be modernised gradually, the priority being to eliminate transfrontier bottlenecks and thus promote an efficient multimodal approach.

For this purpose, a compromise must be found between a microeconomic approach by project, essential to avoid wasting resources, and a global planning approach consistent with national and international programmes. But everything depends on whether or not it will be possible to finance these investments.

2. Investment Funding Sources and Instruments

Aside from the technical details of greater or lesser complexity, two fundamental questions arise with respect to the funding of investment:

i) Who pays?
ii) Over what period?

In the last analysis, there are only two replies to the first question:

-- transport system/users;
-- taxpayers.

Funding techniques do in fact serve to defer maturity dates by manipulating time to adjust the imbalance existing between the large volume of funds called for in the short term and the insufficient resources available.

The difference between private and public funding can be seen in the same context: with the first, the user ultimately has to cover the total cost, whereas with public funding the taxpayer usually takes over directly or indirectly from the user by means of subsidies, loans or guarantees.

This general pattern is to be found in the funding of investment for the modernisation of the transport systems in Central and Eastern Europe, although there is an additional dimension in that the costs can be borne not only by users and taxpayers but also by the international community through one channel or another.

Before examining the pros and cons of potential funding instruments, let us review the different sources of finance available for projects to modernise transport infrastructure and systems.

2.1 Sources of finance

The sources are many and varied, but it is important to differentiate between national and international funds in view of the monetary systems in use. Most of the countries of Central and Eastern Europe have now joined the International Monetary Fund, but the high levels of inflation prevailing in them and the persistent problem of convertibility considerably complicate funding procedures.

In countries like Poland (since 1990), Hungary, and the Czech and Slovak Republics (since 1991), currencies have become convertible, but the parity of the rouble vis-à-vis western currencies is still problematical.

Rates of exchange are adjusted frequently. The collapse of COMECON and the economic difficulties of the former USSR have prompted the Central European countries to seek some of their supplies in the countries of Western Europe, so payment for these usually has to be in a hard currency, a fact that is a severe constraint, as well as being conducive to the integration of Europe as a whole.

Account therefore has to be taken of this complex reality when funding investment projects, so the distinction between finance of national origin and funds from abroad in hard currencies is important.

The break-up of the former USSR has made the situation much more complex by disrupting the operation of the rouble area. The Baltic states left this area in 1991 in order to get away from the economic control of the Soviet Union.

Since summer 1992, Estonia has had the "kroon", which is linked to the mark and stable against the dollar. Lithuania and Latvia first established currencies on a provisional basis: the Lithuanian "talona" and the Latvian rouble, which have now become national currencies. The Ukraine introduced "Karbonavets" (coupons) precursory to a national currency. This currency is not stable against the rouble, the value of which has itself diminished considerably against the dollar.

Highly contrasting situations are therefore to be found in what is a delicate and complex process of transition.

International funding

In the context described above, international funding is of particular interest and can play a dynamic role. The sources are extremely diverse, but the following may be singled out initially:

- loans in hard currencies from western consortium banks;
- recourse to international capital markets (shares, bonds, etc.);
- assistance and soft loans from western governments under bilateral agreements;

- soft loans, grants and guarantees from international financial institutions such as the World Bank, EBRD, EIB, etc.;

- assistance provided by international organisations: the EEC PHARE programme, the United Nations Development Programme (UNDP), etc.;

- stand-by credit issued by the International Monetary Fund to promote macro-economic stability may also make an indirect contribution to funding.

National sources of finance

Most national finance earmarked for investment in transport systems previously came from central government budgets, which have now been cut back considerably.

At the same time, the transition towards a market economy since 1989 has led to the establishment of national financial markets offering new possibilities for calling on bank loans and public savings.

Financial markets are going to develop as a result of the privatisation of many state enterprises, more particularly in the banking and financial sectors.

An expanding role will be played by local and regional authorities, etc.

The effective mobilisation of these various sources of national finance has been made more complicated by the economic difficulties bound up with the transition towards the market, i.e. a recession combined with a high rate of inflation.

Accordingly, the authorities of Central and Eastern European countries are focusing particular attention on funds from financial institutions and international organisations, so more thorough consideration should be given to the scope offered by these institutions.

2.2 Funds from financial institutions and international orgunisations

Two main types can be singled out:

i) International governmental organisations;
ii) International financial institutions.

Funding by international governmental organisations

The PHARE programme

The PHARE programme (22) is the product of the European Economic Community's efforts to support the process of economic reorganisation under way in the countries of Central and Eastern Europe. It was set up under EEC Council Regulation No. 3906/89 of 18 December 1989 (Official Journal L375 of 23rd December 1989).

It was initially confined to Hungary and Poland and subsequently -- under EEC Council Regulation No. 2698/90 of 17 September 1990 -- extended to other countries of Central and Eastern Europe: Bulgaria, Romania, the Czech and Slovak Republics, the former Yugoslavia and Democratic Republic of Germany.

The Democratic Republic of Germany has since been reunified with the Federal Republic of Germany as a full member of the European Community. The Eastern Länder therefore have the various financial resources provided for in the context of the EEC regional and transport policies.

More recently, EEC Regulations No. 3800/91 (Official Journal L357/91) and No. 2334/92 (Official Journal L227/92) broadened the scope of the PHARE programme to include Albania, the Baltic countries and Slovenia. The programme allocates resources from the Community budget whereby the beneficiary countries can finance reconstruction programmes which they run themselves.

The national authorities are responsible for implementing the PHARE programme, priority being accorded to sectoral development projects for policy reforms rather than to separate one-off projects. The European Commission's services help to draw up the projects and specifications, and supervise and monitor invitations to tender, the signing of contracts and payment. In the last analysis however, it is up to the beneficiary countries to assume responsibility and take the decisions.

Overall, the PHARE budget totalled Ecu 500 million in 1990, 785 million in 1991 and 1 billion in 1992 in non-repayable grants. There is also a loan programme for the establishment of joint undertakings.

There have so far been very few aid projects to finance investment of direct concern to the transport sector, although it may be noted that a decision was taken on 30 July 1992 to set up a programme in Albania for a total of Ecu 4.4 million for the improvement of

- urban and inter-city passenger transport;
- freight transport.

In 1992, Ecu 21 million were committed under a three-year programme for the modernisation of transport in all the countries of Central Europe. The programme consists of four sections:

- improvement to frontier crossings: Ecu 15 million;
- studies for the North-South Trans-European Motorway (TEM) and the North-South rail link: Ecu 2 million;
- a training and technical assistance programme: Ecu 2 million;
- sectoral studies relating to the analysis of traffic flows, the improvement of waterways transport, combined transport and logistical techniques, and the upgrading of road infrastructure: Ecu 2 million.

These projects, involving a relatively small volume of resources, provide a basis for preparing work on a larger scale by facilitating the completion of preliminary studies for projects and the compilation of documentation. It has recently been decided to commit the PHARE programme more directly to project funding, which should facilitate certain types of funding arrangements. Ecu 30 million could be committed to such projects.

The United Nations Development Programme (UNDP)

This is a multilateral technical assistance programme which is primarily focused on the developing countries but was recently broadened to cover countries in transition in Eastern Europe. More particularly, the programme has helped to fund the modernisation of the transport sector's statistical databases in Eastern Europe where special interest has been shown in intermodal transport data.

The Council of Europe's Social Development Fund

Set up in 1956, the Fund grants soft loans, primarily for activities in the social sphere but may also fund projects for transport infrastructure and training. The capital was recently increased by Ecu 1 billion.

The countries of Central and Eastern Europe will be able to receive such loans after becoming members of the Fund.

Funding by International Financial Institutions

European Investment Bank

One of the Community's financial institutions, the European Investment Bank was soon active in Central Europe. It had already been financing projects in Yugoslavia since the 1970s.

The EIB's funding activity in the Central and Eastern European countries is governed by Article 18 of its constitutional rules whereby the Governors, acting unanimously on proposals by the Board of Directors, can authorise the Bank to grant loans for projects to be implemented outside the Community.

The EIB's activity is part of the Community's policy for co-operation with those countries to facilitate the transition towards a market economy.

In November 1989 the Bank's Board of Governors -- comprising Ministers for the economy and finance of the Community's 12 member states -- authorised the grant of loans up to Ecu 1 billion for projects in Poland and Hungary over a three-year period. The first loans were issued in summer 1990.

In February 1991 the EU Council asked the EIB to extend its activities to the Czech and Slovak Republics, Bulgaria and Romania. In April 1991 the Board of Governors authorised additional loans totalling Ecu 700 million (23).

At the European Council's meeting in Lisbon in June 1992, the twelve Heads of State and Government reaffirmed the EU's support for the process of political and economic reform in the countries of Central and Eastern Europe. They requested the EIB to continue and extend its lending in these countries.

Given the entry into force of the association agreements between the EU and the Baltic countries and also with Slovenia, the EIB is to broaden its scope for action in these countries.

The EIB is currently discussing the possibility of making another, larger, line of credit available, Another consideration is that some infrastructure projects for trans-European links that are of interest to the EU may qualify for funding under the European Growth Initiative.

The overall volume of loans granted under contracts actually signed between 1989 and 1992 totalled Ecu **820** million as follows:

-- 215 million in 1990
-- 285 million in 1991
-- **320** million in 1992

The transport sector's share of this amount was Ecu **140** million, or 17 per cent of the total loan contracts concluded up to the end of 1992. The projects financed included:

-- in Poland, the reconstruction of railway repair shops (Ecu 20 million) and Warsaw airport (Ecu 50 million);

-- in **Hungary,** a road network improvement programme (Ecu 50 million) and air traffic control facilities (Ecu 20 million).

A considerable number of projects in the whole area covered are currently being processed.

The EIB has taken part in technical studies with a view to the complete overhaul of the air traffic control system in Central Europe. The Bank offers loans to undertakings in both the public and private sectors covering **up** to 50 per cent of the total cost of a project, and as much **as** 70 per cent for a project under the European Growth Initiative. Each project is analysed in great detail with respect to not only its economic **and** financial return but also from the standpoint of protection of the environment, competitive tendering rules, technical soundness of documentation, and its impact on employment, regional development and European integration. The standards used for reference purposes in the various sectors are to a very large extent those laid down by existing Community Regulations and Directives.

Funds can only be granted by the EIB for projects whose technical, economic and financial viability have been established. The bank cannot invest in the share capital of enterprises, which means that it is classified among development banks (24).

The loans granted **by** the EIB in Central Europe are guaranteed by the European Community. Furthermore, the Community's member states -- the EIB's shareholders -- do not receive dividends, so the Bank can borrow on the international financial markets on excellent terms. It has the highest rating, "**AAA**", assigned by the relevant institutions and, given its relatively low administrative costs, can provide its borrowers with good terms as regards interest rates, maturity dates and currency mixes. Maturity dates are particularly important in the transport sector, especially in the case of investment in large-scale infrastructure. The loans granted by the EIB often cover long periods of **up** to 25 years, so the terms are very attractive.

EBRD

The European Bank for Reconstruction and Development (EBRD), set up in May 1990, was officially inaugurated on 15 April 1991. Its primary aim is to facilitate the transition towards a market economy and support public and private initiatives in the Countries of Central and Eastern Europe, including those which were part of the former USSR. It can operate in a much larger area in this region than the EIB since it covers not only the countries of Central Europe but also those of the CIS.

The countries of the Community, the Community as such and the EIB have a 51 per cent holding in the EBRD.

Under its constitutional rules, the EBRD should in principle work to a large extent as a commercial bank and devote the rest of its efforts to development bank activities, Like the EIB, it has an excellent "AAA" rating.

As of 31 December 1992, the EBRD had approved 70 projects which accounted for a total amount of Ecu 1.6 billion in loans. Three projects related directly to the transport sector and accounted for loans totalling Ecu 57.5 million (25).

In 1992 loans were granted for the following:

- the funding and modemisation of the commercial fleet of the Czechoslovakian airlines (CSA) for Ecu 20 million;
- upgrading and maintenance of roads in Bulgaria (including a section of the North-South Trans-European motorway -- TEM) for Ecu 35.5 million;
- participation in the funding of the Budapest ring-road for Ecu 2 million.

Since these arrangements have only recently been introduced, many projects are still at the appraisal and/or approval stage. Over the past two years the EBRD Board of Directors has examined some ten projects involving loans of around Ecu 400 million.

At the same time, technical assistance operations and studies have been initiated. As of 31 December 1992, 260 technical co-operation projects in 18 countries had been approved, 20 of them being in the transport sector. These relate to the regulation and modernisation of transport systems, the establishment and privatisation of undertakings, etc.

In eight countries, the EBRD has also funded analyses of the future role of the railways and determined the appropriate steps to be taken.

The EBRD was recently reorganised on a geographical basis; this should make it easier to maintain direct, regular contacts with the various countries concerned, and to put together and to speed up loans.

Over the next few years the EBRD can be expected to fund between six and eight projects per year, lending an average Ecu 40 million per project. This represents an overall loan budget of some Ecu 1.2 billion for five years, and a total investment sum of the order of Ecu 2 billion allowing for co-financing.

These various measures have been carried out in collaboration with the EIB and World Bank. The G24 Working Party on Transport, for which the Commission of the European Communities provides the Secretariat, also plays an active role in co-ordination.

A database has been established for the various projects undertaken in the CEECs and covers more than 1 000 projects, 90 of them in the transport sector.

The World Bank or IBRD

The International Bank for Reconstruction and Development (IBRD) or World Bank was set up in 1946 in accordance with a decision of principle taken during the Bretton Woods Conference which established an international monetary system after the Second World War.

The Bank's purpose was to provide funds for its less-developed member states to implement projects or programmes by means of Government loans to public or private bodies, the loans being guaranteed by the Government concerned. Most of the resources lent by the IBRD are obtained in the form of loans on international capital markets.

Since 1990, the World Bank has acquired nine new member countries, six of them in Central and Eastern Europe: Albania, Bulgaria, Estonia, the Russian Federation and the Czech and Slovak Republics (26).

The splitting up of the former USSR led to further applications for membership from Latvia, Lithuania and eleven other republics of the former Soviet Union, thus bringing the Bank's membership up to 173 States. Applications have also been received from Bosnia-Herzegovina, Croatia and Slovenia.

In order to cope with this new work, four new operational divisions have been set up since 1 April 1992 and, as from 1 December 1991, the Bank has had a new regional Vice-President whose responsibilities include the countries of Central and Eastern Europe and the new states which were formally part of the **USSR.**

Departments have been set up specifically to deal with Central and Eastern Europe. Overall, the IBRD allocates some 20 per cent of its loans to this geographical area, primarily to fund government programmes for economic reform.

A specific technical co-operation programme for $30 million was organised for 1992 to fund particular studies in the former **USSR.**

Loans have been granted in the context of a full programme for reform of the public sector to accompany the reform of enterprises. However, these steps relate only very indirectly to the transport sector.

The World Bank's annual reports on its activities in 1991 and 1992 (26) include no projects relating directly to the transport sector, although a number of studies and quality analyses were carried out, The IBRD wishes to focus its efforts on the upgrading of existing infrastructure.

The activity of the IBRD's subsidiary, the International Finance Corporation (IFC), is also quite limited in the transport sector at present.

Other International Financial Institutions

Central and Eastern Europe may well be of interest to other international financial institutions, one example being the Nordic Development Bank which is involved in a number of projects in countries around the Baltic.

Also relevant here is the active part that international leasing companies like EUROHMA can play. EUROFIMA was established in 1955 on the ECMT's initiative to provide lease/purchase facilities for UIC-standard rail equipment. EUROFIMA soon acquired a very high rating in international capital markets, which gave it access to capital on advantageous terms.

2.3 *Funding techniques*

The full gamut of funding techniques can be used, ranging from 100 per cent public funding to wholly private financing.

The two basic techniques are:

-- traditional public funding

-- wholly private funding.

Are these techniques applicable, and in what conditions, in the present context of Central and Eastern Europe?

What are their respective advantages and drawbacks?

We shall first examine these basic techniques; the more complex techniques will then be easier to understand.

Public funding

Transport infrastructure is often considered to be a basic element of economic and social organisation. Given the capital-intensive nature of the transport sector and the fact that some types of major infrastructure investment (ports, tunnels, etc.) cannot be split up into separate parts, it seemed natural to policy-makers to finance transport infrastructure out of public funds, with operation financed jointly by users and taxpayers.

The provision of transport infrastructure was thus considered to be part of the role of the state which, given the vital role that transport plays in economic activity, has the responsibility to fund it either directly or indirectly.

However, the financial constraints on central and local governments considerably reduce the scope for public funding, irrespective of the underlying political choices and economic policies.

In the traditional model, which prevailed in Western and Eastern Europe for nearly a century, costs were borne jointly by the taxpayer and the user; in principle, the user was charged on the basis of marginal cost.

In accordance with the principle of not earmarking resources -- whereby revenue is not allocated to specific uses -- governments have tended to allocate funds globally, resulting in a lack of transparency. It is for this reason that countries such as Hungary have created ancillary budgets or special funds financed out of specific taxes.

Projects are then usually financed by a combination of

- funds allocated directly out of the budget;

- borrowing, the cost of which (interest and capital) is paid for out of the state budget over what may be a fairly lengthy period of some 10 to 25 years.

Currently, the scope for public funding of infrastructure in most of the countries concerned is limited by the following constraints:

- reduced budgetary resources as a result of the severe economic recession;

- high levels of indebtedness, which make it impossible to bear any further large increase in public debt or financial commitment.

Private funding

With this kind of funding, all the costs are ultimately borne by the user. Cash flow is generated by levying a toll (or a charge that the user can clearly identify). The toll or charge must be sufficient to cover operating costs, repayment of the loans incurred to finance the project, and the return on the promoter's investment. The project has to be thoroughly appraised and the risks have to be shared out on a clear-cut basis.

It is more difficult to use private funding in the transport sector than in industry, for several reasons:

- project lead times are long -- 5 to 10 years for infrastructure;
- the technical risks can be high;
- projects have a very long life;
- loan repayment periods are often much shorter than the life of a project, making it difficult to adjust repayments to the rate at which cash flow will be generated, etc. (27).

Besides the technical and financial risks which have been mentioned, there may also be economic and political risks. "Undiluted" private funding is possible only if the promoter is sure that the rules of the game will not change and if he is able to estimate future effective demand with some accuracy. He must also be really free to set tolls and fares.

The size of the risks involved explains why up to now there have been very few privately-funded projects in Central and Eastern Europe.

However, mention can be made of several motorway projects in Hungary, the concessions for which have been granted to private consortia. Tolled sections and facilities -- service stations, shops, hotels, restaurants, etc. -- will be built on the M1 and M5 motorways (28).

Prequalification of bidders for the **MI** project started in September 1991. The total cost of the project was estimated at **US$** 210 million (1991). The concession-holder was finally selected at the beginning of 1993. The tolled section is scheduled to come into service by the end of 1995. It must be ready for the World Exhibition due to be held in Budapest in 1996 (29).

At the same time, a **20** km-long section will be built in Austria, increasing the total length of motonvay between Vienna and Budapest to 260 km (30).

This link will be a major improvement to East-West communications, although Austria has strong misgivings about any indiscriminate growth in transit traffic. However, the major regional co-operation initiatives that it has taken attest the importance that it attaches to the **area.** Mention may be made of the four-cornered initiative launched by Austria and Italy in **1989 to** promote the development of Hungary and the former Yugoslavia; this subsequently became five-comered when the Czech and **Slovak** Republics joined **in** 1990, and then "hexagonal" when Poland joined. This organisation, which recently became the "Central European Initiative", is a pressure group which does not have any funds of its own.

Two other projects in Hungary **can** be considered to come into the category of privately-financed projects:

- the construction of a bridge on the Danube and 20 km of expressway in the Szekszard region;
- the M5 motorway concession, although the government is contributing indirectly to the project via the infrastructure that already exists.

The feasibility of using this funding technique in a Central European country in transition thus seems to have been demonstrated, although it is not certain that it would be easy to apply in all countries in the region. The **EBRD** and the Hungarian government have undertaken studies to determine whether other motorway concession projects are feasible (31).

Mixed finding techniques

Between these two extremes, there is a whole range of intermediate techniques:

- special funds financed with the revenue from specific taxes, which can be used to build new infrastructure;
- semi-public companies or state-controlled public bodies that use private capital;
- the infrastructure **is** built by a private undertaking, which may also be responsible for operation, but the owner is public: funding is private but is guaranteed by the state;
- the infrastructure is built and financed entirely by the private sector, but is operated by a public body.

This list is not exhaustive. What are the advantages and drawbacks of each of these techniques?

Special Funds

Special funds are consistent with the principle of not earmarking expenditure provided that they take the form of "ancillary budgets" **(32).**

The ancillary budget remains under parliamentary control but is autonomous to a certain extent, Only the balance **is** shown in the general budget. This makes it possible to identify more clearly the amount **of** expenditures and the **uses** to which revenue is put, provided that **the** budget is in overall balance and that revenue increases in line with expenditure. It has been shown that this system works provided that it is soundly managed and regularly audited.

This is **not** simply **a** matter of accounting techniques but of putting in place efficient tools of management. **A** public entity or authority can be set up to make such structures easier to manage.

Hungary **has** some experience with such funds. **In** 1989 it **set** up a Road Fund financed essentially with the revenue from a special fuel tax (33).

The purpose of this fund is to develop, maintain and operate the national road network. The special tax **amounts** to **7-8** per cent of the selling price of fuel. The total tax on fuel is about 60 per cent. 10.5 billion Forints (about Ecu 100 million) were collected in 1991, and 18 billion Forints (Ecu 170 million) in 1992. According to A. Timar, the amount collected in 1991 was not sufficient to cover the minimum fixed costs of road maintenance, which he estimated to be between 16 and 18 billion Forints.

As a result of the failure to provide for the indexing of revenue when the fund **was** set up, expenditure rapidly **got** out of line with revenue. This shortcoming has since been corrected. In 1991 the breakdown of revenue was **as** follows:

-- fuel tax	**81** %
-- appropriations	**14** %
-- other	5 %

The breakdown of expenditure **seeks** to achieve **a** balance between development, maintenance and operation:

-- operation	**29** %
-- maintenance	25 %
-- development	45 %

The Fund **is** managed by a service attached to the National Highways Department in the Ministry **of** Transport. **A** databank containing information about the current state of the road network facilitates the setting of priorities.

This example **shows** that special funds are an effective way of managing, maintaining and modemising an existing network.

In its final **report** (10), the **Japan** International Co-operation Agency **(JICA)** recommended a similar solution for Poland. In recent years, the Polish road budget has been substantially reduced. In 2992, it was only a quarter of the budget for 1986 and 38 per cent of the budget for 1990. The situation with regard to the road budgets of local authorities is even more critical.

At the same time, the proportion of road tax revenue that is not earmarked has risen steeply. This situation is untenable in the medium term, since road traffic is growing very rapidly.

The creation of a fund on the Hungarian model would thus seem to be an appropriate solution, though it would leave unresolved the overall problem of co-ordinating the various modes.

On the same principle, it would be possible to finance the modernisation of the air traffic control system in the region by charging taxes for flying through airspace. This solution was adopted in France. In 1985, an ancillary budget -- the "Budget Annexe **de** la Navigation Adrienne" (BANA) -- was introduced and it has proved to be very effective.

However, this would deal with the problem only at a national level. The example of Western Europe shows that the absence of harmonisation can have very serious consequences. Despite the existence of Eurocontrol, there is frequent congestion of airspace, and the various computer systems are to a large degree incompatible with one another.

Recent studies show that advantage should be taken of the opportunity that has arisen to modernlse completely the air traffic control system in Central and Eastern Europe, to harmonize technical standards and to implement effective international co-operation. One means of doing this would probably be to create a special fund, provided that an efficient and consensual system of management can be devised.

It would also be appropriate to set up a fund for waterways, ports and airports. The aim would be to achieve a balanced, transparent system of quasi-taxes for the use of infrastructure.

In the rail sector, the problem is more complex because operating systems and infrastructure are closely integrated, and management is highly centralised and lacking in transparency.

The organisational changes under way should help to introduce a little more transparency into the way revenue is allocated.

The principles set out in the EC Directive 91/440 of 29 July 1991 -- concerning the separation of infrastructure management and operation in EC rail undertakings -- could serve as a model. The difficulties experienced for the past 35 years in the EC show that the time factor is an important variable that needs to be taken into account.

Specific charges could be introduced to finance certain types of clearly-identified investments. For example, an additional charge could be levied on rail tickets to finance the renovation of stations.

Semi-public ***undertakings and public undertakings***

A convenient way of combining public and private capital is to set up entities that are legally independent of the State or local authorities and that have their own corporate status.

This method is widely used in Western Europe for the various transport modes. It makes it possible to mobilise large amounts of public and private capital, often with a State guarantee for loans.

In the case of semi-public companies, foreign investors could be allowed to take minority stakes in the capital to facilitate the introduction of modern methods of management and organisation and

technology transfer. A very wide variety of funding arrangements is compatible with this type of legal and organisational structure.

In fact, the effectiveness of such structures and funding arrangements will depend on whether or not the company is free or not to operate without interference from the State. To allow it to do so, precise contractual arrangements must be negotiated by the State and the public undertaking (or semi-public company). These structures are also compatible with concessions and Build-Operate-Transfer(BOT) arrangements (34).

Under the latter arrangements, the concession-holder is responsible for building the infrastructure or, more generally, for carrying out the investment, and then for operating it for a period at least equal to the period of repayment of the capital that has been borrowed.

At the end of this period, ownership of the infrastructure and related facilities is transferred to the authority that granted the concession, which can decide whether or not to renew the concession, on terms to be negotiated by the parties (35).

An example of such an arrangement is the French system of tolled motorways. With the exception of one company (COFIROUTE) that is wholly private, these are run by semi-public companies which are controlled by a holding company -- *"Autoroutes de France".*

This system permits a certain amount of cross-subsidisation between projects. The cash flow generated by infrastructure for which the loans have been completely repaid can be used to finance extensions to the network. The system was widely used in the 19th century to finance the expansion of the rail network (the so-called "overspill" principle).

Revenue from one project can thus be used to finance another. The system has proved its effectiveness, although it has been criticised, principally by the Audit Office. Those who subscribe to the ultraliberal school of thought are opposed to such "half-way" arrangements, which in their view seek to reconcile principles that are irreconcilable. In fact, however, they are suited to the state undertaking culture that is frequently found in transport authorities.

Such arrangements have proved effective in Western Europe in several areas: motorways, ports, airports, urban public transport, etc.

Private operator -- Public owner

The concession to operate infrastructure can be granted to a private undertaking under the control of a public owner.

The land remains in public ownership. The relations between the owner and operator are specified by contract.

The concession-holder can be chosen by direct agreement or by issuing a restricted or open invitation to tender. The funding is usually private but some public funding in the form of contributions in kind, subsidies, loans or loan guarantees, is frequent. To a large degree, everything depends on the financial viability of the project.

The Build-Own-Transfer (BOT) technique referred to above is often used for this kind of project.

The key elements of the concession contract relate to:

i) the duration of the concession, and possible undertakings not to compete ;

ii) whether or not the operator is free to set charges;

iii) operating constraints imposed by the authority granting the concession: minimum service, rules regarding safety, exceptional measures relating to the strategic nature of the infrastructure, etc;

iv) the maintenance of the infrastructure by the concession-holder;

v) contributions by the authority granting the concession:

-- direct subsidies;
-- provision of existing infrastructure or operating systems;
-- back-up investment;
-- possible contributions to the cost of reducing any negative externalities.

The latter point is the subject of much debate. Should the concession-holder be made to pay for the cost of measures to reduce disamenities and negative externalities in general, or should the owner bear all or part of the cost of such measures?

In fact, this boils down to whether it is the user who should bear all the direct or indirect costs of a transport system.

The "polluter-pays" principle was introduced in the EC by the Single European Act, but it has not as yet been applied much in **the** transport sector.

In Central and Eastern Europe, it could perhaps be used to regulate intermodal competition in a manner consistent with the principles set out in the Prague Declaration.

But given the current lack of effective demand, except on some international routes, these principles would have to be applied very cautiously. The key question is whether the project is profitable or not for the concession-holder.

If the profitability is well below the rates of return that can be earned on savings, private promoters will clearly hesitate to invest in projects that are very risky -- given the difficult situation in the economies in transition -- and that offer a poor return,

The authorities granting concessions must carry out prior appraisals very carefully with a view to calculating as precisely as possible any public contributions that would help to facilitate implementation of the project.

The importance of government guarantees for loans must be stressed. Most international banks and financial institutions require guarantees before they will grant a loan. This is a frequent cause of the delays in disbursing loans. If the guarantees are provided by private institutions, they add on several points to the interest rate, increasing considerably the repayments and thus **the** final total costs of the project that are borne **by** the user.

If the authority granting the concession considers that the project is viable, it is thus preferable that it provides, if necessary, a loan guarantee rather than subsidise **part** of the project. But **in** the East European context it is sometimes unfeasible for governments to do ***so*** because they already have **a** high level ***of*** debt, and may not **wish** *to* increase their commitments.

Infrastructure built and financed by private investors but operated by a public body

This is **a** variant of the previous technique. The project is built entirely by a private promoter with private capital, Once the infrastructure **has** been completed, it is transferred to **a** public body that **is** responsible for operating it.

This solution is particularly appropriate when the project involves a transfer of technology. An international private promoter acts as general contractor. He **gets** together the necessary finance and then hands over the infrastructure to a local public operator.

Frequently, this type **of** solution stipulates that contracts which do not involve advanced technology -- such **as** certain types of carcase work and civil engineering -- must be placed with local suppliers. This question of "local preference" **is** often a subject of controversy.

Should international open tendering procedures **be** used **or** should preference be given to local firms with a view to generating linkage effects on the "investment multiplier" principle?

Another **factor** in **the** East European context **is** ***the*** hard/soft currency difference, In accordance with **GATT** rules, some international financial institutions make open tendering **a** condition for granting loans,

However, this general principle is qualified by certain unwritten rules. For projects in developing countries or countries in transition, less open tendering procedures for some contracts, or local preference requirements **as** high **as** 15 to 20 per cent, may be acceptable.

There is thus **a** very wide range of funding techniques, and each basic technique may have several variants. For example, the Build-Own-Transfer (BOT) technique has the following variants:

-- Build-Own-Transfer (BOT)
-- Build-Own-Operate-Transfer (BOOT)
-- Build-Own-Operate (BOO)
-- **Build-Own-Operate-Subsidise-Transfer** (BOOST)
-- Build-Lease-Transfer (BLT)

Financial engineering is becoming increasingly sophisticated, but in the context of Eastern Europe it has little to offer in addition to the basic techniques (36).

In fact, what is **striking** is the disparity between the number of existing techniques and the (relative) shortcomings of existing systems of funding.

3. Shortcomings of Existing Systems of Funding and Proposed Improvements

There is no shortage of funding techniques and sources of funding. But when one compares the amount of loans recently disbursed in Central and Eastern Europe by major international financial institutions with the needs of the area as estimated by the same institutions, the gap is blatant. The area needs tens or even hundreds of billions of Ecu, while the total amount of loans granted in the past three years amounts to less than 1 billion Ecu.

Assuming that international funding will continue to play a major role in the modernisation of transport systems in the region, at this rate the transition will take more than 50 years!

Given this paradoxical situation, we shall:

- examine more closely its causes;
- propose some solutions.

3.1 Difficulties encountered in implementing funding

International financial institutions will finance individual projects as soon as they exceed a certain size, rather than programmes.

Of course, they also provide package loans which are distributed by local banking institutions.

In practice, however, this procedure is reserved for small loans, usually for SMEs or local authorities, or small projects.

The World Bank, the EIB and the EBRD use different but similar procedures to draw up detailed instructions for each project. The World Bank **has** published instruction manuals that show how difficult and complex the exercise is.

These institutions require assessments of all the technical, financial, economic and environmental aspects of a proposed project. The latter aspect is becoming an increasingly important part of project appraisal.

Such appraisals make it possible to measure the various types of risks that could cause a project to fail.

The banks do not rely on what the promoters say; they require independent appraisals carried out by their own staff and/or outside consultants.

The appraisal procedure involves:

- analysis of the documentation submitted **by** the promoter and the drawing up of a preliminary opinion;

- sending a multidisciplinary team to carry out an appraisal on the ground;

- writing detailed financial and technical reports and an overall appraisal;

-- project monitoring, drawing up a report on the completion of the project, and an ex post appraisal.

The banks base their decisions on these independent appraisals. At the same time, they work out with the promoter the financing arrangements that are best suited to the project and each party's requirements.

The EIB also systematically consults the European Commission, as it is required to do under its rules of procedure (Article **21).** The procedure varies according to whether the project **is** located in the EU or an associated country. Finally, a loan contract containing the schedule of disbursements and repayments, **and** a Technical Annex, is signed.

This procedure takes at least four to six months and would be difficult to do more quickly. It is appropriate when the documents submitted by the promoter have been properly prepared.

Many promoters in Central and Eastern Europe are not used to this type of procedure.

With a view to helping them to prepare projects, several institutions have financed -- with support from the **PHARE** programme -- audits, studies and training. They have helped promoters to design projects and to *carry* out the essential preliminary studies. This all takes time and partly explains the situation prevailing today. Fortunately, though, that situation is starting to improve.

A second major obstacle slows down the disbursement of funds, and thus the speed at which projects are carried out -- the question of **guarantees.** Usually, state guarantees are required for loans provided by international financial institutions. However, most of the governments in Central and Eastern Europe are already overindebted and reluctant to enter into further commitments.

Yet guarantees are essential, because it is largely the guarantee which determines **how** favourable the terms are on which an international financial institution can borrow on financial markets.

Some degree **of** pooling of risks in the form of a Guarantee Fund might be **worth** considering to make them easier to bear.

The third obstacle relates to the fact that the loan provided may not be sufficient to finance the project. For example, the EIB cannot finance more **than** 50 per cent than of the total cost of a project. As the proportion of the project that can be self-financed is very small, **other** partners have to be found, sometimes **necessitating** protracted negotiations **that** are not always successful.

Further constraints are the rules laid **down** by international financial institutions regarding **competitive bidding and environmental protection.** The transition to a market economy involves the gradual introduction of competition rules which break with previous practices.

As regards environmental protection, the debate is even more open. All the organisations emphasize its importance. The World Bank has published a manual in three volumes devoted to the issue **(37).** Here again, a transition period **is** necessary but environmental requirements will inevitably become more stringent.

From this standpoint, EC Directives, notably those relating to environmental impact studies (Directive 85/337), can serve as a frame of reference. A change of outlook is required. Things are improving but not as quickly as some people had imagined **(38).**

Finally, mention should be made of the problems involved in co-ordinating the various levels of decision-making **(39).**

The concept of promoter has a precise meaning in Western Europe because there is a stable legal framework.

This is not always the case in Central and Eastern Europe.

The authorities, especially Ministers of Transport, have an important role to play in clarifying the rules of the game and relations between local, regional and national bodies. This would help to define clearly the roles of the various public promoters. It could also help to attract private promoters.

3.2 Proposed improvements to funding mechanisms

There are frequently long delays in the provision of appropriate funding, and thus in the time it takes to complete projects, because economic and financial feasibility studies have not been carried out and the funding mechanisms envisaged are unsuited to the project.

The following improvements could be made:

- ensure that the type of funding is appropriate to the type of project;
- improve the preparation of technical, economic and financial feasibility studies;
- improve the preparation of applications for funds.

Funding mechanisms must take into account the fact that transport projects fall into two categories:

- those that are capable of generating substantial revenue in national and foreign currency.
- those incapable of paying their own way and which do not carry any international traffic (or very little).

East-West motorways, international airports, some ports, etc. fall into the first category.

The second category includes:

- local roads and most national roads
- urban and suburban transport
- local rail transport.

The choice of funding instruments must take into account this fundamental distinction.

For the first category, private funding, concessions or mixed funding arrangements can be used. Loans must be guaranteed totally or partly by the cash flow that the project will generate.

For the second category, the cost will be borne by the user and the taxpayer via general taxation and special funds financed out of specific taxes. National and local authorities will thus retain a large degree of responsibility even if the infrastructure is operated as a concession.

The choice of an appropriate funding instrument can certainly help to facilitate and speed up the disbursement of funds.

It is necessary to carry out feasibility studies which not only cover the traditional technical and economic aspects but also deal in detail with the funding.

Appraisal of funding arrangements should therefore be included in the technical assistance programmes of the various institutions -- PHARE, UNDP, EBRD, World Bank, EIB, etc.

In addition, training and information could be provided for officials in the countries concerned.

There is a lack of knowledge about the procedures to be followed when preparing project documentation, the range of existing possibilities and the criteria used by the various institutions. All these matters need to be made clearer by showing the possibilities and limitations of the various instruments available.

The foregoing analysis has also shown that financial estimates of requirements are often very vague.

Countries such as Poland, Hungary and the Baltic states have made more precise estimates for their national road and rail programmes.

These efforts need to be continued and supported, and should be extended to take in the regional dimension. The initiative taken by the UN/ECE in co-operation with the Finnish Government to appraise the needs of the Baltic countries should be continued with a view to integrating the financial dimension.

The international financial institutions can play a very active role in this area provided that the officials in the countries concerned are closely involved and remain in charge of projects undertaken.

A procedure similar to that adopted for the PHARE programme could be used.

Lastly, there is the question of guarantees. This is a key question, the importance of which has often been underestimated in Central and Eastern Europe, as a result of which major projects have been blocked. The EC already provides some guarantees for EIB loans, but they are insufficient in relation the scale of the needs.

Project financing and implementation could certainly be speeded up by creating a Guarantee Fund for loans issued by international financial institutions to Central and Eastern Europe.

If risks were pooled, it would clearly be easier to put together and speed up loans. The European Guarantee Fund (EGF) being set up by the EVIS is an example of such an arrangement though it would probably not be directly transferable to Central and Eastern Europe given the special features and high level of risk of some of the projects.

The governments of the countries concerned are unwilling to bear all the risks to which such guarantees give rise. For this reason, rather than subsidising projects directly -- which in any case would have only a marginal effect -- it would be more effective to finance a fund to guarantee loans.

The EU guarantee mechanism launched by the European Council at the Edinburgh Summit in December 1992 could serve **as** a model for such a fund.

The EU could also take an initiative in this area by confirming its resolve to support Pan-European integration. **A** first step would be to place the issue on the agenda of the discussions which the Community has initiated with the "Visegrad" group, which currently consists of four countries: Poland, Hungary and the Czech and Slovak Republics.

This report has emphasised that it is not enough to modernise infrastructure but that it is also necessary to upgrade operating and information systems. It is certainly at this level that the malfunctions and shortcomings are the worst.

The following two technical proposals are therefore **put** forward:

i) Reliable databases should continue to be put in place. The data should relate not only to flows but also to the technical state of infrastructure, equipment and services.

Such databases are needed to generate the management reports which are essential for optimising investment, especially for maintenance. The Hungarian example referred to earlier illustrates this very clearly.

ii) Projects that could significantly increase the productivity and efficiency of existing operating and maintenance systems should be identified and appraised.

The example of the modernisation of rolling stock repair shops in Poland shows that this type of project can be:

-- very profitable;

-- have a significant direct local impact in terms of jobs and activity;

-- have a very positive effect on productivity by considerably increasing rolling stock availability.

Projects need to be backed-up by training in logistics, management and organisation.

In addition to these technical recommendations, the following recommendations are addressed to Transport Ministers.

Avoid an artificial** distinction **between projects** anal **programmes

Master plans and investment programmes are required to ensure that transport projects are consistent with one another. It is essential to appraise each project with a view to determining the technical, economic and financial risks involved. Rather than making an artificial distinction between projects and programmes, complementary features and synergy should be sought.

A stable framework and rules of the game

Many projects are currently held up because of difficulties in co-ordinating the various levels of excision-making. A clear-cut division of responsibilities and contractual procedures among the various excision-makers is necessary. Similarly, privatisations or concessions of public services require rigorous procedures and stable rules of the game that specify the respective responsibilities of the concession-holder and the owner.

Adopt an integrated approach to transport systems

Investment programmes must include operating systems as well as "infrastructure". Given the budgetary and financial constraints, this means that priority should be given to modernising existing infrastructure and operating systems. Management training, new information technologies and efficient logistical systems are an integral part of transport systems, and thus must figure in any investment programme.

Appraise the feasibility of combined transport systems

One way of controlling the growth of road transport on East-West corridors would be to develop combined transport. However, combined transport requires a fairly complex multimodal logistical organisation. In addition to statements of principle, feasibility studies of the technical, economic and financial aspects of combined transport are urgently required so as to be able to implement investment projects in due course. The rapid growth of road transport is likely to create situations that will be difficult to reverse.

Have no illusions about private funding

Private funding is not a miraculous solution. Private capital cannot make an unprofitable project profitable. However, it can help to make management more efficient and ensure that more weight is given to market constraints. The operating revenue of privately-funded projects should thus be sufficient to ensure long-term profitability. At present, such funding would therefore seem to be limited to major international infrastructure, notably on East-West routes,

Encourage the creation of ancillary budgets and special funds

Transport Ministers are often regarded by their colleagues in the ministry of finance as spendthrifts. When the economic situation is difficult, traditional budget rules often squeeze transport investment. A better balance can be achieved between tax revenue and transport investment by creating ancillary budgets and special funds.

Argue the case for setting up Guarantee Funds for loans from International Institutions

International Financial Institutions often require guarantees from governments for the loans that they provide. The implementation of projects of European interest could be speeded up by creating a Guarantee Fund similar to the European Investment Fund set up by the EU at the Edinburgh Summit

in December 1992. The feasibility of establishing such a fund should now be investigated as a matter of urgency.

4. Conclusion

Aside from these sectoral proposals, it is essential to consider ways of giving a fresh impetus to the initiatives taken by the international community in the past three years to finance the modernisation of transport systems in Central and Eastern Europe.

The example of German reunification shows that very large resources -- commensurate with the size of the task -- are required for at least five years.

This report has shown that positive and constructive measures are under way. However, it is not certain that they will suffice for the task. The stakes -- both economic and political -- are enormous.

Given the revival of nationalism, ethnic conflicts and the remodelling of traditional state structures, there is an enormous risk that the new states, especially in the former Soviet Union, will break up.

The Marshall Plan, which was implemented in September 1947 under the name of the "European Recovery Programme", made it possible to finance major public investment. The massive transfer of funds under the programme between 1947 and 1955 accelerated the rebuilding of national economies and the modernisation of infrastructure.

Thanks to the Plan, Europe was rebuilt in a few years. The refusal of the Soviet Union -- and subsequently its East European satellites -- to accept Marshall Aid marked the division of Europe into two blocks.

A similar programme, but on a much larger scale than the aid currently being provided, could create a shock and give fresh impetus to the rebuilding of Central and Eastern Europe.

Given its specific features, the transport sector could play a major role in promoting the recovery and integration of Central and Eastern Europe (40).

Such a long-term vision rules out considerations of short-term profitability.

Criticising the short-termism of society, Bertrand de Jouvenel wrote:

> **"The cathedrals would never have been built if people had considered only the short-term. It is the difference between a society that plants conifers or poplars and one that plants oak trees".**

Bibliography

1. GASPARD, M. (June 1991), *Quels transports pour l'autre Europe?,* Report prepared for the French Ministry of Public Infrastructure, Housing, Transport and Land Use, and the Commissariat Général au Plan, Paris.

2. DE WAELE, A. (1991), *Consequences of Closer East-West Relations* in *Prospects for East-West European Transport,* Proceedings of the ECMT International Seminar, Paris, 6-7 December 1990, OECD, Paris, 1991, pp 11-33.

3. SUCHORZEWSKI, W. (March 1993), *Infrastructure and Transport Renovation -- Notably in the East-West Framework* , Background Report for ECMT Round Table 95, Paris.

4. GERARDIN, B. (March 1993), *Infrastructure and Transport Renovation -- Notably in the East-West Framework,* Background report for ECMT Round Table 95, Paris.

5. **REYNAUD,** C. and POINCELET, M. (1992), *Quelles politiques de transport pour accompagner la transition*?, Barbizon Seminar, 20-27 November 1991, INRETS, Editions Paradigme, Caen.

6. CERWENKA, P. and ROMMERSKIRCHEN, S. (1991), Prospects for Freight Transport, in *Prospects for East-West European Transport,* ECMT International Seminar, Paris, 6-7 December 1990, pp. 79-150.

7. ROTHENGATTER, W. and KOWALSKI, J. (1991), Prospects for Passenger Transport, in *Prospects for East-West European Transport,* ECMT International Seminar, OECD, Paris, 6-7 December 1990, ECMT, Paris, pp 197-236.

8. KESSEL, K. and ROTHENGATTER, W. (1990) *Szenario zur Verkehrsentwicklung mit der DDR und Ost Europa*, Untersuchung im Auftrag des Bundesministers fur Verkehr, Freiburg, Karlsruhe.

9. SUCHORZEWSKI, W. (May 1991), *Study in Motorway and Expressway Network,* Report prepared for the General Directorate of Public Roads, Warsaw, University of Technology.

10. JICA (Japan International Cooperation Agency) (December 1992), *Study on the national Transport Plan in the Republic of Poland -- Policy guidelines for the transport sector,* Final report.

11. ECMT (March 1993), *Trends in International Transport and Infrastructural Needs in Europe.*

12. INTRAPLAN (1992), *Les transports interurbains de voyageurs a l'horizon 2010*, Study carried out for the Community of European Railways.

13. UN-ECE (1992), *International transport in Europe: an analysis of major traffic flows in corridors,* United Nations, New-York,

14. *BOINCELET, M.* (1992), *Base COMEXT -- Exploitation des données,* INRETS - *DEST.*

15. *WORLD BANK, Highway Rehabilitation and Maintenance in Central and Eastern Europe : a survey,* Infrastructure Division -- Technical Department, **June** 1991. *Privatization Problems at Industry Level -- Road haulage in Central Europe,* Discussion Paper *No.* 182, Washington, 1992.

16. THOUVENIN, *C.* (1992), *L'évolution des chemins de fer tchécoslovaques et hongrois*, INRETS-DEST, Editions Paradigme, Caen.

17. ATKINS, W.S. (January 1992), *Transport in Eastern Europe: Assessment of Infrastructure Needs,* Draft final report, study carried out for the Directorate-General for Transport of the Commission of the European Communities.

18. VIATEK Group (1993), VTT Technical Research *Center, North-Eastern Europe Transportation Study, Preliminary Phase.* Study carried out **for** the UN/ECE **and** the Finnish Ministry of Communications.

19. COWI Consult (August 1991), *Assessment of Transport Infrastructure Needs in the light of Eastern European Development,* study carried out for the Directorate-General for Transport of the Commission of the European Communities.

20. CURIEN, N. *(May* 1992), *Rôles respectifs de la réglementation et de la concurrence : le cas des réseaux*, Table Ronde *des* GDR Réseaux, Paris.

21. EBRD (March 1993), *Transport Sector -- Issues and Options.*

22. PHARE **Advisory** Unit, Documents de bilans et de prospective, Commission of the European Communities, Directorate-General for Information and Public Relations.

23. EIB (1992), *Annual Report* 1991, Luxembourg.

24. EIB (April 1993), *The European Investment Bunk -- 35 Years,* Luxembourg.
- *Communications,* 1992.
- *EIB Annual Report 1990.*
- *EIB Information,* No. 74, November 1992.
- Press Conference in Luxembourg, **28** January 1993.
- *Financing Europe's Future, March* 1992.

25. EBRD, *Annual Report 1992.*

26. World Bank, 1991 *and* 1992 *Annual Reports.*

27. GERARDIN, B. (1990), *Private and Public Investment in Transport -- Possibilities and Cost,* Background Report *for* ECMT Round Table 81 on "Private and Public Investment in Transport" 11-12 May 1989, ECMT, Paris.

28. TIMAR, *A. Financial self-help* ***measures:*** *taxation and user charges* OECD Seminar *RP* 4 *in Road Technology Transfer and Diffusion* ***for*** *Central and East European Countries,* Budapest, 12-14 *October* 1992.

29. TIMAR, A. *Hungarian Motorway Concession Contract in Preparation,* Conference BOOT Projects, 18-19 May 1993.

30. World Bank, (1990), *Hungary: Infrastructure review, Transportation sector.*

31. Hungarian Ministry of Transport (1993), *From studies to the concession contract - motorways M1 and M15.*

32. GERARDIN, B. (1992), *Les instruments potentiels d'harmonisation fiscale : opérationnalité et efficacité,* Séminaire *ESTI,* Bruxelles, 19-20 November 1992 "L'harmonisation fiscale des transports terrestres de la CEE, Objectifs - Problèmes - Perspectives", Brussels.

33. Hungarian Ministry of Transport (1992), *Hungarian Public Road Network,* Budapest.

34. AUGENBLICK, M., SCOTT, B. and CUSTER, J. (August 1990), *The Build-Operate and Transfer ("BOT") -- Approach to Infrastructure Projects in Developing Countries,* Policy, Research and External Affairs, Working Papers Infrastructure, World Bank.

35. HEGGIE, I.G. *Institutional Reform of Road Management and Financing,* World Bank, PTRC Summer Annual Meeting, University of Manchester, 14-18 September 1992.

36. GERARDIN, B. (July 1993), *Le financement des réseaux d'infrastructures de transport dans la Communauté Europe'enne,* Recherche Transport Sécurité, INRETS, RTS Special Issue "Europe des Transports".

37. World Bank (1991), *Environmental Assessment Source Book:*
Volume I - Policies - Procedures and Cross-Sectorial Issues
Volume II - Sectoral Guidelines
Volume III - Guidelines **for** Environmental Assessment of Energy and Industry Project
World **Bank** Technical Papers 139-140-154, Washington.

38. LEE, N., COLLEY, R. (1990), *Reviewing the quality of Environmental Statement,* EIA Centre-Department of Planning and Landscape, University of Manchester.

39. FEDUCI (1991), *Financement privk d'ouvrages publics à l'horizon 1993,* Proceedings of Paris Seminar of 26-27 March 1990, European Communication Forum, Paris.

40. TIMAR, A. (1992), *Un objectif de défi de la transition : Amkliorer le réseau routier de l'Europe Centrule et Orientale et le relier à l'Occident* in *Quelles politiques de transport pour accompagner la transition ?,* Paradigme, Caen.

41. CHATELUS, G. (September 1993), *Les Transports en Europe Centrale -- Inadéquation de l'offre face à une demande restructurée,* INRETS, Arcueil.

OECD PUBLICATIONS, 2 rue André-Pascal, 75775 PARIS CEDEX 16
PRINTED IN FRANCE
(75 95 05 1) ISBN 92-821-1203-9 - NO. 47523 1995