Overview of research programming and cooperation mechanism

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Table of content

PART ONE – CONCEPTUAL FRAMEWORK

1. INTRODUCTION ......................................................................................................................1
   1.1. Conceptual framework .........................................................................................................2

PART TWO – COUNTRY DESCRIPTIONS

2. AUSTRIA ................................................................................................................................5
   2.1. Contextual patterns ...............................................................................................................5
       2.1.1 Country description and Transport infrastructure .........................................................5
       2.1.2 Transport Industry ........................................................................................................5
       2.1.3 Transport policy related general goals ..........................................................................6
   2.2. Transport research and innovation system ..............................................................................7
       2.2.1 Mapping of the country specific transport research funding system ..............................7
       2.2.2 Mapping of relevant transport research institutes ............................................................8
   2.3. Policy process description along the policy circle ..................................................................8
       2.3.1 Policy formulation and policy determination ....................................................................8
       2.3.2 Policy implementation and policy dissemination ............................................................9
       2.3.3 Policy evaluation and policy monitoring .........................................................................9
   2.4. Institutional barriers for cooperation in transport research ..................................................9
       2.4.1 Policy and administrative barriers ..................................................................................9
       2.4.2 Legal and budgetary barriers .........................................................................................10

3. BELGIUM ................................................................................................................................11
   3.1. Contextual patterns ............................................................................................................11
       3.1.1 Country description and Transport infrastructure ..........................................................11
       3.1.2 Transport Industries ......................................................................................................11
       3.1.3 Transport policy related general goals ...........................................................................11
   3.2. Transport research and innovation system ............................................................................11
       3.2.1 Mapping of the country specific transport research funding system .............................13
       3.2.2 Mapping of relevant transport research organisations ....................................................14
   3.3. Policy process description along the policy circle ..................................................................15
       3.3.1 Policy formulation and policy determination ....................................................................15
       3.3.2 Policy implementation and policy dissemination ............................................................16
       3.3.3 Policy evaluation and policy monitoring .........................................................................17
   3.4. Institutional barriers for cooperation in transport research ..................................................18
       3.4.1 Policy and administrative barriers ..................................................................................18
       3.4.2 Budgetary and legal barriers ..........................................................................................18

4. DENMARK ................................................................................................................................19
   4.1. Contextual patterns .............................................................................................................19
       4.1.1 Country description and Transport infrastructure ............................................................19
       4.1.2 Transport Industries ......................................................................................................19
       4.1.3 Transport policy related general goals ...........................................................................19
   4.2. Transport research and innovation system ............................................................................20
       4.2.1 Mapping of the country specific transport research funding system ..............................20
       4.2.2 Mapping of most relevant transport research organisations ..........................................20
   4.3. Policy process description along the policy circle ..................................................................21
       4.3.1 Policy formulation and policy determination ....................................................................21
       4.3.2 Policy implementation and policy dissemination ............................................................22
       4.3.3 Policy evaluation and policy monitoring .........................................................................22
4.4. Institutional barriers for cooperation in transport research ........................................... 22
  4.4.1 Policy and administrative barriers ............................................................................ 22
  4.4.2 Legal and budgetary barriers .................................................................................. 23

5. ESTONIA .......................................................................................................................... 25
  5.1. Contextual patterns ...................................................................................................... 25
    5.1.1 Country description and Transport infrastructure .............................................. 25
    5.1.2 Transport Industries ......................................................................................... 26
    5.1.3 Transport policy related general goals .............................................................. 26
  5.2. Transport research and innovation system .................................................................... 27
    5.2.1 Mapping of the country specific research funding system .................................. 28
    5.2.2 Mapping of relevant transport research organisations ....................................... 28
  5.3. Policy process description along the policy circle ...................................................... 28
    5.3.1 Policy formulation and policy determination ....................................................... 28
    5.3.2 Policy implementation and policy dissemination .............................................. 29
    5.3.3 Policy evaluation and policy monitoring .......................................................... 29
  5.4. Institutional barriers for cooperation in transport research ....................................... 29
    5.4.1 Policy and administrative barriers ....................................................................... 29
    5.4.2 Legal and budgetary barriers ............................................................................. 29

6. FINLAND .......................................................................................................................... 31
  6.1. Contextual patterns ..................................................................................................... 31
    6.1.1 Country situation ................................................................................................. 31
    6.1.2 Transport Industries ......................................................................................... 31
    6.1.3 Transport policy related general goals .............................................................. 31
  6.2. Transport research and innovation system .................................................................... 32
    6.2.1 Mapping of relevant transport research organisations ....................................... 33
  6.3. Policy process description along the policy circle ...................................................... 34
    6.3.1 Policy formulation and policy determination ....................................................... 34
    6.3.2 Policy implementation and policy dissemination .............................................. 35
    6.3.3 Policy evaluation and policy monitoring .......................................................... 37
  6.4. Institutional barriers for cooperation in transport research ....................................... 37
    6.4.1 Policy and administrative barriers ....................................................................... 37
    6.4.2 Legal and budgetary barriers ............................................................................. 37

7. FRANCE ............................................................................................................................. 39
  7.1. Context ....................................................................................................................... 39
    7.1.1 Country description and Transport infrastructure .............................................. 39
    7.1.2 Transport Industry .............................................................................................. 40
    7.1.3 Transport research related policy goals .............................................................. 40
  7.2. Transport research and innovation system .................................................................... 40
    7.2.1 Mapping of the country specific transport research funding system .................... 40
    7.2.2 Mapping of relevant transport research organisations ....................................... 41
  7.3. Policy process description along the policy circle ...................................................... 42
    7.3.1 Policy formulation and policy determination ....................................................... 42
    7.3.2 Policy implementation and policy dissemination .............................................. 43
    7.3.3 Policy evaluation and policy monitoring .......................................................... 43
  7.4. Institutional barriers for cooperation in transport research ....................................... 44
    7.4.1 Policy and administrative barriers ....................................................................... 44
    7.4.2 Legal and budgetary barriers ............................................................................. 44

8. GERMANY .......................................................................................................................... 45
  8.1. Country description and Transport infrastructure ....................................................... 45
    8.1.1 Transport industry .............................................................................................. 45
    8.1.2 Transport policy related general goals ............................................................... 46
11.4. Institutional barriers for cooperation in transport research ........................................ 72
  11.4.1 Policy and administrative barriers ................................................................. 72
  11.4.2 Legal and budgetary barriers ............................................................................. 72

12. SWEDEN .................................................................................................. 73
  12.1. Contextual patterns ......................................................................................... 73
    12.1.1 Country description and Transport infrastructure ...................................... 73
    12.1.2 Transport Industries .................................................................................... 73
    12.1.3 Transport research policy related general goals ........................................ 73
  12.2. Transport research and innovation system ...................................................... 74
    12.2.1 Mapping of the country specific transport research funding system .... 74
    12.2.2 Mapping of relevant transport research organisations ............................. 74
  12.3. Policy process description along the policy circle ......................................... 75
    12.3.1 Policy formulation and policy determination .............................................. 75
    12.3.2 Policy implementation and policy dissemination ...................................... 76
    12.3.3 Policy evaluation and policy monitoring .................................................... 77
  12.4. Institutional barriers for cooperation in transport research ........................... 77
    12.4.1 Policy and administrative barriers ............................................................... 77
    12.4.2 Legal and budgetary barriers ...................................................................... 77

13. UNITED KINGDOM ................................................................................................. 79
  13.1. Contextual patterns ......................................................................................... 79
    13.1.1 Country description and Transport infrastructure ...................................... 79
    13.1.2 Transport Industries .................................................................................... 80
    13.1.3 Transport policy related general goals ........................................................ 80
  13.2. Transport research funding system ................................................................. 81
    13.2.1 A short mapping of the country specific research funding system .... 81
    13.2.2 Mapping of the most relevant transport research organizations .......... 82
  13.3. Policy process description along the policy circle ......................................... 82
    13.3.1 Policy formulation and policy determination .............................................. 82
    13.3.2 Policy implementation and policy dissemination ...................................... 82
    13.3.3 Policy evaluation and policy monitoring .................................................... 83
  13.4. Institutional barriers for cooperation in transport research ........................... 83
    13.4.1 Policy and administrative barriers ............................................................... 83
    13.4.2 Legal and budgetary barriers ...................................................................... 83

PART THREE - THE DIAGRAMS 84

ANNEX 97

Interview partner | Contacts: .................................................................................... 99
PART ONE – CONCEPTUAL FRAMEWORK

1. Introduction

In ERA-NET TRANSPORT research work package 1 has the overall research goal to analyse patterns and mechanism of cooperation in transport research policy concerning especially political and institutional activities towards trans-national transport research cooperation. As a first step the following overview was drafted.

In European countries policy regimes and policy styles in transport research policy are quite diverse. But to have a starting point concerning activities in trans-national transport research policy cooperation, a first overview on these diverse policy regimes and policy styles is necessary: a picture of the main players, their roles and their functions in the national transport research an innovation system and specifically the national transport research financing and funding system. This picture offers ENT support to address “the right partners in the right way”.

The analysis is focusing on national transport research policy regimes and policy styles, specifically public financing and funding mechanism for transport research in several European countries. A clear distinction is drawn between transport policy and transport research policy. The analysis is based on a conceptual framework using the innovation system metaphor, the policy circle model and a sectoral governance approach (see below). Information and data are originated from desk research of existing comparative studies on European transport research policy (e.g. smart-bench), a questionnaire survey and several interviews with experts to deepen these information bases. Special thanks as well for the written contributions and expertise from the different ERA-NET TRANSPORT Partners.

A four step analysis is performed: Firstly a rough picture of the countries context, the national transport infrastructure and the country specific transport industry sector is sketched out. Secondly an overview on relevant strategic- and transport planning documents significant for transport research policy is given. The main players of the transport research financing and funding system and the national transport research and innovation system are identified and described. The policy process concerning actions in the transport research policy sector is illustrated along the different stages of a policy circle. For the policy formulation stage, e.g. the competences and the practices within the policy formulation process are mentioned. For the policy implementation stage, e.g. the research programming process is described including the dissemination of research results. For the policy evaluation stage, e.g. the programme- and project evaluation and monitoring practices are characterized. In a last chapter expert opinions concerning institutional barriers on trans-national cooperation in transport research are pointed out.

The analysis includes as far as possible a description of the relevant actors and a characterisation of the institutional links between them (key player diagrams). Qualitatively the roles and functions of the main players in the national transport
research and innovation system and the financing and funding system are explained, institutional competences, political influence and power is mentioned. For each stage of the policy circle formal and informal cooperation procedures are roughly described and with that the opportunity to have a short glimpse on policy regimes and policy styles in different national transport research policy areas. The result of this study is a first overview. The ongoing research in ENT will focus on a more distinctive analysis of similarities and differences in policy regimes and policy styles concerning trans-national transport research policy cooperation.

1.1. Conceptual framework

The conceptual framework is based on a structural approach, which refers to the sectoral innovation system metaphor (Malerba 2002) and the concept of sectoral governance in research policy (Braun 2004). Furthermore the model of the policy circle is used as a structural element. A three period divided into six stages policy circle was applied here. The policy cycle describes three main periods and outlines six stages in a circular policy process.

- **Policy formulation** = policy description and policy determination.
- **Policy realisation** = policy implementation and policy dissemination.
- **Policy learning** = policy evaluation and policy monitoring.

The period of *policy formulation* is significant for setting direction and for policy orientation. At the policy description stage, e.g. visions, political agendas and overall political goals are set up, while at the *policy determination* stage detailed target setting and strategic planning is conducted.

In the *policy realisation* period the implementation of research programmes and the dissemination of the research outcomes is central. At the *policy implementation* stage e.g. research programming modalities and research topics are defined and funding models and budgets are negotiated. At the *policy dissemination* stage research results should be published and distributed in a comprehensive knowledge transfer and a wide information diffusion process.

The *policy learning* period refers to the fact, that policy processes are non-deterministic but complex. At the *policy evaluation* stage research programme and project results are assessed concerning the program or project objectives. Or at the *policy monitoring* stage, policy performance and societal aspects are assessed along the process. The outcomes are addressed to the policy formulation period.

The concept of sectoral governance deals with complexity and contingency. The new governance paradigm is directing firstly the cooperative state and secondly new forms of public management. With that there is a new production paradigm for sectoral policies (here: research and technology policy and transport policy). Governance in sectoral policy areas is influenced by overall political questions, driven by institutional circumstances. From a national perspective sectoral policies are imbedded in specific political structures and political cultures. Policy regimes changing towards more complex and indirective forms of steering are characterized in the white paper on governance as the improvement of the existing procedures and institutions in the policy sector. With the ERA-Net initiative the European Commission intends to establish a new form of trans-national Governance in research policy complementing existing forms like the 6th Framework Programme or other European research policy initiatives.
Benchmarking can range from simple qualitative comparative analysis to a detailed quantitative accounting based analysis. Benchmarking is a technique used to compare performance patterns and identify strengths and weaknesses. Benchmarking concerning policy questions normally intends not to identify best or worst case practices. Instead, it is expected comparing differences and similarities.

In this first report – overview on transport policy and transport research policy in different European Countries – the benchmarking technique was solely used to apply the same structure for each single country description, so that by reading the report similarities and differences can be identified.
PART TWO –
COUNTRY DESCRIPTIONS

2. Austria

2.1. Contextual patterns

2.1.1 Country description and Transport infrastructure

Austria has a population of about 8.0 million people (January, 1st 2001) residing on 83,871 sq km. The average dense is about 97 inhabitants/sq km.\(^1\)

Austria has a huge variety of landscapes, like the spacious Vienna basin, the gentle Austrian upland, the alpine areas from the West to the East and the lake districts in the Salzkammergut and Carinthia. The land use of the whole territory can be divided into agricultural land use (31,4%), forests (43,2%), the alp regions (10,3%), water surfaces (1,7%) and other areas (13,4%). The area of settlement covers about 2/5 of the territory.\(^1\)

Austria consists of 9 federal states: the federal state of Lower Austria, Upper Austria, Salzburg, Carinthia, Styria, Tyrol, Burgenland, Vorarlberg and Vienna. The largest cities are Vienna with around 1,5 Mio. inhabitants, followed by Graz, Linz and Salzburg. The main river in Austria is the Danube. The Danube is the most important inland waterway and crosses Austria from the North West to the South East.

Austria has a 6,281 km long railway network and about 12,000 km of paved roads, including 1,633 km of motorways. The most important airports are Vienna and Salzburg. Other international airports are situated in Linz, Graz, Innsbruck, and Klagenfurt.\(^1\)

2.1.2 Transport Industry

Austria has a traditional steel industry and a wide range of different other industrial sectors. The most important regions for transport technology industry are Upper Austria, Lower Austria, Styria and the Vienna region. Austria has a strong automotive supply and automotive industry, but also a strong sector for railway industry. Some technological highlights of the automotive industry in Austria are e.g. Diesel engine design, design of all-wheel powertrain systems and the development of special-purpose vehicles. Austria has as well an enhancing ITS sector – several ICT firms have a focus on ITS - and a rather small aviation and aerospace industry.

\(^1\) Statistik Austria, p. 393 ff, 2003.
2.1.3 Transport policy related general goals

The enlargement of the European Union pushes Austria into the centre of Europe. The Austrian government formulated the need for an active transport policy within the last few years. In view of handling the expected increase of transport flows across Austria two strategy plans were set up: firstly the National Transport Plan and secondly the Transport Telematic Master Plan.

In January 2002 the Austrian government presented the Austrian National Transport Plan 2002 (GVP-Ö)\(^2\). The National Transport Plan is focusing on general principles regarding transport policy and on an infrastructure development programme referring to the transport modes road, rail and inland waterway system.

The main transport policy objectives in this plan are:

- To strengthen the Austrian business location,
- To extend the transport network in an efficient way,
- To enhance safety and security in transport,
- To ensure financing, and
- To ease the implementation measures.

All suggested infrastructure projects announced in the national transport plan are considered with different key players in the transport sector. The total volume of investment until the year 2021 is denoted by 45.1 bill. Euro. The short- and medium-term investments imply 17.1 bill. Euro for road and rail projects. The financing of these projects is mainly ensured by a kilometre based toll for heavy duty vehicles and a time based toll for cars and motorcycles on motorways.\(^2\)

The Telematic Master Plan was presented recently. The plan is blueprinted in five chapters: a mission statement, a status analysis, a frame for the ITS system architecture, an ITS technology portfolio and project implementation guidelines for Austria.\(^3\) The main objective of the multimodal approach of the Transport Telematic Master Plan is to show a balanced picture for future use of Transport Telematic applications and services in Austria.

3.1.4 Transport research and innovation system

The Federal Ministry for Transport, Innovation and Technology (bmvit) plays the major role in Transport policy and Transport research in Austria. Two divisions of the Ministry are involved in transport research policy: firstly bmvit section II which is responsible for the transport infrastructure policy and secondly bmvit section III which is responsible for transport related research and technology policy. Beside of the bmvit several other ministries and the federal state governments are involved in transport research policy.

Austria has several research councils like the National Science Fund (FWF) funding academic research, the Austrian Research Fund (FFF) funding industrial research, the Austrian Business Fund (AWS) and the European Recovery Fund (ERP). Several other research funding initiatives on the regional level, for example in Vienna, Styria and Upper-Austria are significant. For the allocation of national budgets for R&D funding the Council for Research and Technology (RFT) is responsible.

\(^3\) bmvit, ITS Austria, p. 2 ff, 2004.
In 2004 a new Austrian Research Funding Agency\(^4\) was founded. The discussions on the reorganisation of the Austrian research funding system started in 2003. With a so called reform dialogue on the 15th of April 2004 the Austrian parliament decided to reorganise the Austrian research funding system as follows:

- The formation of the Austrian Research Funding Agency (FFG),
- The reform of the Austrian Science Fund (FWF),
- An independent role for the Austrian Council for Research and Technology (RFT)\(^5\),
- The foundation of a national fund for research, technology and development.

The Austrian Research Funding Agency (FFG) is assembled by the following organisations namely the Austrian Industrial Research Fund (FFF), the Bureau for international research and technology cooperation (BIT), the Technology Promotion Agency (TIG) and the Austrian Space Agency (ASA).

### 2.2. Transport research and innovation system

#### 2.2.1 Mapping of the country specific transport research funding system

The National Ministry for Transport, Innovation and Technology (bmvit) administers the largest public funding budget for transport research in Austria (direct funding as well as programme funding). The ministry conducts several strategic transport research programmes\(^6\):

- IV2S - Intelligent Transport Systems and Services (2002-2006), with three sub-programmes A3 (Austrian Advanced Automotive Technology), I2 (Intelligent Infrastructure) and ISB (Innovative Railway Systems);
- Pilot programme River Danube Transport (2001-2006);
- LAP - Logistics Austria and Logistics Austria Plus (1999-2003);
- TAKE ÖV – Transport Telematic for public transport (1999-2003);
- Move – Mobility and Transport technologies (1999-2003);
- IFT - Intermodal freight transport systems (1999-2002);

Besides the bmvit other ministries are involved in transport research policy like the Ministry for Economic Affairs and Labour (BMWA), the Ministry for Agriculture, Forestry, Environment and Water Management (BMLFUW) and the Federal Ministry for Education, Science and Culture (BMBWK). Some of the strategic research funding programmes of these ministries are open for transport and mobility research projects, e.g. for research on sustainable mobility (PROVISION/BMLFUW) or transdisciplinary research (TRAFO/BMBWK). Direct funding is as well conducted by these ministries. They finance or co-finance public or semi-public research organisations, e.g. the Austrian Environmental Agency (research on transport emissions).

The federal states conduct as well programme funding and direct funding for Transport Research, especially the upper Austrian government, the government of Styria or the Vienna Region government are funding research projects related to transport research. Some small transport research funding budgets are conducted...
by initiatives like the Austrian Car Driver Associations ÖAMTC, ARBÖ, VCÖ, the Austrian chamber of labour (AK) or the Austrian chamber of commerce (WKÖ).

2.2.2 Mapping of relevant transport research institutes

The largest public funded non-university research institute with a relation to transport research is the Austrian Research Centre Seibersdorf (ARCS), especially Arsenal Research, the ARCS division for transport technology research. In socio-economic transport research the Austrian Transport and Mobility Research Center (FGM AMOR) plays a major role. Another important non-university research institute related to transport research is Joanneum Research in Graz (transport and energy unit), funded by the regional government of Styria.

Several Austrian Universities have transport research departments and play an important role in the Austrian transport research arena. University departments focusing on transport and mobility research are e.g. located at Vienna University of Technology, the Graz University of Technology and the Vienna University of Natural Resources and Applied Life Sciences. A special strength of transport research at Austrian universities is socio-economic transport research, especially research on sustainable mobility and intermodality as well as research on combustion engines for transport applications.7

Public funded transport research activities are as well situated in several competence centers, e.g. in the Austrian Competence Centres for automotive acoustics. The automotive clusters, AC-Upper Austria, AC-Vienna Region (Vienna, Lower Austria and Burgenland) and AC Styria are public supported regional networks of Austrian automotive industry. Other important public supported cluster initiatives in Austria are for example the Rail Technology Cluster Austria (RTCA) and the Austrian Traffic Telematic Cluster (ATTC).

2.3. Policy process description along the policy circle

2.3.1 Policy formulation and policy determination

Main responsible for transport policy and transport research policy formulation is the National Ministry for Transport, Innovation and Technology (bmvit). Other ministries are involved like the Federal Ministry of economy and labour (BMWA) and the Federal Ministry for Agriculture and forestry, environment and water (BMLFUW). Bmvit is responsible for long-term strategies in transport research policy. Strategic visions and transport research priorities are developed in a cooperative process with several stakeholders, e.g. representatives from other ministries, public administration, research organisations and industry - but far not formalized and systematic then rather in an informal and co-operatist way.

The Bmvit is responsible for the major Austrian transport research funding programmes. These programmes are developed by the department of Mobility and Transport Technologies in close cooperation with the department of transport infrastructure. The transport research funding programmes have to be approved by the Austrian Council for Research and Technology Development (RFT) which also allocates the funding budget. The RFT was founded by the government to assure long-term strategies in research policy. But due to changes in national political in-

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7 5th EU framework programme, key action 2.
terests it is not uncommon that research programmes built on long-term strategies are shortly cut off to go for other policy objectives.

2.3.2 Policy implementation and policy dissemination

The main players for transport research programme implementation are the Federal Ministry of Transport, Innovation and Technology (bmvIt), the Research Funding Association (FFG) and several management consultancies (programme managements). The BMVIT is the responsible authority.

The above mentioned Research Funding Association (FFG) is a newly founded organisation in Austria which integrates four former research funding and research promotion agencies (see above). The main task of the FFG will be in future the overall administration of the funding programmes, e.g. legal and administrative advice for project applicants, reliability check of proposals and application forms and the preparation of the contracts. In the past a private management consultancy was employed for the operative programme management, e.g. to give detailed advice on programme modalities; organize programme meetings, workshops and conferences.

The transport research programmes of the bmvIt are disposed as open calls. The project proposals are peer-reviewed by a jury of national and international experts. The guidelines for the project proposal evaluation are defined by the Ministry. The jury consists of national and international experts. The programme management is responsible for the project monitoring during the programme, at least one intermediary project report is called for. The Ministry is responsible for the final appropriation of project results.

The dissemination process is organized by the ministry and partly by the programme management. The dissemination is based on brochures, articles in newspaper and on the web. At least three open conferences focusing the programme objectives are arranged during a programme period: a programme opening conference, an intermediary project presentation workshop and a final conference on project results.

2.3.3 Policy evaluation and policy monitoring

The Federal Ministry for Transport, Innovation and Technology (bmvIt) has drafted an ex-post programme evaluation. It is planned that at the end of each programme period a programme evaluation will be carried out. The project monitoring during a programme period is carried out mainly by the programme management. The programme evaluation will be done by a team of national and international experts. These evaluation results are significant for the follow-up of the research programmes of the bmvIt.

2.4 Institutional barriers for cooperation in transport research

2.4.1 Policy and administrative barriers

Transport research policy is directly affected by the conflicts between different sectoral policies. This occurs for example between the national transport policy and the national economic policy not only because of the responsibility of two different ministries. Main barriers are different focal points of sectoral policies. The main objectives of transport policy are for example policy initiatives regarding intermodality, traffic reduction, those of economic policy for example competitiveness,
economic growth and stability. Diverse policy objectives have to be coordinated between the ministries. But co-ordination is time consuming and with that an essential barrier within the public administration. Another policy barrier occurs due to diverse transport policy philosophies in European countries.

2.4.2 Legal and budgetary barriers

Austrian research budget restrictions are a fundamental barrier for trans-national cooperation in transport research. Cross-national Funding has to be based on a legal framework which is not set up or even drafted yet. Cooperation on the project level is much easier to put into practice, but at this level other barriers are apparent:

- The funding rates of national or EU programmes (approximately 50% of the project costs), to ensure the project financing.
- There is less experience on alternative financing mechanism
- The whole administrative work to draft a project proposals.
- The competition between project partners from different countries and the role of Intellectual Property Rights (IPR)
3. Belgium

3.1. Contextual patterns

3.1.1 Country description and Transport infrastructure

Belgium has a population of around 10.3 million people (2002). They are spread on 30,528 sq km. The average population density is around 337 people per sq km. Belgium’s capital city is Brussels (0.2Mio), the largest city is Antwerp (0.5Mio.)

Belgium has three main physiographic regions: the coastal plain (sand dunes and polders), the central plateau, and the Ardennes highlands with the highest peak Botrange (694m).

Belgium is bordered on the north by The Netherlands and the North Sea, on the east by Germany and Luxembourg, and on the south and southwest by France. The country is about 280 km long, measured in a southeast-northwest direction, about 145 km wide, and is roughly triangular in shape.

The main rivers are the Schelde (Escaut) and the Meuse. Both rivers rise in France and are for the most part navigable in Belgium. The ports of Antwerp, Brussels, and Ghent are situated along the Schelde - the principal waterway of Belgium.

Antwerp is also one of the largest sea ports in the World. The rivers of Belgium are connected by an important system of waterways. The aggregate length of waterways and navigable rivers totals about 1,520 km. Belgium has a system of 149,028 km paved roads and motorways. There are 3,471 km of railroad tracks. The Belgian national airline company, SN Brussels Airlines, operates routes to major cities in the world.

3.1.2 Transport Industries

The area around the port of Antwerp is the largest centre of chemical industry in Europe and the second largest center of chemical and raw oil industry in the world - after Houston, Texas. The resident companies are for example BASF, Bayer, BP, Dupont etc. In Flanders, there is the highest density of car manufacturing sites in Europe. In this region at a radius of 40 miles, Ford (Mondeo), Opel (Astra), Volvo (S60 and V70) and Volkswagen (Golf) produce more than 1 million cars a year.

3.1.3 Transport policy related general goals


3.2. Transport research and innovation system

Belgium is a Federal State composed of seven autonomous, but related entities: the Federal State, the three Regions (the Flemish Region, the Walloon Region and the Region of Brussels-Capital) and the three Communities (Flemish Community, the French Community and the German-speaking Community). In practice the Flemish Region and Flemish Community have merged their government and insti-
tutions, which are referred to as the government and institutions of the Flemish Community.

Research policy in Belgium is distributed across all federated and federal entities. The main responsibility for research policy is conferred to the Regions and the Communities. As an exception to this rule a number of competencies in research policy are entrusted to the Federal Government. While the Communities have the main responsibility for fundamental research and applied research at universities and higher education institutes, the Regions have the main responsibility for funding R&D and innovation and technology oriented research. The Federal State is responsible for research policy linked to its own competencies, and for research activities of national and international interest, in agreement with the Communities and the Regions. Cooperation and consultation between the federated entities is organised through the Inter-Ministerial Conference on Science Policy (CIMPS-IMCWB).

At the Federal State level, the Council of Ministers from the Federal Government is responsible for research policy. The administration responsible for the implementation of the federal research policy is the Public Planning Service Science Policy (PPS Science Policy), placed under the authority of the Minister of Economy, Energy and Science. The PPS Science Policy prepares and implements research funding programmes under the Federal Government’s responsibility and in a framework of Cooperation agreements with the Regions and the Communities.

In the Walloon Region the Minister of Research and New Technologies is responsible for research policy. The Minister administers the most significant part of research policy, focusing especially on R&D policy. Other Ministries in the Walloon Region are also empowered to fund research activities. They develop these activities in full autonomy. The administrative body in charge of R&D policy in the Walloon Region is the Directorate General for Technologies, Research and Energy (DGTRE). DGTRE implements programmes to support R&D activities in industry, research centres and at universities in the Walloon Region. Other administrative units of the Ministry of the Walloon Region manage smaller research budgets in their field of competence, e.g. Natural Resources and Environment, Social Science and Health, Equipment and Transport.

In the French Community the Minister of Higher Education and Scientific Research has the main responsibility for research policy. Other Ministers of the French Community have a limited portfolio of research responsibilities within their competences. The administrative body in charge of the implementation of research policy in the French Community is the Directorate General for non-compulsory Education and Scientific Research of the Ministry of the French Community (DGENORS). This directorate is responsible for financing universities and higher education institutions and fundamental research activities (including FNRS8 and the associated funds). DGENORS ensures the coordination of all research activities in other ministerial departments and is responsible for the follow-up of international and EU research activities. Other departments of the Ministry of the French Community are responsible for sector-specific research programmes: e.g. on health, culture, sports, tourism and public services.

In the Region of Brussels-Capital the responsibility for research policy lies with the Minister of Economy, Employment and Scientific Research. The Research and

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8 FNRS: National Fund for Scientific Research
Innovation Office (SRI-DOI) of the Ministry of the Region of Brussels-Capital is responsible for the implementation of research policy in this region, e.g. to support basic industrial research and prototype development in regional companies. Technopol Brussel-Bruxelles is a non-profit organisation financed by the Regional Government. Technopol supports technology transfer and innovation activities with participation of regional stakeholders.

In Flanders the Department of Education and the Department of Science, Innovation and Media are responsible for research policy. The ministerial unit responsible for the implementation of the Flemish research policy is the Science and Innovation Administration (AWI) of the Ministry of the Flemish Community. This unit coordinates research funding initiatives between various ministerial departments. Two intermediary organizations are responsible for the allocation and distribution of R&D funds: IWT-Flanders (Institute for the promotion of innovation by science and technology in Flanders) organizes R&D funding initiatives to support industrial research and technology transfer in the Flemish industry. IWT aims to coordinate technology transfer and innovation intermediaries in Flanders. FWO Flanders (Fund for scientific research in Flanders) implements policy with regard to basic research at the universities.

The other departments of the Ministry of the Flemish Community are responsible for the implementation of sector-specific research funding initiatives, e.g. in Education, Economy, Employment, Internal Affairs, Environment and Infrastructure, Welfare, Public Health and Culture.

3.2.1 Mapping of the country specific transport research funding system

Competences in the field of transport research policy are distributed between the Federal State, the Flemish Region, the Walloon Region and the Brussels-Capital Region. Research activities in the field of transport and mobility are thus funded by different actors - at different levels of competences – in Belgium.

At the Federal level the Public Planning Service Science Policy (PPS Science Policy) implemented several thematic research funding programmes on transport/mobility:

- The Transport and Mobility Programme (1991-1995);
- The Sustainable Mobility Programme (1996-2001) was one of the thematic sub-programmes of the First Scientific Support Plan for a Sustainable Development Policy, SPSD I (1996-2001);

The Programme Policy Research Centres (Programma Steunpunten voor Beleidsrelevant Onderzoek) of the Flemish Government (Science and Innovation Administration, AWI), covers research on 13 research topics, one of which is safe mobility management: Steunpunt verkeersveiligheid – Policy Research Centre on Traffic Safety.

IWT-Flanders (the Institute for the Promotion of Innovation by Science and Technology in Flanders) is responsible for R&D funding initiatives as well as technology transfer for the Flemish industry. The following initiatives are relevant in the field of transport research: the Telematics Cluster, the Flanders Drive initiative and the Flemish Logistics Institute.
In the Walloon Region, the Directorate General for Technologies, Research and Energy (DGTRE) implemented the research funding programme WIST - Wallonie - Information - Société - Technologies. This programme funds research projects contributing to the economic and social development of the Region. Several projects are situated in the field of Transport Telematics. The Walloon CPDT (Permanent Conference on Territorial Development) has been set up in 1998 to initiate an interdisciplinary research programme on the territorial development of the Walloon Region, which covers among others spatial and transport planning. CPDT is working on pluriannual basis and relies on most of the ministerial departments of the Walloon Region.

In the Brussels Region, the Minister of Economy, Employment and Scientific Research is responsible for research policy and works closely together with the Research and Innovation Service (SRI-DOI), to promote new research activities and follow-up international research programmes. The research programme “Prospective Research in Brussels” covers, among other topics, research on “Mobility, environment and sustainable development”.

Besides the above mentioned programmes for project funding, transport research is institutionally financed by different ministries - ministries of transport, ministries of environment, ministries of energy - at both the Federal and Regional level. For example the Federal Public Service Mobility and Transport (FPS Mobility and Transport) finances policy oriented research related to its competences. Moreover the FPS Mobility and Transport can base its policy on the input of several (semi-) public research institutes.

In the Flemish Region, the Ministry of the Flemish Community has created a Mobility unit (Mobiliteitscel), within the Department of Environment and Infrastructure. Several transport research projects are financed to support the implementation of the Mobility Plan Flanders approved by the Flemish government in 2000.

The Walloon Equipment and Transport Ministry (MET) funds several transport research projects to support the implementation of the “Mobility and Transport Plan for the Walloon Region” approved by the Walloon government in 1995.

The Equipment and Transport Administration (AED/BUV) of the Region of Brussels-Capital is also funding transport research projects within the framework of its Regional Transport Plan: IRIS (Gewestelijk vervoerplan: IRIS / Plan régional de déplacement: IRIS), adopted by the government in 1999.

3.2.2 Mapping of relevant transport research institutions

The following public- and semi-public research institutes play a major role in the field of transport and mobility research in Belgium:

- Belgisch Instituut voor de Verkeersveiligheid (BIVV) / L’Institut Belge pour la Sécurité Routière (IBSR) (http://www.bivv.be) / “Belgian Institute for Road Safety”.
- Instituut voor de autocar en de autobus / Institut pour l’autocar et l’autobus (http://www.icb-transport.be) / “Institute for the autocar and autobus”.
- Belgisch Instituut der Transportorganisatoren / l’Institut Belge des Organisateurs de Transport (http://www.bito-ibot.be) / “Belgian Institute of Transport’s organizers”.
The above mentioned research institutes are non-profit institutions, in which the FPS Mobility and Transport has a central role. Sectoral, professional associations are also involved in most of these institutions. They have their own financial means (from different sources). The functioning is based on intense exchange with policy makers.

- Belgian Road Research Centre (BRRC) (supported by the Federal Public Service Economy (FPS Economy) and the three Regions).
- Vlaamse Instelling voor Technologisch Onderzoek (Vito) (Flemish institute for technological research).

At the universities and higher education institutions several institutes are involved in transport research, e.g.: Katholieke Universiteit Leuven (KULeuven), Universiteit Gent (UGent), Universiteit Antwerpen (UA), Vrije Universiteit Brussel (VUB), Limburgs Universitair Centrum (LUC), Provinciale Hogeschool Limburg (PHL), Vlerick School, Université Libre de Bruxelles (ULB), Facultés universitaires Catholiques de Mons (FUCAM), Facultés Universitaires Notre-Dame de la Paix de Namur (FUNDP), Facultés Universitaires Saint-Louis (FUSL), Université Catholique de Louvain (UCL), Université de Liège (ULg)...

3.3. Policy process description along the policy circle

The most important point for understanding the policy process along the policy circle in Belgium is the federal structure. There are major research funding programmes at the Federal as well as at Regional level. Besides transport research funding programmes, transport research is financed by different ministries at the Federal and the Regional level. The Communities have the main responsibility for fundamental research in universities and applied research in higher education departments. Many different actors are involved in the policy process concerning transport research policy.

Within the ICC-TRANSPORT concertation group (International Cooperation Commission - Concertation Group in the field of transport research – see below) it was decided to restrict the description in this paragraph to the mission, strategy, activities and procedures of the PPS Science Policy.

The Public Planning Service Science Policy (PPS Science Policy) operates at the Federal level and has developed several thematic research programmes on transport/mobility as mentioned before:

The PPS Science Policy is only responsible for what is mentioned below.

3.3.1 Policy formulation and policy determination

At the Federal level, the PPS Science Policy plays a key role in the formulation of long-term strategies in research policy. Long-term strategies on federal research policy are decided by the Federal Ministerial Council (pluri-annual research programmes), based on a strategic input from the PPS Science Policy.

There are different stages in research policy formulation and determination.

The PPS Science Policy submits a note to the Federal Ministerial Council. The Ministerial Council takes a decision on research priorities for future research programmes, the overall funding budgets and the time schedule. This takes into account the advice of the Programme Committee whose structure is defined in a cooperation agreement with the Regions and the Communities.
The Programme Committee gives input/advice on the text for the call for proposals (specific research topics and programme management procedures).

The text of the call for proposals is published in the Belgian Official Journal (Moniteur Belge/Belgisch Staatsblad).

The strategic input of the PPS Science Policy department is based on a number of negotiation activities between the different levels of competences in Belgium:

**Concertation with other federal departments:**

ICSP (The Federal Interministerial Commission for Scientific Policy) The mission of the ICSP is defined by the Royal Decree of 6 January 1997: to coordinate the formulation and implementation of governmental decisions with regard to federal research policy, which requires the concerted action of two or several ministerial departments. The Commission includes general officials from different federal departments.

**Concertation with the Communities and the Regions:**

The Interministerial Conference for Science Policy (IMCSP) involves members of the Federal, Community and Regional governments proficient for research policy. The IMCSP constitutes the instrument for consultation between the Federal State, the Communities and the Regions. In IMCSP Cooperation Agreements are worked out (including research topics falling under mixed competences of the Federal State, the Regions or the Communities and matters of international affairs), various procedures for collaboration and exchange of information are implemented.

The International Cooperation Commission (ICC) is one of the permanent Commissions of the Interministerial Conference for Science Policy (IMCSP). ICC is responsible for the consultation of the Federal State and the different federal entities on matters of interest of national and international significance. The International Cooperation Commission (ICC) arranged several concertation groups, e.g. CIS-TRANS for transport research. CIS-TRANS was set up to prepare the position of the Belgian delegation in international meetings, notably the programme committees for the Sixth EU Framework Programme.

**3.3.2 Policy implementation and policy dissemination**

At the Federal level, the PPS Science Policy does not only have the responsibility for the formulation but also the implementation (programme of research programmes with support and advice of the Programme Committees. Several funding programmes on transport/mobility research were implemented:

- The Transport and Mobility Programme (1991-1995)
- The Sustainable Mobility Programme (1996-2001) was one of the thematic sub-programmes of the First Scientific Support Plan for a Sustainable Development Policy, SPSD I (1996-2001)

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9 These Cooperation Agreements are published in the Belgian Official Journal (Moniteur Belge/ Belgisch Staatsblad) and formalise the cooperation between the Federal, Regional and Community level.
For each research funding programme a Programme Committee is set up. The Programme Committee includes representatives of different administrations concerned by the research programme. In case of a research funding programme concerning mixed competences (competences at Federal, Regional, Community level) the arrangement of the Programme Committee is fixed by the Cooperation agreement. In practice, since transport policy is a mixed competence, Federal and Regional transport ministries are involved in the Programme Committee. Since transport research is embedded in the framework of the Sustainable Development research programme (Scientific Support Plan for a Sustainable Development Policy - SPSD), the Programme Committee also includes representatives from Federal and Regional ministries on environment, energy, health and representatives from the Communities. The role of the Programme Committee is threefold. (1) The Programme Committee is involved in the preparation of the call for proposals. Whereas the Decision of the Federal Government relates to research priority setting, the overall funding budget and the time schedule. (2) The Programme Committee gives detailed advice on specific research topics and management procedures for the call for proposals. (3) The Programme Committee is involved in the selection of submitted proposals and in the follow-up process, e.g. the dissemination of results and information to the PPS Science Policy.

The implementation of research programmes is based on the publication of calls for proposals, followed by an evaluation of the submitted proposals. The proposals are selected on the basis of peer reviews (international experts) and a strategic evaluation procedure by the Programme Committee. Projects are set up in interdisciplinary networks, which are made up of a maximum of 5 research teams, belonging to at least two separate institutions and including at least one university. The contribution from the partner in the network may vary, resulting in separate project budgets and research periods. Calls are open to universities, public research institutes, non-profit research centres and specialised consulting agencies. Consulting agencies may receive up to 25% of the total budget requested.

- Each project proposal must indicate a coordinator. The project coordinator may request a coordination budget not exceeding 2.5 % of the total project budget. Research projects are funded up to 100 %. Since 2001 the research programmes of the PPS Science Policy are open to participation by European universities or research institutes. In this case, cooperation will be based on co-financing (50 %) and will be limited to a maximum of 10 % (for future programmes it will be 20 %) of the proposal's budget.

Within research programmes administrated by PPS Science Policy the dissemination process is well organized. Research reports are publicly available, summary reports are published. For each funded research project a Users Committee (e.g. public administrations, other researchers, NGO's, private sector interest groups) is set up. This committee plays an important role in the dissemination process. Within the research programme SPSD II, a special managerial effort is made to stimulate cooperation between complementary research projects (initiate project clusters) funded by different sections of the SPSD II programme. One of the objectives of this initiative is to enhance the dissemination of research results, e.g. by organizing joint workshops and supporting synthesis reports.

3.3.3 Policy evaluation and policy monitoring

The PPS Science Policy is responsible for the evaluation and monitoring of its research programmes. At the beginning of a programme the monitoring and evalua-
tion tools are decided upon. This decision depends on the scope of the pro-
gramme/ the scope of the projects and the available time and budget. The follow-
ing three evaluation types are common:

- Intermediary project evaluation;
- Ex post project evaluation;
- Ex post programme evaluation.

The research contract broadly mentions the procedures for intermediary and/or ex post project evaluations. In some cases an ex post evaluation at the programme level is conducted (e.g. fulfillment of objectives, dissemination of results, identification of future research priorities). For example: the first Scientific Support Plan for a Sustainable Development Policy – SPSD I was ex post evaluated by a panel of international experts.

3.4. Institutional barriers for cooperation in transport research

3.4.1 Policy and administrative barriers

The main administrative barriers and political conflicts are seen in concerns losing knowledge, competence and political power (sovereignty on national and regional research funding programmes). Further administrative barriers are the lack of re-
sources (staff, budget) and the lack of time. Differences across countries concern-
ing the scale of research programmes might be a barrier as well. It can be ques-
tioned whether large research programmes can be easily combined with small re-
search programmes. There might be huge contradictions concerning the objec-
tives of research programmes: e.g. focus on technology and innovation oriented research versus policy/problem oriented research. In some research funding pro-
grames research results are public whereas research results of other pro-
grames are restricted to specific users.

3.4.2 Budgetary and legal barriers

The timing of the calls for proposals within research funding programmes in Bel-
gium is closely linked to the planning of the government research budget. It might be difficult to adapt this timing to the time-schedules on research budget decisions in other countries. There are differences in available budgets for research and di-
fferences in research programming approaches: e.g. differences in selection pro-
cedures; differences in project financing (100% funding versus co-funding) and in the opening of programmes to different types of research institutes. Other signifi-
cant barriers are legal aspects concerning contracts with foreign partners, intellec-
tual property rights concerning research results and legal regulations referring to the use of national languages.
4. Denmark

4.1. Contextual patterns

4.1.1 Country description and Transport infrastructure

Denmark has a population of around 5.4 million people (2004 est.) and the size is 43,094 sq km (excluding Faeroe Islands and Greenland), which gives an average population density of around 126 people per sq km. Most people live in the cities and suburbs in close connection to the cities: Of the entire population more than ¼ live in The Great Copenhagen area (1.5 mill. people) Other large cities and city areas are Aarhus (220,000 inhabitants) and Odense (150,000 inhabitants).

Denmark consists of several islands, of which the two largest are Zealand, the site of Copenhagen, and Fuen. However, both islands are internal connected by a bridge and with the continent through bridges to Jutland and Sweden. The landscape of Denmark is low and flat to gently rolling plains, which is underlined by the fact that the highest point of Denmark only reaches 173 meters above sea level.

Denmark has 3,164 km of railways. Paved roads accounts for 71,591 km. Unpaved roads hardly exist. Denmark has larger and smaller 28 airports, of which only 2 of them have runways longer than 3,000 meter.

4.1.2 Transport Industries

It is the policy of the Danish government to encourage the industry sector to play a more prominent role in research and development in general. In the case of transport research this kind of involvement exists only at a small scale. This is partly due to the fact that there is only a limited industrial production in the transport sector in Denmark. The Danish transport sector consists of a few large companies and a lot of very small companies with a limited potential for contribution to transport research. Formerly Denmark was a big ship builder nation, but today only a limited amount of shipbuilding is situated in Denmark.

4.1.3 Transport policy related general goals

Denmark has a weak tradition in transport research. The level of Transport Research Funding budget has not been at a constant level, and can best be characterised as an on-off approach. Also substantial changes in the research organisation both at the level of programme funding and the funding of research institutes have taken place in the last decade. In the current situation transport research funding is at a minimum. Transport policy goals and transport policy strategies are not high on the political agenda,

The latest transport research policy strategy dates back to year 2000 and the strategy plan is expected to be renewed in 2005. The main issues are:

- Concentrate transport research environments into fewer but stronger units
- Establish a national transport research institute under the Ministry of Transport
- Focus transport research topics
- Create a stronger cooperation on transport research at universities
- Create a stronger cooperation between academic research and industry

Partly due to a change regarding research priorities in Denmark, the strategy has never come fully into force.
Some major transport policy goals have been formulated by the current Government:

- Safety in transport – reduce the number of traffic accidents especially death casualties
- Reduce traffic congestion – especially in the Copenhagen area
- Promote the use of public transport
- Promote intermodal freight transport to and from Denmark
- Reduce the environmental costs of the transport sector
- Draw up a decision basis for establishing a Femern Belt link to Germany

In regards to transport infrastructure development, an infrastructure investment plan was announced in February 2003. The time frame of this plan is 2012. The main objectives of the transport infrastructure investment plan are the following:

- Improvement of existing road- and rail infrastructure.
- Reduction of traffic congestion problems.
- Improving the transportation network within and between regions.
- Improvement of international infrastructure connections in order to establish an European transport infrastructure without barriers (to secure free exchange of goods and people between European countries).

The transport infrastructure investment plan also stresses the importance to prioritise transport research, but does not focus clearly objectives. To realise the transport infrastructure investment plan, 26 billion DKK are reserved in the state budget for a 10 years period (approx 3.5 billion Euro, or 350 million Euro per year).

4.2. Transport research and innovation system

4.2.1 Mapping of the country specific transport research funding system

The Ministry of Transport plays the lead role in funding transport research in Denmark. The Ministry manages a fund of approximately 1.1 mill Euro for applied transport research. Through direct funding to the Danish Road Directorate and the Danish Transport Research institute the two organisations receive around 5 Mill Euro per annum for transport research. With the funding the institutes finance in-house research and a number of external projects selected within their transport research strategies. The National Rail Authority Rail Net Denmark and The Danish Maritime Authority have a small funding budget for transport research.

Apart from the Ministry of Transport the Danish Council for Strategic Research under The Ministry of Science, Technology and Innovation provides research funding in Denmark. However, transport researchers very seldom – if ever – have successful tenders through the Council for Strategic Research. One reason for this is that transport research is not considered to be a scientific discipline, but a kind of applied research and therefore not in focus of the Danish Council for Strategic Research. In 2003 the Danish transport researchers received around 2.5 mill. Euro from the EU framework programme.

4.2.2 Mapping of most relevant transport research organisations

The main players in the Danish transport research arena are the Danish Road Institute, which is funded by the Danish Road Directorate, and the Danish Road In-

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10 “Benchmarking of Nordic Transport Research”, NTF, Marts 2005
stitute carries out research on technical aspects of road construction and maintenance. It is roughly estimated that 2.6 mill Euro is allocated yearly to the Road Institute for research. The Danish Road Institute finances in-house research as well as external projects.

The Danish Transport Research institute (DTF) under the Danish Ministry of Transport has special focus on transport safety and risk as well as transport economics and traffic modelling. In 2004 2.4 mill Euro were set up for this institute from the national budget. DTF finances in-house research.

The Danish Research Agency (under the Ministry of Science) administrates two ongoing research programmes, where transport is in focus. The Research Agency has not earmarked resources for transport research, but occasionally programs with focus on transport research are started. The estimated yearly funds for the two programs are 2.6 mill Euro. Both programs terminate at the end of the year 2004.

Three Universities have transport research units with a certain volume: CTT, Center for Transport and Traffic Research, Technical University of Denmark, FLUX, Center for Transport Research, University of Roskilde and TRG, The Transport Research Group at Aalborg University.

The industrial participation in transport related research activities is mainly taking place within some collaboration between CTT and the shipping industry. Moreover The Ministry of Science, Technology and Innovation invests around 15 mill Euro per year in R&D activities of the Danish Technological Institute which includes transport related research and development.

4.3. Policy process description along the policy circle

4.3.1 Policy formulation and policy determination

The ministry of Transport is at the moment the sole ministerial player in transport research policy. Concerning transport infrastructure investments the Ministry of Transport has the overall responsibility, whereas the responsibility on transport research in Denmark is much more undefined. The Ministry outlines the overall research priorities for the Road Directorate and the Danish Transport Research Institute. It is then up to the two organisations to specify and detail these research priorities within their own fields of competence. Apart from that very little transport research is carried out.

The Ministry of Transport regards it very difficult to introduce long-term research strategies, since politicians often have a shorter time frame and a focus on present problems. As consequence, it is up to universities and the national research boards to define strategic visions in transport research: in fact the process of identifying research themes is very much in the hands of research departments at universities. Research officers in other than Danish Ministry of Transport are particularly working on transport relevant topics.

The other major player in research funding, the Strategic Research Council, under the Ministry of Science, Technology and Innovation has no explicit policy or strategy for transport research. For that reason one of the objectives of the Ministry of Transport is to include mobility and transport as a topic in a coming overall strategic research program of the Ministry of Science, Technology and Innovation.
4.3.2 Policy implementation and policy dissemination

The transport research policy implementation process in Denmark is not very well structured. One explanation can be found in the lack of a long-term strategy in transport research policy and the overall lack of specific transport research programmes. As one of the few countries in the EU, Denmark does not have an earmarked funding budget for transport research. The Danish State Railways and other public transport authorities have a very limited - or no funding budget. They only have funding for direct exercises or specific expositions. Due to this situation, one of the objectives of Ministry of Transport is to draft in near future an appropriate transport research programme - however, it is uncertain when this will happen.

Dissemination of research results is primarily organised and carried out by the research organisations. If private consultants are carrying out transport research, the funding party is very likely to demand dissemination. Every year 400 researcher and participants meet at a two day national transport research conference. The main goal of the conference is to disseminate research results to the end users from the federal state, regional and local authorities. Often interesting results will be discussed in the press and most research groups try to get dissemination both to other researchers and to the public in general.

Stakeholders of transport research agree that dissemination and discussion of research results is very important. It is fundamental that researchers have to disseminate and publish research results, especially in the case of transport research, which often is a “practical matter”. It is necessary to keep in mind that research results have to reach the decision makers whether they are politicians or business leaders. Unfortunately, an in depth knowledge of transport research is often not high amongst politicians. However, it seems that a new generation of younger politicians with interest and knowledge in transport is beginning to emerge. The Ministry of Transport admits that they are not aware enough of “marketing and visualising” the outcome of transport research.

4.3.3 Policy evaluation and policy monitoring

Since no overall strategies or programmes exist for transport research in Denmark, no central guidelines for evaluation and dissemination are established. As a result evaluation and monitoring are very often in the hands of the funding organisation. Researchers are responsible for the dissemination process. Nevertheless, sometimes the funding organisation demands some degree of dissemination as well.

4.4 Institutional barriers for cooperation in transport research

4.4.1 Policy and administrative barriers

The lack of a national transport research strategy and transport research programmes are at the moment the most relevant and overshadowing barrier for transport research in Denmark. Without a strong national focus on transport research the support from the public administration is limited and researchers are handicapped to participate in trans-national transport research programmes. Concerning EU projects, the complicated process drafting EU proposals is a significant barrier. In addition the new structure for tenders with "Networks of Excellence" and "Integrated Projects" are administratively difficult and time consuming and make it very laborious for new participants. The Ministry of Science, Technology and Innovation has a fund, which supports the costs to draft a EU proposal.
with a maximum of DKK 100.000 (around Euro 13.000). Of cause, a formal application has to be made and not all applicants receive funding.

4.4.2 Legal and budgetary barriers

The budgetary barriers are over powering. Only a very limited amount of the research funding budget of Denmark is available for transport research. No earmarked funding budget for transport research is in general available. Currently it is difficult for Danish transport research organisations to receive funding for research, e.g. to participate in the EU-programme according to the "self-financing share" in the 6th EU framework. Previously, Danish researchers and consultants had previously a fair good share in EU funded projects but the new overhead policy has prevented many of them from participating.
5. Estonia

5.1. Contextual patterns

5.1.1 Country description and Transport infrastructure

Estonia has a population of about 1.342 million people (July 2004) populating around 45.227 sq km, which is nearly the size of the Netherlands and Denmark. The average population density is about 30 inhabitants/sq km.\(^{11}\) Nearly two-thirds of the population is living in urban areas.

Estonia lies along the Baltic Sea and is conterminous with Russia, along the 294 km eastern border, and Latvia, along the 339 km southern border. The capital city is Tallinn in the Northwest of Estonia. Tallinn is situated around 80 km south of Helsinki across the Gulf of Finland. Around 400,000 inhabitants (this number stands for Tallinn city)\(^{12}\) live in Tallinn.

The climate is maritime, characterised by icy, snowy winters and long light summers. The country is mostly flat in the north and hilly in the south, with more than 1500 islands and 1200 lakes, the largest lake is Lake Peipus in the East which is the natural border to Russia and the 4\(^{th}\) largest lake in Europe. The islands and islets at the West Coast are designated as a biosphere reserve by the UNESCO and are a popular recreation area for Estonians and tourists from abroad in summer.

About 60% of the territory of Estonia is covered by forests and marshes. The rest of the territory is used as farmland and for industrial sites, the latter mostly around the metropolitan areas like Tallinn, Narva in the Northeast, Tartu in the south and Pärnu in the west.

Estonia has a national road network with a length of 16.452 km whereof 48% are non paved and 52% paved roads. The total length of the road network is announced with 55.952 km by the Estonian Road Administration\(^ {13}\). There are no motorways in Estonia, but around 94 km of so called expressways.

The length of railway tracks are around 958 km: 105 km are double tracks, 132 km are electrified. The total railway network has a length of 1.811 km and is managed by the Estonian Railway Ltd. (4/5) and the Edelraudtee Ltd. (1/5).

Estonia has around 101 seaports, whereof 31 perform commercial shipping operations like passenger- and cargo transport. The largest seaport is Port of Tallinn, which consists of Old Port, Muuga Port, Paljassaare Port and Paldiski South Port. The seaports are open for navigation all-season, only during severe winters icebreakers are in use. Other important seaports are the Kunda port, the Paldiski North port, Pärnu port\(^{15}\) and Sillamäe port, which is just undergoing major reconstruction.

Estonia has 5 airports and 9 airfields. Tallinn airport is the only international airport, in Estonia. The other are former soviet military airports or airports/airfields of local or regional importance.

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\(^{11}\) Enlargement Website of the European Commission, 2004
\(^{13}\) Estonian Road Administration, Webpage, 2004.
5.1.2 Transport Industries

The main sectors of the Estonian industry are food processing, textile and garment manufacturing, wood processing, electrical engineering, chemical production, machine-building industry, construction and construction materials.

Products of the Estonian technical industry are e.g. electric motors, cables, control and measuring equipment, integrated circuits. Several joint ventures between Western, primarily Scandinavian enterprises and Estonian manufacturers evolved in the last few years. Estonia's regional economic cooperation is focused primarily on the Baltic Sea Region, but as well on European Countries and Russia.¹⁵

In the service sector, which is one of Estonia's most significant and rapidly growing economic areas, freight-logistics and tourism are booming. The volumes of the turnover of goods, in particular the oil transit from Russia, as well as passenger transport are heavily grown in the last few years. Jointly responsible for that growth are safe and crime-free facilities within the transport sector.

There are more than 40 small or medium sized companies (SME) providing transport and logistic services. The three largest companies in vehicle construction and maintenance are UVZ & AVR (e.g. wagon assembly and maintenance), BLRT Group (e.g. shipbuilding and maintenance, maintenance of rolling stock) and Balti ES a manufacturer of a wide range of transport related products including containers, fans, technical equipment for ships and offshore applications.

5.1.3 Transport policy related general goals

Since the reopening of Estonia and the accession to the European Union several transport infrastructure development plans and strategy papers have been set up to improve the transport infrastructure to an efficient, high-capacity, serviceable network.

These planning documents are namely:

- The Transport Infrastructure Development Plan 1999-2006 (The new Transport Development Plan 2004-2010 is under preparation),
- The Long-term Road Management Plan 2002-2010,

The Transport Development Plan was worked out due to the need to lay down the directions of advance of Estonian national transport up to the year 2006. The plan underlines the main objectives of transport policy. These objectives are Environmental and Human Friendliness (emission reduction, stop traffic increase at a certain level, traffic safety), Mobility Management (costs of public transport must remain on a lower scale than the cost of passenger cars, sustainable mobility) and Social Accessibility to transport services.

The Long term Road Management Plan 2002-2010 includes a list of future construction sites and road works, a calculation of road maintenance costs for the following years, a budget estimation for road management and a calculation of cost revenue shares, e.g. from national budget, from local budgets, loans, foreign credits and other financial sources. In the planning of road management, environ-

¹⁵ IBS, Doing Business in Estonia, p.10ff.
mental protection requirements, regional development and the estimated traffic volume have been taken into consideration. The priorities of future road management are the maintenance of national roads, reparation of national roads, construction and reconstruction of national roads, reconstruction and reparation of bridges, traffic safety, development, maintenance expenses, maintenance of local roads.16

One of the most important planning documents is the “Estonian National Development Plan for the Implementation of the EU Structural Funds – Single Programming Document (SPD) 2004-2006”. The Estonian government has implemented this plan as a basis for common national and EU efforts to fasten the social and economic development of Estonia. Based on an analysis of the county specific strengths and weaknesses, development opportunities and risks are summarised. Concrete measures are specified.

As one of the weaknesses in Estonia the transport infrastructure is mentioned. It is described as a “Technically insufficient transport network, poorly maintained and without overtaking capacities”. The main transport infrastructure policy objectives today are targeted to roads, railways, ports and airports and are described as:

- Construction and upgrading of transport projects linked to the Trans-European transport network (TEN-T), (Via Baltica, Rail Baltica)
- Improve access to regional centres,
- Improve safety in the transport sector,
- Improve environmental situation in the transport sector, and
- Technical preparation of infrastructure projects.

Before infrastructure projects are selected for realisation they have to fulfil specified selection criteria and monitoring and evaluation indicators.

A national transport research policy is not set up in Estonia. Transport research is not pointed out in the above mentioned infrastructure planning documents. But the Estonian Ministry of Economic Affairs and Communications, which is in charge of technological research, development and innovation, already noticed the demand for national transport research policy and the importance of transport research funding programmes for the whole Estonian research landscape and for the national industry and SME’s in general.

5.2. Transport research and innovation system

The understanding that knowledge, creativity and innovation have a major role in the long-term competitiveness of the Estonian economy has led the Estonian government to a strong commitment to improve Estonian innovation policy. Therefore the Ministry of Education, the Division of Technology and Innovation of the Ministry for Economic Affairs and Communications and the Estonian Academy of Science prepared an innovation strategy paper which led to the National Research Strategy plan called “Knowledge based Estonia – Estonian Research and Development Strategy 2002-2006”. During the preparation process a public debate with participation of representatives from universities, research organisations, private enterprises and different associations took place.

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5.2.1 Mapping of the country specific research funding system

Currently, there are no national transport research funding programmes or clearly identifiable funding initiatives for transport research in Estonia. The institution which would be in charge to specify transport research funding is the Ministry of Economic Affairs and Communications. This Ministry is mainly responsible for technology and innovation policy. The Ministry of Education and Research is responsible for the organization of research policy and education policy.

Estonia’s structure for research and development has undergone several changes. An institutional reform regarding R&D and higher education was started at the beginning of the 1990’s. In this institutional reform a new research funding system was established - including the corresponding legislation. The basis of the Estonian research funding system is provided by the Organization of Research and Development Act (1997) and the following updated Amendment Acts (2001).17

The most important research funding initiatives in Estonia are:

- **The Estonian Science Foundation** (EstSF), is a research-funding organisation, supporting the most promising research projects in all fields of fundamental and applied research. The EstSF relies on a yearly research funding budget and spends research grants to individuals and research organisations.

- **Enterprise Estonia – Enterprise Development Foundation** (EAS) is one of the largest organisations within the national support system for entrepreneurship. Being under the jurisdiction of the Ministry of Economic Affairs, EAS is responsible for the implementation of EU structural funds in Estonia.

- **Archimedes Foundation** is an independent body established by the Estonian government in 1997 with the objective to coordinate and disseminate different EU funding programmes in the field of training, education, research, technological development and innovation.

5.2.2 Mapping of relevant transport research organisations

In Estonia technology and innovation oriented transport research is carried out by universities, research organisations and engineering companies. Research is mainly funded by the Estonian Science Foundation or Enterprise Estonia or funded within a trans-national research cooperation project.

5.3. Policy process description along the policy circle

5.3.1 Policy formulation and policy determination

In Estonia the Ministry of Economic Affairs and Communications is responsible for the formulation of national technology and innovation policy as well as for transport policy. Responsible for transport policy within the Ministry of Economic Affairs and Communication are the following administrative bodies: Estonian Civil Aviation Administration, Estonian National Road Administration, Estonian Railway Inspectorate and Estonian Maritime Administration. These administrations are responsible for the formulation of long-term strategies, for the outline of policy priorities and the planning of major investments within their fields of competence.

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The **Estonian Research and Development Council (TAN)**, which is the strategic advisory body to the Government in research and development issues, was set up 3 years ago, has 12 members and is chaired by the Prime Minister. TAN advises the Estonian Parliament and the Government on strategic issues regarding research and development. On the basis of the Estonian Innovation strategy plan, which will be reviewed and updated every three years and on behalf of proposals submitted by the Research and Development Council (TAN), annual Research, Development and Innovation (RD&I) action plans will be drafted and specific RD&I initiatives defined.

**5.3.2 Policy implementation and policy dissemination**

In Estonia the Ministry of Economic Affairs and Communication and its specific administrative bodies are responsible for the implementation of technology and innovation oriented research programmes and transport research programmes. But due to other primary needs, regarding transport infrastructure, research funding programmes have not been discussed or initiated by the Ministry yet.

The dissemination of research results is organised by the performing research organisation itself and by the Ministry of Economic Affairs and Communications. Research results are disseminated in workshops, at information days, in conferences and dedicated publications and newsletters. Some dissemination activities are outsourced to research promotion agencies and consultancies.

**5.3.3 Policy evaluation and policy monitoring**

The main role in research evaluation lies with the Ministry of Education and Research. In the evaluation of transport research the Ministry of Economic Affairs and Communications is involved as well. Each research organisation and higher education department is evaluated at an annual basis by the Research Competency Council (TKN) and the Centre of Higher Education Accreditation; For this evaluation international experts are invited as evaluators. TKN has 9 members and 9 thematic expert groups, who evaluate the work and contribution of research organisations. The results of the evaluation are drawn for funding decisions for the following year.

**5.4 Institutional barriers for cooperation in transport research**

**5.4.1 Policy and administrative barriers**

There are no national transport research programmes in Estonia today, therefore there are no institutional barriers. Access into the trans-national research is often impeded by the small size and limited research arena and market of the country.

**5.4.2 Legal and budgetary barriers**

Clear budgetary barriers can be identified regarding national co-financing requests for participation in FP6 programmes and other trans-national funding initiatives.
6. Finland

6.1. Contextual patterns

6.1.1 Country situation

Finland has a population of around 5.2 million concentrated around the southern part of Finland with 1.2 million people living in the metropolitan area of Helsinki. The largest cities are Helsinki (559,330 inhabitants), Espoo (224,231), Tampere (200,966), Vantaa (184,039) and Oulu (125,928). The country covers 337,030 sq km, giving an average population density of around 15 people per sq km.

Except for a small highland region in the extreme northwest, the country is lowland less than 180 m above sea level. Off the southwest coast are the Swedish-populated Åland Islands (1,505 sq km), which have had an autonomous status since 1921. The close proximity to the Baltic States has created strong bonds between the countries, something that is also visible in the transport policies.

Finland has 5,850 km of railways. Paved roads accounts for 50,305 km, however, unpaved roads forms a quite large part of 27,668 km. The coastline is bordering the Baltic Sea (the Gulf of Bothnia and the Gulf of Finland) and has a length of 1,126 km. Because of its northern position Finland has special transport issues regarding ice and shipping and transport lines to Europe.

6.1.2 Transport Industries

Finland has small-scale automotive industry, e.g. Oy Sisu Auto Ab manufactures Sisu trucks and Valtra manufactures tractors. Finland has one car manufacturing company, Valmet Automotive, which is producing cars for Porsche AG. The Finnish automotive manufacturers are mainly subcontractors. One of the main industry sectors in Finland is telecommunications. With that Finland is strongly involved in Transport Telematic applications.

6.1.3 Transport policy related general goals

Finnish transport policy is defined in the document “Towards a Intelligent and Sustainable Transport 2025” covering the period of 2000-2025. This document presents guidelines for current and future Finnish transport policy. The main issue of the document is the future transport infrastructure development concerning the structural changes taking place in the society. Key words are: globalisation, international economy, environmental issues, information society, regional and demographic transformation, values and lifestyles choices, future transport technologies and the special characteristics of Finland.

The Ministry’s “Operating strategy and financial plan (2006-2009)” is a strategic document that gives guidelines to transport research policy and sets up research priorities concerning the goals of Finnish transport policy. The main issue of the strategy is to develop a transport system in which personal mobility and transport services are intelligent and sustainable. Emphasis is given to:

- Lowering of logistics costs,
- Taking care of the Finnish interests and competitiveness of national transport industry in the EU and the international agreements,

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• Development of the most important infrastructure connections between regional centres and the Helsinki Metropolitan Area,
• Safeguarding basic service level of lower road network,
• Implementing transport system plans to reduce negative impacts of transport (safety, environmental and accessibility issues),
• Developing the Helsinki Metropolitan Area transport system,
• Intensifying full use of existing transport networks using telematic devices,
• Safeguarding basic service level of public transport.

Sustainable transport system is one major objective of the strategy. Sustainability refers to a system that is economically, environmentally and socially sustainable. A sustainable transport system requires more effective range of measures and a full awareness of the impact of different measures.

The Finnish Road Administrations (Finnra) “Operating strategy and financial plan TTS (2005-2008, 2006-2009)” outlines the framework of the organisation’s research strategy. The focal points of the strategy are requirements of road users and other client groups, impacts of road management, asset management, working markets for procurement of road works and services, traffic management and management of traffic and road network information.

The Finnish Rail Administration’s “Action and Economic Plan (2006 – 2009)” is based on the strategic directions of Finnish railway infrastructure development. It includes a list of infrastructure development priorities as well as an assessment of their costs and impacts. The focal points of the Finnish Rail Network Plan are:

• The railway network will be maintained in a condition which allows competitive and efficient rail transport operations. This objective can be achieved e.g. through maintenance and replacement investments.
• The requirements of regional and social equity will be implemented by increasing the speed level of passenger trains, constructing additional tracks for commuter trains and new station arrangements. Achieving of the objective also requires actions from the operators, such as decisions on rolling stock and improved supply of services in the railway sector.
• The environmental objectives will be achieved through activities which reduce noise emissions, vibration, energy consumption and emissions of air pollutants. The safety objectives can be achieved through automated train protection systems, safety equipment, the renewal of radio system as well as removing and securing of level crossings.
• The objectives of transport policy will be poorly achieved at a low level of investment. Early implementation of development projects is more profitable.

Research funded by the Finnish Maritime Administration is concentrated, according to administration’s vision and strategy, on enhancement of waterborne traffic and waterway network, developing of safety and environmental issues and on use of information and communication technology. The Finnish Maritime Administration also engages in research aimed at improving maritime safety and information systems particularly within the Baltic Sea region, working closely with other Baltic states and with the Helsinki Commission (HELCOM).

6.2. Transport research and innovation system
The national research, technology and innovation policy is formulated by the Science and Technology Policy Council, which works under the Prime Minister. The
ministries that are responsible for the research policy are the Ministry of Education and the Ministry of Trade and Industry. The Ministry of Education is responsible for education and training, higher education and science policy as well as the Academy of Finland. The Ministry of Trade and Industry is responsible for industrial and innovation policy, the Technical Research Centre of Finland (VTT) and the National Technology Agency (Tekes).

6.2.1 Mapping of the country specific transport research funding system

Transport research in Finland is mainly generated and funded by the Ministry of Transport and Communications (MinTC). Besides transport research, the MinTC is funding e.g. research related to communication networks, media policy, e-commerce, data security and the information society. Other main financiers are offices and agencies within Ministry's administrative sector like the Finnish Road Administration (Finnra), the Finnish Maritime Administration, the Finnish Rail Administration and the Finnish Vehicle Administration.

In Finland the funding for transport research is mainly generated in the ministries or associated organisations to the ministry. Funding is allocated by call for tenders (95% of all public funding). The Ministry of Transport and Communications (MinTC) and the Finnish Road Administration (Finnra) holds the largest transport research funding budgets. Both institutions hold around 35% of the total transport research funding budget.

Tekes (Technology Development Agency of Finland) is the main public funding organisation in Finland and is as well an important funding organisation for Finnish transport research. Tekes funds industrial research as well as academic research. Tekes especially promotes innovative, risk-intensive research projects. Funding is mainly distributed to R&D projects run by companies and research organisations. Several funding organisations, e.g. the Ministry of Trade and Industry and industry itself, are pooling their funds - and Tekes is managing these funds. Tekes offers partners from abroad a gateway to the Finnish research and technology arena. The Academy of Finland is as well a large public funding organisation for research in Finland subordinate to the Ministry of Education concentrating on basic research.

6.2.2 Mapping of relevant transport research organisations

The actual transport research is done by universities, polytechnics, business schools, research institutes and private consultants (about 30 consultancies). The most important academic institutions in transport research are Helsinki University of Technology and Tampere University of Technology. A central role plays also the Technical Research Centre of Finland (VTT). The MinTC and its' administrative sector do not do the actual research but are generating and funding it.

The main focus of the research funded by Ministry of Transport and Communications is set on intelligent and sustainable transport systems. An intelligent transport system is defined as a system, in which IT-technologies are widely used e.g. for different transport applications and personal mobility solutions. Other main focus areas are logistics and traffic safety.

The main objective of the research activities funded by the Finnish Road Administrations is to create knowledge to operate road transport more efficient, safe, competitive and sustainable. Most of the research projects are funded successfully but the Administration has had as well some poor experiences with research pro-
ject funding. The final outcomes of the projects did not match the total funding and it seemed that the research organisations were not able to manage large funds in a way that was satisfactory for the demand side (road administration). Several research projects might produce a lot of understanding and input for the researchers but not sufficient output for the users.

The research activities funded by the Finnish Rail Administration’s mainly concentrate on applied research and policy research, e.g. the development of guidelines and methods for railway infrastructure management. Major focus in research are the competitiveness of rail services, the condition and development of the rail network, the opening of the rail network to new operators, improving safety and developing a strong railway transport authority. Research activities are based on the Finnish Rail Administration’s daily tasks as well as its visions for the future. Research is guided by several objectives, e.g. the development of transport and travel chains, maintaining rail traffic market shares, expanding the 25-tonne axle load network and the high-speed network, and raising railway safety to a top European level.

Research and Development activities funded by the Finnish Maritime Administration focus on research on waterway transport, the operating environment, the development of waterway transport and the development of services. Research activities consist of strategic projects and development projects. The starting point for the research activities of the Finnish Maritime Administration is the implementation of the administration’s vision and strategy. The yearly research programme prioritises focal areas and strategic projects based on this strategy. The executive board of the Finnish Maritime Administration decides upon a funding frame for research activities and strategic projects.

6.3. Policy process description along the policy circle

6.3.1 Policy formulation and policy determination

On the national level The Science and Technology Policy Council of Finland (chaired by the Prime Minister and with a secretariat from the Ministry of Education and Ministry of Trade and Industry) is responsible for the strategic development and co-ordination of Finnish research policy as well as for the national innovation system. The guidelines of the research council are defining ministries role in the Finnish innovation system.

National representatives of the Ministries are involved in programme committees of EU framework programmes, steering groups of Joint Research Centre of ECMT & OECD, technical committee of COST Transport, management board of Nordic Transport Forum (NTF) etc. Research project clustering is an important initiative in Finnish research policy, e.g. to produce new knowledge and collaboration opportunities, to break down traditional barriers between disciplines, intensify contacts between researchers and end users, enhance cooperation between public funding organisations and researchers. Around 50% of the MinTC’s funding budget is used as catalyst for cluster initiatives.

The main responsibility for the formulation of the long-term transport research policy strategy lies with the Ministry of Transport and Communications (MinTC), and is formulated in close cooperation with its subordinate organisations. For the Ministry transport research is seen as an policy instrument to support strategic planning, used to find a socio-economic optimum for the Finnish transport system. On the regional level a number of Regional Councils, cities and public authorities in the
cities, e.g. Helsinki City Metropolitan Area, formulate regional transport- and transport research policy strategies.

In MinTC the research objectives of research programmes are discussed with all parties interested, such as other, e.g. public authorities, funding organisations, associations and municipalities. There is no legal background for this procedure. Final decisions on transport research programmes are made by the Permanent Secretary. The subordinate organisations of MinTC's prepare their actual research agendas on the basis of long-term strategy documents (see above), taking into account as well actual policy demands from MinTC and the EU. For example in Finnr a new system was introduced to insure that strategic planning identifies the research needs. Around 30% of the research projects are funded due to strategic planning, the rest in a similar bottom up process then in the MinTC.

Research priority setting for transport research programmes is organised according to the strategic plans by the MinTC. It is also possible that researchers present research ideas and if they are relevant and appropriate with the strategic plan they will be included in the next call for tender. In general researchers have criticised the bottom-up system as inefficient and not transparent, because they feel that they spend too much time on writing proposals compared to carrying out research. A good dialogue with the programme management is more important, than the assessment of research tenders. Researchers wish a clearer and long-term strategy on transport research priorities from public administration.

For the strategic development of larger transport research programmes feasibility studies, interviews and workshops are launched. Evaluation results of previous research programmes are used as well for the programme development. MinTC has tried to invite policy makers to a meeting in order to get their input for future transport research needs. However it is very difficult to get clear input from the policy side. This is explained partly by the fact that politicians have less time and resources. In their daily work they look for adequate knowledge to solve actual problems, and that is very different from identifying future knowledge. Several foresight exercises and future studies to identify research priorities have been carried out as well, but they turned out to be too unfocussed and not quite as useful as hoped.

6.3.2 Policy implementation and policy dissemination

Around 50% of MinTC transport research funding budget is for major long-term oriented transport research programmes and other half is allocated to current surveys and projects. This ensures a high quality of research results and supports the development of expertise in the transport sector. Furthermore Tekes is a major funding organisation for transport research in Finland.

The organisations that are funding transport research have various kinds of internal procedures for programme management and the evaluation of project proposals. All research programmes by MinTC are funded by open calls. At the Finnish Road Administration strategic transport research programmes are funded by open calls, but some are simply negotiated directly with researchers by asking one or two organisations for a proposal (call by invitation). Tekes (Technology Development Agency of Finland) has formalised its project selection procedures, e.g. for project cluster initiatives. Tekes organises first a pre-screening procedure where the most potential applicants (usually six) are pre-selected. Three of these projects are selected and funded.

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The use of external programme secretaries to administrate the programmes is common in the research programmes of the MinTC. The programme secretariat is selected on the basis of a competitive bidding. Research Programmes always have management boards or steering boards involving representatives from the main funding organisations as well as experts and stakeholders from the public and the private sectors. A project officer from one of the divisions of the Ministry (e.g. division for traffic safety, logistics, transport telematics etc.) is responsible for the research programme. The programme secretariat is in charge for the administration of the programme. In larger transport research programmes a small Working Committee is set up in the Ministry to support the programme secretariat. The project proposal evaluation process is organized in the management or the steering group of the research programme.

MinTC organises research within so called thematic fields. These thematic fields are relatively stable research directions, e.g. transport economy, traffic modelling, traffic safety, freight transport and logistics, passenger transport, environmental issues etc. Each division in the Ministry due to their competence is responsible for a thematic field. Small investigation projects and large cooperative projects are funded in these thematic fields. The projects are funded by simple contracting as well as in more elaborate funding procedures.

For large transport research programmes with several project areas, or programmes with sub-programmes, there is a specific programme administration procedure. Management groups for each research area are set up, involving Ministry’s personnel, external experts and stakeholders. A project steering committee is in charge to manage the relevant project areas. The steering committee is chaired by a coordinator assisted by a secretary. The programme management organises the calls for proposals, and the steering committees decide on the appliance of incoming proposals.

For the Dissemination of research results all research projects have to publish a report. The reports are available on the websites of the Ministry, on the websites of the research programmes and MinTC’s subordinate organisations. MinTC has done some efforts to collect results from transport research programmes and larger projects. However there is a general feeling that the research results have too little influence on transport policy making. This is mainly due to both the lack of ability from the researchers to offer the results in a way that they reach the policy level, and as well a lack of interest of potential end-user, e.g. policy makers.

Dissemination of research results for the international research environment are high on the agenda at some universities. MinTC is also disseminating research results through international programmes like the ERA-NET TRANSPORT and Extr@web as well as databases like ITRD (international Transport Research Documentations). However – small projects with no time for more than a report for the Finnish client – are the mainly funded project types in transport research. Finnish is the common language at universities and research institutes. Nevertheless, at larger research programmes there are meanwhile often efforts to write articles for international research journals. The most efficient dissemination process is achieved when the target group follows the project all the way through the research process. This leads to ownership of the research results and ensures dissemination to relevant end-users.
6.3.3 Policy evaluation and policy monitoring

The Finnish Science and Technology Policy Council organizes from time to time a evaluation for all ministerial research funding programmes. The last programme evaluation was carried out in 2000. The Ministry of Transport and Communications contracts the programme evaluation to external national and international evaluators. The evaluation results are used as input for current and future transport research agendas. Self evaluations by programme management groups have been used as well. These evaluations are carried out by using questionnaires and workshops and self-analysing exercises inside the steering boards.

Several of the above mentioned organisational units are in charge for the project monitoring, like management group, steering board and programme secretary. Along the timeline of a transport research programme, project evaluation is usually carried out when two thirds of the programme period is finished, to check the direction and re-orient the project if required. The evaluation is made by independent evaluators, either national or international. In some cases self-evaluation is used, e.g. by the steering board members.

6.4. Institutional barriers for cooperation in transport research

6.4.1 Policy and administrative barriers

At the national level different sectoral policy objectives between ministries are sometimes a barrier. Within the Government there are horizontal programmes set up to overcome these barriers and to meet shared targets (four programmes at the moment at the government agenda). Language and cultural barriers do exist as well. To over-come the barriers some joint funding for the gap-type research or joint open calls for innovative research initiatives could be useful. Also a stronger learning process through clustering of programmes and planning of programmes will become more strategic and co-operative. Trans-national pilots, benchmarking of best practices, learning process from exchange of information on levels of co-operation, inventories of national research programmes and opportunities to have mutual benefits would be a good way to ensure and increase cooperation.

6.4.2 Legal and budgetary barriers

At the national level budgetary barriers can affect transport research by leaving gaps between academic research, private sector and industrial research on the one hand, and public funded policy and problem oriented transport research on the other hand. Funding budgets are from different Ministries relating to different state budget acts. Transport research is Finland is mainly policy- and problem oriented research and that is why MinTC and its subordinate organisations have to take care of sectoral policy. The technology and innovation agency Tekes which is subordinate to the Ministry of Trade and Industry concentrates on industrial and innovation oriented research. On the Trans-national level limited budgets and limited human resources (number of researchers and those who administrate research) are a huge problem.
7. France

7.1. Context

7.1.1 Country description and Transport infrastructure

France is one of the largest countries in Europe by size and inhabitants with a population of about 59.9 million people. The size of the country is around 543,965 sq km, excluding the French overseas departments and territories located in North America, the Caribbean, South America, the western and southern Indian Ocean, the northern and southern Pacific Ocean. The average population density is around 110 people per sq km. Most people live in the area around the capital city Paris (9 million). Other large cities and metropolitan areas are Marseille (1.2 Mio), Lyon (1.2 Mio) and Bordeaux (680,000).

France has a large variety of landscapes. Nearly two thirds of the country in total is covered by plains and coastal plains, the other parts are hilly and include the mountain ranges of the Alps in the Southeast, with Europe’s highest Mountain the Mont Blanc (4,807 metres), the Pyrenees in the South and other mountainous areas like the Massif Central, the Ardennes the Jura and the Vosges.

The climatic conditions in France are dominated by three types, namely the Oceanic climate in the West, the Mediterranean in the South, and the Continental in central and eastern France.

France extends from the Mediterranean Sea to the North Sea and from the River Rhine to the Atlantic Ocean with a total coastline of 5,500 kilometres. It is bordered by the United Kingdom (sea side border), Belgium, Luxembourg, Germany, Switzerland, Italy, Monaco, Andorra, and Spain (land side borders). Overseas land side borders are e.g. shared with Brazil and Suriname.

The French road transport network is one of the largest in Europe with about 950,000 km roads, including around 11,000 km of motorways. The road network is well-maintained and fully interconnected with the main countries of Western Europe.

France has a huge railway-network with about 31,385 km in total, which is operated by French National Railways (SNCF). Nearly the half of the routes (14,464 km) are electrified and over one third (12,132 km) of the routes are double- or multiple-track based. France has the longest rail-network in Europe explicitly constructed for high-speed-trains (TGV) with a length of around 1,540 kilometres.

France has several main rivers like the Loire River, the Rhone River, the Garonne and the Seine. It has the longest waterway network in Europe apart from Russia, with a total of 14,932 km of navigable rivers and canals, whereof 6,969 kilometres are used more heavily. About 16 important sea ports and harbours exist, like Bordeaux, La Rochelle, Le Havre or Marseille.

France has in total 474 airports and airfields. The most important airports are Charles De Gaulle International Airport and Orly Airport in or near Paris.

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20 INSEE, France in figures, 2003.
7.1.2 Transport Industry

France has a large transport industry, especially automotive sector, railway sector and aviation and aerospace industry. Furthermore France has a strong focus on information technology industries and with that a strong sector for intelligent transport systems (ITS). Research and Development in the automotive industry is well organized and coordinated, although it avails almost no public funding. Adverse, R&D in aviation and aerospace industry as well as railway- and public transport is highly public funded.22

7.1.3 Transport research related policy goals

The Ministry of Construction, Housing and Transport is accountable for transport policy visions and policy goals as well as for transport infrastructure investments. French Transport Policy had to cope with a huge intersection in 2003, when the national assembly cut heavily down investments in transport infrastructure (source: Oudin 2003). The two most prevailing policy goals within the French transport policy are at the moment:

- Road safety and road security - reduce the number of traffic accidents,
- Enhancement (double) the overall proportion of railway freight transport till 2010.

One of the largest projects in French transport policy in the last decades was the TGV. France has today worldwide a high technology prominence in high speed train technologies. But with that, the extension of railway freight transport was delayed and a very poor intermodality factor is one of the hardest transport problems in France today.23

Focusing sustainability criteria French municipalities with more than 100.000 inhabitants are obliged to operationalize mobility plans (PDU - plans de déplacements urbains). The municipalities are committed to reduce automotive transport, to promote low-emission vehicles as well as to develop and implement concepts for user friendly public transport and parking site regulations.

In France the great majority of transport research programmes are conducted at the national and ministry level. The Ministry of infrastructure, transport, housing, tourism and sea (MELTLM) plays the lead role in funding transport research in France.

Apart from MELTLM several other ministries are involved in funding transport research. Actual national transport research priorities are e.g. road safety, energy, environment and freight transport. France has not only a research focus on technology and infrastructure, but also a strong focus on socio-economic issues in transport research.

7.2. Transport research and innovation system

7.2.1 Mapping of the country specific transport research funding system

The FNS (national science fund) is in charge to fund new and strategic relevant research topics and mobilize cooperation between academic research institutions and interdisciplinary research. Several FNS domains are relevant for transport research, like e.g. space and territories, nano-science, road safety and road security and environment and health. The FRT (national technology research fund) is in

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charge to fund applied- and technology research as well as innovation and network activities. The PREDIT programme is funded within the budget of the FRT.

PREDIT is the largest transport research programme in France. It is in general one of sixteen French national research and innovation network programmes (RRIT). In 1990 the inter-ministerial land transport research and innovation programme PREDIT started. PREDIT 2 (1996-2000) covered already around 1300 transport research projects, with more than 180 strategic transport research projects. PREDIT 3 started in 2002 and will operate till 2006 (more details see below).

DEUFRAKO was initiated in 1978. At the beginning the programme was a bilateral agreement between INRETS and the German ministry of research with a focus on railway research. After a few years the above mentioned partners were ready to develop joint projects. In 1998 the French ministry of infrastructure, transport and housing joined the programme and with that the opportunity of funding transnational projects. In 2003 a first call for proposals for a joint French-German transport research programme was launched.

CALFRANCE the French-Californian research cooperation framework started in 1998. Till 2002 the programme was focused mainly on the exchange of researchers and joint publications between INRETS and the University of California. In 2002 it was decided to fund joint research projects with partners particularly from industry.

RGC&U (urban and civil engineering research network) and PUCA (town planning, construction and architecture) are research programmes governed by the ministry of infrastructure, transport, housing, tourism and sea. The RGC&U initiative is a research network for urban development and civil engineering. The PUCA initiative hosts six thematic programmes and platforms to promote research on urban development, some of them related to transport research in urban areas.

7.2.2 Mapping of relevant transport research organisations

The main players in (land based) transport research in France are the following national and regional transport research initiatives:

INRETS (National Laboratory for transport and safety research) is the largest institute in transport research in France. INRETS is based in Paris but has three further headquarters (Lille, Lyon, Marseille). The 4-year internal transport research programme of INRETS is actually focusing the following research topics: Road Safety, Driving Aids, Transport Networks and Services, Sustainability and Environment. Some of the regional headquarters of INRETS are highly recommended as competence centres in transport technology, e.g. the headquarter in Lille for the railway sector.

LCPC (Public Works Research Laboratory) is a national institute for applied research and development in transport infrastructure (road construction, bridgework, railway construction). SETRA (service d'études et techniques de routes et autoroute) is a national organization for applied research in road infrastructure.

CERTU (centre d'études des reseaux, de transports, de l'urbanisme et de construction publique) is a national institute for applied research and development on urban planning and transport systems.

RT3 (interregional network for technological research in surface transport) is an inter-regional cooperation initiative in transport research of the regions Alsace, Franche-Comte, Haute Normandie, Midi Pyrenees, Nord-Pas de Calais and Poi-
In this regions several cluster initiatives, competence centres and technology transfer agencies concentrating on (land based) transport research, are established, e.g.: IRSEEM – research centre for on-board electronic systems – a competence center focusing ITS and on on-board electronics (Haute Normandie). IERSET - electronic systems for transport – a cluster initiative including around 20 organisations from industry and research centres (Midi Pyrenees). ASTRID – agency for technology support in industrial research and development – a technology transfer agency, which supervises transport research initiatives (Alsace, France Comte). GRRT – Nord - Pas de Calais Regional Initiative for transport research – a regional cluster on transport research co-ordinated by the Pas-de-Calais regional authority. CRITT – research centre for automotive acoustics – a competence centre in automotive acoustics (Nord-Pas de Calais), INEVA-CNRT – a research centre for fuel cell systems and interfaces for land transport (Belfort-Montbéliard and Nancy) and CEREVEH – research centre for electric and hybrid vehicles - a competence centre on hybrid vehicles (Poitou-Charentes) as well as several other research centres in the regions mentioned above.

CNRS (Centre National de la Recherche Scientifique) is the largest french science and research institute. CNRS is funding and closely connected (pluri-annual contracts) with several university institutes in transport research, e.g. the institute of transport economics of the University Lyon2. LET (Laboratoire d’Economie des Transports) is the largest academic research institute in France dedicated to research in transportation economics and land use planning. Furthermore several smaller university institutes, research departments and transport planning agencies are engaged into socio-economic transport research and land use planning.

The GART initiative associates more then 200 public authorities in the transport sector in France. GART is initiating research on public transport. Furthermore the main operating companies in public transport SNCF and RATP have transport research units. The research unit of SNCF runs several competence centres for transport research. RATP has departments on transport related R&D but also a department for prospective transport studies. The French motorway operating companies run under coordination of ASFA (association de societes francaise de autoroutes) a specific motorway research programme.

7.3. Policy process description along the policy circle

7.3.1 Policy formulation and policy determination

For the formulation of long term strategies in transport research policy the French ministry of infrastructure, transport, housing, tourism and the sea (MELTLM) and the ministry of research (MRNT) are accountable. Furthermore the ministry of industry (MinEFI) and the ministry of environment (MEDD), as well as the national agency for innovation (ANVAR) and the national agency for energy and sustainability (ADEME) are involved. In the ministry of infrastructure, transport, housing, tourism and sea (MELTLM) the executive department on transport research (DRAST) is prominent.

INRETS and LCPC are under supervision as well of MELTLM and MRNT. Four-year contracts on internal transport research programmes are signed with both in-

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24 ENT Questionnaire of France, 2004
stitutes\textsuperscript{24}. Both organisations are an important part of the research network of both ministries and are involved in the transport research policy formulation process\textsuperscript{24}.

To take the PREDIT programme into charge, the above mentioned four ministries and two research agencies sign an agreement protocol. A steering committee is taken into charge of the protocol for that time.\textsuperscript{26}

\subsection*{7.3.2 Policy implementation and policy dissemination}

PREDIT 3 (2002 -2006) is a very large research funding and support programme and has an annual budget of 60 Mio Euro. The programme is funding not only research projects, but is supporting cooperation and networking initiatives. The programme is the overall frame for co-operative and demand oriented transport research in France.\textsuperscript{25}

PREDIT 3 is divided into eleven sub-programmes, clustered into six transport research fields: mobility and territory, safety and security, energy and environment, freight transport, technology integration and integrating sectoral policies. Furthermore it includes four horizontal programme trajectories.

PREDIT 3 - as one of the French research and innovation networks (RRIT) - operates in 7 regional hubs.\textsuperscript{26} There are several regional activities initiated by the PREDIT programme. The regionalisation of the programme has a strong impact on regional networks and the promotion of SME.

PREDIT 3 is funding a large panel of projects, especially in applied transport research. PREDIT 3 is heading towards close cooperation with industrial research partners. PREDIT 3 concentrates on larger projects. The promotion of smaller projects, towards incremental innovation, is not focused explicitly yet.\textsuperscript{25}

DEFRAKO is a joint transport research funding programme between France and Germany. In 1998 four research areas were established: SNCF and DB (railway), Renault and Daimler Chrysler (transport telematics), CERTU and FhG (urban transport) and freight transport. A first call was published in both countries in December 2003. Twelve project proposals were received. Four project proposals were retained for funding. The actual initiative is to open up DEUFRAKO for new partners.

PREDIT is since more then one decade in French transport research a well known brand. The regional PREDIT network hubs are important within the dissemination process. The PREDIT secretary is closely affiliated to the ministry of infrastructure, housing, transport, tourism and the sea (MELTLM), but as well connected with the ministry of industry (MinEFI) and the ministry of environment (MEDD). All ministries organise on a regularly basis research symposia and colloquia. These activities are well documented on the web page of the ministries.\textsuperscript{25}

\subsection*{7.3.3 Policy evaluation and policy monitoring}

For the evaluation of PREDIT 2 an ad hoc committee of experts chaired by representatives of the ministries was in charge\textsuperscript{24}. The follow up of PREDIT 3 (actual PREDIT 4) implicates a requisite policy learning process.
7.4. **Institutional barriers for cooperation in transport research**

In France two cross-national public funding and support programmes for transport research are in charge. DEUFRACO is a cooperation programme between France and Germany. DEUFRACO supports cross-national network activities, funds joint projects and launches joint calls for proposals. CALFRANCE is a cooperation network between French government and California state authority. CALFRANCE funds at the moment joint projects especially on ITS topics.27

7.4.1 **Policy and administrative barriers**

The transport research arena in France is slowly growing but still highly fragmented. Only a few public transport research institutes reach a critical size and have the potential to co-operate in trans-national research programmes.25 For joint projects cooperation may be difficult to address in a fragmented research arena.25

France has major experiences with joint transport research programmes (see above). But experiences with DEUFRACO point on several administrative barriers: e.g. diverse project evaluation procedures and evaluation criteria or different model contracts and programme management procedures.

Trans-national transport research programme implementation is a long standing political process and a result of several years of joint efforts and trust building. Strategic decisions have to be taken by the ministries, e.g. with which countries and in what research areas ministries want to prioritize research cooperation.8

7.4.2 **Legal and budgetary barriers**

PREDIT has a broad budget, which enables to finance a great panel of projects.24 The research funding budget of the PREDIT programme comes directly from several ministries. For that the funding budget has to be negotiated in inter-ministerial cooperation (problem: ministries having different calendars on budgetary decisions).

DEUFRACO has a bilateral funding budget. Funding is always done in parallel. French authorities fund the French partners, German authorities fund the German partners. The synchronisation of funding decisions is quite difficult due to different “budget calendars” in both countries.

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27 ENT, Questionnaire of France, 2004
8. Germany

8.1. 1.1 Country description and Transport infrastructure

Germany has a population of around 82.5 million people (2003). The population is spread on 357,026 sq km. The average population density is around 231 persons per sq km. The densest areas are metropolitan areas like the Ruhr Valley (6 million people), Germany’s capital city Berlin (3.3 million), Hamburg (1.7 million), Munich (1.2 million) and Cologne (1 million). Germany has also large areas with a very low population density, like some areas in former Eastern Germany, Schleswig-Holstein, Lower Saxony and Bavaria.

Germany has a varied terrain that ranges from low coastal flats along the North and Baltic seas, to a central area of rolling hills and river valleys, to forested mountains and the Alps region in the south. The highest mountain is the Zugspitze (2962m).

Germany is borderer on the north by the North Sea, Denmark, and the Baltic Sea; on the east by Poland and the Czech Republic; on the south by Austria and Switzerland; and on the west by France, Luxembourg, Belgium and the Netherlands. From the Baltic and North seas to the Alps, Germany measures around 800 km from north to south and around 600 km from east to west.

Several major rivers (River Rhine 778 km, Elbe 700km, Weser 440 km, Danube 387 km, Oder 162 km) and inland waterways (Mittellandkanal with 321.3 km, Dortmund-Ems Kanal 269 km, Rhine-Main-Danube canal 171 km) cross the country. The inland waterway system is one of the largest in Europe and gives direct access to the North Sea and the Baltic Sea. The coastline is characterized by several important sea ports, including Hamburg, Bremerhaven, Wilhemshaven at the North Sea coast, and Kiel, Rostock and Lübeck at the Baltic Sea coast.

The railway network in Germany covers around 44.300 km. Paved roads account up to 230,800 km, with 11.800 km motorway without a principal speed limit. In road transport there is a stock of around 45 million passenger cars and of 8 million heavy duty vehicles. In Germany 18 international airports are situated with a passenger volume of around 141.1 million in 2003, including Frankfurt/Main Airport one of the largest airports in Europe.

8.1.1 Transport industry

The automotive sector is one of the most important industry branches in Germany. Five large global automotive manufacturing companies are situated in Germany: Volkswagen (VW, Audi, Seat, Skoda), DaimlerChrysler (Mercedes-Benz, Smart, Maybach, Chrysler, Jeep), Opel (belongs to GM), BMW (incl. Mini and Rolls-Royce) and Porsche. Important automotive supply companies are e.g. Conti, Bosch, Beru and Hella. Another important industry is the Transport Telematics (ITS) branch, with Siemens, Infineon and Bosch. As well in the railway sector several manufacturers and suppliers are important, for instance Bombardier Transportation Germany, Siemens Transportation, Alstom-LHM Germany and Vossloh Transportation. Germany has today only a small industry sector for shipping and maritime technologies, but has a still important aviation and aerospace industry. The largest share of expenditures for Research and Development in the transport sector is still done by private companies, in particular the German automotive industry.
8.1.2 Transport policy related general goals

In March 2000, the Federal Cabinet adopted the new Mobility and Transport plan for a future-oriented policy on mobility and transport. In extending the concept of 1996, new priorities for mobility and transport were set up. This Mobility and Transport plan intends to support transport policy to resolve problems caused by a level of traffic which is increasingly meeting its economic, ecological and social limits. The problems are no longer merely the limited capacities of the current transport infrastructure, or the ecological and health aspects, but also include the ability to finance ever more costly transport infrastructure projects. The Mobility and Transport research plan concept is more fundamental and long-term in nature, the departmental research of the Federal Ministry of Transport, Building and Housing (BMVBW) covers the many needs for short-term and medium-term information.

In November 2000 the Federal Government, represented by the Federal Ministry of Transport, Building and Housing, published the “Transport Report 2000”, which names the following ten elements of an integrated policy on transport, land use planning and urban development:

- Strengthening European transport policy,
- Continuation of building up Eastern Germany,
- Combination of transport planning and land use planning,
- Provision of a proficient transport infrastructure,
- Networking and inter linkage of transport modes,
- Generating fair conditions of competition in transport,
- Improvement of transport safety,
- Improvement of environmental issues related to transport,
- Fostering of innovative transport technologies,
- Supporting mobility research.

The Transport Report 2000 sets out the guiding principles for a modern, integrated and ecologically responsible transport policy. It forms the basis for the new Federal Transport Infrastructure Plan. The Benchmarks for a Mobility Programme for the Future, which were adopted by the Federal Cabinet on 06 March 2002, specify the following as key areas for investment until 2010:

- Removing transport bottlenecks;
- Relieving congestion and enhancing the quality of life in towns and cities by constructing 300 bypasses;
- Enhancing the competitiveness the maritime industry by upgrading hinterland connections;
- Strengthening infrastructure in Eastern Germany;
- Increasing investment in existing networks;
- Providing support and assistance to modern transport technologies.

The total level of funding available for the road, rail and waterway modes for the period from 2001 to 2015 is around 150 billion Euro. A planning reserve on top of this amount will make it possible for planning to go ahead on projects where sizeable shares of the funding will not be required until after 2015 but which have to be planned as a whole before that date. It ensures that there is alternative potential construction work that can be performed if the realization of other projects experiences delays. A fundamental pre-requisite to achieve the above listed transport policy objectives is transport research.
Therefore in March 2000 the Federal Government, represented by the Federal Ministry of Education and Research (BMBF), launched the research framework programme “Mobility and Transport”\textsuperscript{28}. The research programme “Mobility and Transport” comprises a total funding volume of 260.8 million Euro and is also intended as a means of exploiting export opportunities and of securing jobs through the application of high technologies. Furthermore, new mobility services are expected to contribute to the creation of new jobs.

\textbf{8.2. Transport Research and innovation system}

The overall German public research funding system is characterised by a diversity of players and a high degree of plurality. In the federal system of Germany, both the Federal Government and the \textit{Länder} governments are responsible for research funding. Under Art.91 b of the Basic Law the Federal Government and the \textit{Länder} governments are called for cooperation in science and research. In 1957 the Science Council - financed by the Federal Government and the \textit{Länder} governments – was established to discuss questions relating to science and research. The Federal/\textit{Länder} Commission for Educational Planning and Research Promotion (BLK) is another permanent forum for the discussion and co-ordination for research promotion subjects that affect the Federal Government and the \textit{Länder} governments.

Project funding is provided in the framework of general or specialised research funding programmes, and always on the basis of applications for particular projects and specific research topics. The purpose of indirect project funding is to support qualified research organisations, individual researchers as well as companies in their research and R&D efforts. The funding is not focused on a specific research topic. Indirect project funding is as well appropriate to fund equipment and research infrastructure or cooperation activities and exchange of researchers.

Institutional (or statutory) funding is not earmarked for specific research projects. These funding is granted by the Federal Government (or jointly with \textit{Länder} governments). The objective of institutional funding is to maintain expertise and strategic research orientation. Major examples are grants-in-aid provided by the Federal and \textit{Länder} governments in the framework of their joint promotion of research under Article 91 b of the Basic Law. The institutions funded jointly by the Federal and \textit{Länder} governments pursuant to Article 91 b of the Basic Law must be flexible enough to adapt to changing research priorities.

One particular form of project funding is the funding of competence networks. In a competitive process innovative cluster initiatives are identified and promoted. The first BioRegio competition was followed by competitions for centres of excellence in nanotechnology, competence networks for medicine and technology, and e.g. the InnoRegio competition. The BMWA’s Promotion of Innovative Networks (InnoNet) Programme supports the development of research networks between small and medium-sized enterprises on the one hand and research organisations on the other. A particular strategic initiative of the BMBF was the funding of so-called lead projects as a special type of collaborative projects.

\textbf{8.2.1 Mapping of the country specific transport research funding system}

In Germany the responsible Ministries for transport research funding are the Federal Ministry of Education and Research (BMBF), the Federal Ministry of Trans-
port, Building and Housing (BMVBW), the Federal Ministry of Economics and Labour (BMWA) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

In the Federal Ministry of Education and Research (BMBF) three departments are responsible for transport research: the division 421 and division 424 for transport policy and transport technologies and the division 425 for shipping and maritime technologies. Divisions 421 and 424 share a common long-term strategy entitled ‘Mobility and Transport – Sustainability, Safety and Competitiveness through Intelligent Transportation’. The transport research funding programme Mobility and Transport covers for the years 2000 - 2004 a total funding budget of 260.8 million Euro. This research programme covers the following issues:

- Intelligent Transport Networks,
- Against the Trend: More Freight on Rail,
- Faster and More Comfortable with Railway and Bus,
- Improving the Quality of Life for Future Generations,
- Traffic Safety as a Continuous Task,
- Better Understanding of Mobility,
- Interdisciplinary Tasks (incl. international cooperation).

Division 421 and division 424 are supported by the programme management organisation “mobility and transport, building and housing” (Projekttträger Mobilität und Verkehr, Bauen und Wohnen – PT MVBW) of the TÜV Rheinland Group.

A strategic research programme administrated by division 425 is called Shipping and Maritime Technologies for the 21st century. The programme (period 2000 – 2004) covers a total funding budget of around 75 Mill. €. The programme covers the following issues:

- R&D in improvement of the mode ship and increase on productivity of shipyards,
- Modal shift to inland waterways,
- R&D on maritime technologies.

In this research programme funding is possible for projects that contribute to an improvement of the international competitiveness of German shipping- and maritime technology industry. Addressed by this research funding programme are specifically research organisations and companies of maritime technology industry and services. Division 425 is supported by the programme management organisation for “marine and polar research” at the Research Centre in Jülich.

The Federal Ministry of Transport, Building and Housing (BMVBW) organizes its research initiatives mainly by contract research. BMVBW enters a contractual relationship with a research organisation. Goal and timeframe of the research subject (in most cases in the form of a study) are fixed. Projects are fully financed (100%). Particular grants (projects are (partially) financed, following EU guidelines) are rare at BMVBW. Content and scope of the research activities of the departments of BMVBW are determined by direct questions and problems of daily work.

The current integrated research funding programme of the BMVBW aims directly at the implementation of transport policy objectives; it is practice-oriented and has rather short-term goals. The integrated research programme consists of 12 sub-programmes. The resulting studies serve to generate a knowledge base in order to support political decisions in short and medium term, and to provide scientifically proved knowledge for the daily work of the BMVBW.
The total annual research funding budget of the BMVBW amounts ca. 30 Mio. €. For its research the BMVBW gets support from the Federal Highway Research Institute (BASt) and the Federal Office for Building and Regional Planning (BBR). In the following organisations, which are subordinates of the BMBVBW and bound by instructions, further research is carried out:

- Federal Highway Research Institute (BASt),
- Federal Office for Building and Regional Planning (BBR),
- Federal Waterways Engineering and Research Institute,
- Federal Institute of Hydrology (BfG),
- Federal Maritime and Hydro-graphic Agency (BSH),
- German Weather Service (DWD).

The Federal Ministry of Economics and Labour (BMWA – Department IV A6) is responsible for the research funding programmes on aviation and aerospace. This programme is focusing on innovative research projects of industry, SME and research organisations. After the terror attacks of 11.09.2001, the Federal Government launched a new research programme for the period 2003 – 2007. It has been updated and adjusted according to the new challenges in the aviation sector. The total volume of the funding budget is 800 Mill. € of which 160 Mill. € are financed by the BMWA. The BMWA is supported by the programme management organisation for aeronautics (Deutsches Zentrum für Luft- und Raumfahrt, DLR).

The current main policy focus of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) is in particular climate protection and fostering of renewable energy sources. The sectoral research of the BMU is determined by the priorities and objectives of environmental policy. In the framework of the German Environment Research Plan the BMU also funds transport and mobility research. This covers for instance research topics on vehicle emissions. For the funding programme administration the BMU is supported by the Federal Environmental Agency (UBA) and the Federal Agency of Nature Conservation (BfN).

German Forschungsgemeinschaft (DFG) is the most important funding organisation for research at universities. In the year 2003, the DFG’s funding budget amounted to a total of over 1261 million Euro (for the individual grants programme, the ratio of federal to Länder funds is 42:58). The DFG funding makes it possible to carry out research projects that could not be implemented with the basic funding of the universities alone. In a difficult environment, the DFG provides a variety of incentives to develop and selectively preserve research-oriented structures in higher education institutions. Many of the DFG’s activities are considered to be exemplary in an international comparison.

The German Academic Exchange Service (DAAD) is an organisation jointly run by German universities and primarily financed by the Federal Government. The role of the DAAD is to promote relations with higher education sites abroad, primarily by exchanging students and researchers. One of the DAAD’s funding principles is “individuals take precedence over projects”. The purpose of the mobility cost allowances paid by the DAAD is to enable young researchers to gather experience abroad and in international research projects – as well in transport research.

The German Federation of Industrial Co-operative Research Associations (AIF) has the function to co-ordinate co-operative industrial research which is financed from funds of the Federal Ministry of Economics and Technology (BMWA) and which supports the industry’s own efforts in the field of research and technology.
development. For this reason, approximately 50,000 businesses – most of them small and medium-sized enterprises SME – have established a total of 104 industry or technology related research associations, and the umbrella organisation AIF.

In Germany private foundations complement public research funding. The Association for the Promotion of Science and the Humanities (Stifterverband für die Deutsche Wissenschaft) is an example of a concerted action of industry to promote German science and research. At the end of 2002, the Association administered a total of 347 private foundations and endowment funds under its umbrella with total assets of 1.4 billion Euro. Other large German foundations – such as the Volkswagen Foundation, the Thyssen Foundation, the Robert Bosch Foundation, the German Foundation for the Environment and the Bertelsmann Foundation – sponsor projects or organisations from a wide variety of different fields of research.

8.2.2 Mapping of the most relevant transport research organisations

In 2003, the 15 national research centres of the Helmholtz association of German Research Centres (HGF) had a total budget of 1563 million Euro (obtained in a ratio of 90:10 from the Federal Government and Länder governments, as well as from external funds. The Helmholtz Centres provide large-scale equipment and infrastructure for research. The Helmholtz Centres conduct research in areas where government and society have an interest to obtain research results designed to meet long-term requirements. Against the background of the increasing dovetailing of basic research as well as applied research, functions and research priorities of the Helmholtz Centres are currently being restructured. In future, the funding budget provided to the Centres will be guided by programme initiatives; more cooperation and more competition among the research centres are additional strategies. One of the research centres of the Helmholtz associations is the German aviation and research Centre (DLR) one of the largest transport research centres in Germany.

The Fraunhofer-Society for the Advancement of Applied Research (FhG) is the leading organisation that supports applied research organisations in Germany. The FhG is currently operating 58 research institutes with a total budget of more than 1065 million Euro; more than 394 million Euro is provided by the Federal Government (BMBF) and the Länder governments, while the FhG must cover 671 million Euro from own profits and additional funds. The FhG conducts contract research for manufacturing companies, the service sector and public authorities, and provides research information and services. The activities of the FhG are consistently guided by the objective of translating research results into new and innovative products and services. The contract research institutes of the FhG generate nearly two-thirds of their revenues. The main funding provided by the Federal Government and by the Länder governments to the FhG enables the organisation to build up and maintain its scientific potential, to develop innovative technologies and to monitor them continuously. Some of the 58 research institutes of the Fraunhofer-Society are dealing especially with transport related R&D topics, for example production- and transport logistics (FhG research institute in Dortmund).

The Max Planck Society (MPG) is the most important organisation for fundamental research in Germany. In the year 2003 the total funding budget for the 77 research organisation within MPG covered 935 Mill. € (funding is provided in a 50:50 ratio by the Federal and Länder governments). MPG has a prominent position in fundamental research in Germanys but as well in the international context. The MPG has created centres of excellence that are significant on a global scale. Principally
the activities of the MPG and its co-operative ventures are interdisciplinary in nature. In some of the MPG research organisations research projects on transport policy or transport economics are launched. Other MPG institutes are working on specific mathematical algorithms and models, as well as useful modelling traffic and transport.

Gottfried Wilhelm Leibniz Science Association (WGL) covers a total of 80 research institutions included in the so-called “Blue List” (BLE). The funding available by the Federal Government and the Länder governments in the year 2003 amounts to nearly 701 million Euro (the ratio of federal to Länder funds is generally 50:50). Since their formation, the “Blue List” institutions have focused their attention on future-oriented issues of supra-regional significance and national scientific interest. The Federal Government and the Länder governments use the “Blue List” research organisations as a flexible instrument to promote research into questions and subjects that are of common interest. Some of the research organisations of the “Blue List” promote relevant research activities related to transport research issues, for example the Potsdam Institute of Climate Research or the GMD Maritime and Polar Research centre.

Germany has seven academies of sciences, which are located in Berlin, Düsseldorf, Göttingen, Heidelberg, Leipzig, Mainz and Munich, and which have over 1,400 ordinatied and corresponding members from a wide range of disciplines. The German science academies funded exclusively by the Länder governments, are scientific forums designed to foster research, in particular interdisciplinary reflection and interdisciplinary knowledge production. The science centres act as well as mediators in scientific and societal conflicts and serve as contact points for international research cooperation. For example in the Berlin academy of science an internationally important research department for mobility research and socio-economic transport research is situated.

The research budget of the 52 federal institutions that perform research amounts to some 611 million Euro (fully funded by the Federal Government). These research institutions perform their research and R&D activities in the framework of their governmental duties. The various activities are assigned to the federal ministries they are subordinated to. The objective of their research activities is foremost to obtain research and knowledge for daily departmental work. However, they also help to acquire general knowledge. In addition, there are 174 Länder and municipal research institutes (that are not part of the Blue List) with a total research funding budget of 291 million Euro. These institutes are fully financed from Länder funds.

Germany’s universities have traditionally been the backbone of the country’s research system. When measured in terms of their share of research expenditure, Germany’s universities are the second largest sector following industry. The universities 2002 expenditure on education and research was estimated at 20.5 Bio. €. Universities cover a broad spectrum of research activities, including fundamental research, applied research and R&D activities. A number of cooperation initiatives – in particular collaborative projects and knowledge transfer initiatives – have developed within universities and among universities and non-university institutions. University associated institutes are legally independent, but closely linked with universities. They play a major role as link between universities and industry and conduct mainly research in industry-related areas. Several departments, institutes and associated institutes at technical universities as well as other universities in Germany are national and international well recommended in transport research.
In Germany’s manufacturing sector, every third company is active in R&D (38 per cent in 1998). Over half of the companies have continuous R&D process, the other half tends to R&D occasionally. In some industry sectors more than half of the companies are involved in research and development.

8.3. **Policy process description along the policy circle**

The policy process description along the policy circle will concentrate on the main public actors in transport research: BMBF (divisions 421 and 424) and BMVBW.

8.3.1 **Policy formulation and policy determination**

The overall policy objectives are formulated by the federal cabinet. In Germany most often coalitions of two or three parties are involved in the government. Therefore the appropriate coalition agreements are the fundamentals for the formulation of policy objectives. The federal government has a political agenda for one legislation period. If a sectoral policy agenda will be set up by one of the ministries, the governments political agenda has to be taken into account. Ongoing research funding programmes will normally not be affected from changing political agendas, but of course “slighter adjustments” are possible.

Regarding policy formulations the BMVBW gets support from a permanent scientific advisory board\(^{29}\) and of temporary build commissions (e.g. Pällmann Kommission). The BMVBW, coordinated by the representative for research\(^ {30}\) annually works out an integrative research programme. This requires the definition of research priorities and the integrated research programme has to be defined according to the overall political agenda. After approval of the BMVBW directorate, the integrated annual research agenda will be realised by the appropriate divisions and the subordinate organisations to the BMVBW, the Federal Highway Research Institute (BAST) and the Federal Office for Building and Regional Planning (BBR).

8.3.2 **Policy implementation and policy dissemination**

In the research funding practice of the Ministry of Transport, Building and Housing (BMVBW) projects are fully and partially funded, following EU guidelines (Universities up to 100%; Industry 25-50%; bonus for SME and companies located in the New Länder). In contract research BMVBW enters a contractual relationship with the research organisation about the objectives the time schedule and a frame of the research subject (mainly studies are funded). 100 % funding is rare at BMBF.

Research Funding Programmes of the Federal Ministry of Education and Research (BMBF) are developed and implemented in an internal two-stage process. At the development stage the responsible divisions (421 and 424) draft a first description of the research programme which has to be approved by the ministry directorate. This description encloses information like objectives, target groups, arguments for the funding budget or SME-relevance. This draft describes as well the national and international state of the art in the concerned research field, the time schedule for the programme and of course a first calculation of the financial benefit. At the implementation stage – following approval by the direction - the responsible division will outline a draft research programme. It numbers detailed research topics for funding and offers a first draft for an evaluation concept. When the direc-

\(^{29}\) Wissenschaftlicher Beirat

\(^{30}\) Forschungsbeauftragter
torate of the ministry approves the draft programme, a formal approval by parliament, Federal Cabinet and European Union (notification) will be prepared. Finally the research programme will be published.

For these activities, the division 421 and 424 get support by the project management organisation PT MVBW (TÜV Rheinland Group). In a few cases additional experts (university, industry and consultants) are involved. The programme management organisation has several tasks:

- Support of the Ministries in the development of research programmes,
- consultation and advising of applicants within the respective programmes,
- technical and administrative review of project proposals and funding applications,
- preparation and implementation of the funding decisions of the BMBF,
- congress organisations, seminars and workshops on behalf of the ministries,
- monitoring of funded projects and evaluation of the project results,
- contract issues and financial transactions,
- management and evaluation of technology transfer measures,
- monitoring of development trends relevant for funding programmes.

Other relevant programme management organisations are e.g. the programme management organisations PTJ (Maritime and Polar Research Jülich), DLR (Aviation and Aerospace Research Cologne) and DFG (Deutsche Forschungsgemeinschaft).

8.3.3 Policy evaluation and policy monitoring

In the Ministry of education and research (BMBF) two stages of “quality assurance” are foreseen: programme reports and programme evaluations. For a new research programme the responsible division prepares a start report concerning with frame conditions, actors, funding models, duration, milestones, etc. Once a year an update of this data is provided in a status report, which has to be approved by the State Secretary. For programmes with a funding volume of more than 50 million Euros a programme evaluation by an external organisation and expert panels is obligatory:

- In case of the finalisation of a research programme, but at the latest after 5 years, an ex-post evaluation has to be carried out. The objective is to evaluate the funding measure regarding its direct and indirect effects.
- Before a running research programme can be updated or a new programme can be set up, an ex-ante evaluation, including a strategic audit is mandatory. It comprises a status report including the derivation of the need for public funding and a listing of potential funding objectives and funding instruments.

Another evaluation instrument, the strategic audit, is a major instrument to support political priority setting. It is obligatory for all programmes. It ensures a better maintaining of programme objectives and its co-ordination with the strategic objectives. The strategic audit aims to provide perceptions about the importance of the research area including the programme funding, the future objectives of the programme and suitable instruments to achieve these objectives.

The strategic audit is organised in a two-days hearing, which is carried out by an expert panel (experts, auditors). This panel comprises five representatives of the research community, minimum two from Germany and one from Europe, Asia and America. Furthermore five representatives of the potential target groups are in-
vited. The auditors should not be potential recipients of funding and should also not be representatives of the project management organisations.

The directorate of the BMVBW is informed quarterly about the status of the annual integrated research programme; research activities of the BMBF and the BMWA, BMU, EU, OECD and CEMT are considered. This quarterly report is substantially based on data provided by the Research Information System (FIS).

**8.4. Institutional barriers for cooperation in transport research**

The first joint call of Germany and France in the area of transport research (DEUFRAKO - Green Freight Transport Corridors) was published in 2002. The projects selected for funding are currently implemented. This first joint call required consideration of two largely independent levels, first the co-ordination of the call’s technical content, second the co-ordination of organisational aspects of the call predetermined by existing national funding instruments and procedures. Due to the fact that both countries pursue similar research policy objectives in the field of transport, co-ordination of the technical content of the joint call posed few problems.

In the actual DEUFRAKO programme the co-ordination of the funding instruments and funding procedures proved to be significantly difficult. National funding instruments and funding procedures are founded on national legal structures (in Germany, for example, on the Bundeshaushaltsordnung, or Federal Budgetary Regulations). These structures were not designed to accommodate trans-national cooperation and they cannot easily be modified in short-term. National research funding instruments partly tend to be a barrier for bilateral cooperation (cooperation transcending the level pursued within EUREKA).

**8.4.1 Policy and administrative barriers**

- Money for trans-national cooperation has to be taken from the national budget which is thereby reduced.
- The programme development on national level is a complex and long-term process. Joint programming activities require a co-ordination of the timing. The inflexibility of national programme activities might be a barrier.
- National research funding system does not sufficiently enable the participation of research organisations from other countries.
- Proposals have to be submitted in German language.
- Correspondence with BMBF and the programme management organisations is common only in German language.
- Project Administrators are not explicitly educated for foreign applicants.

**8.4.2 Legal and budgetary barriers**

- The general limitation of transport research funding budget.
- National funding instruments and funding procedures are based on national legal structures (in Germany, for example, on the Bundeshaushaltsordnung, or Federal Budgetary Regulations), not designed to assist trans-national cooperation.
- Trans-national/ cross-border research funding is rarely in common.
- Intellectual property rights (IPR): According to the German funding rules, recipients of funds have to make use of the developed products, knowledge, etc. If they do not, BMBF will have the right to make use of the IPR. This might be a problem between BMBF and non-German research organisations.
9. The Netherlands

9.1. Contextual patterns

9.1.1 Country description and Transport infrastructure,

The Netherlands have a total population of 16.25 million inhabitants populating around 41,526 sq km. The average population density is around 472 inhabitants/sq km\(^{31}\). The largest cities are Amsterdam, Rotterdam, The Hague, Utrecht and Eindhoven.

The Netherlands is largely flat, vast amounts of land have been reclaimed from the sea over the centuries. Nearly the half of the country is situated below the sea level and only in the southeast province – Limburg – hills are situated. The land is mostly covered by urban and suburban areas, grassland, marshes, wetlands and forests.

The Netherlands is divided in twelve provinces and is bordered by the North Sea, Belgium and Germany. It is Europe's most densely populated country, especially the regions around Amsterdam, The Hague and Rotterdam.

The Dutch Transport infrastructure enfolds 2,808 km railway infrastructure and 116,500 km paved roads, whereof 2,235 km are motorways. Apart from motorways and roads, the Netherlands has a dense network of inland waterways with a total length of around 5,050 km.

In the Netherlands many sea ports are situated, ranging from the large multi-purpose seaports of Rotterdam and Amsterdam to more specialized sea ports such as Vlissingen, Terneuzen, and the Groningen Seaports (Delfzijl and Eemshaven). These ports provide a full range of cargo-handling facilities, as well as supply and maintenance sites for ships and other offshore equipment. Rotterdam is the world's largest seaport offering transport connections to the whole of Europe and many overseas destinations.

Six airports are situated in the Netherlands, the largest in Amsterdam and five regional airports.\(^ {32}\) Amsterdam Schiphol Airport is one of the largest airports in Europe for passenger and cargo air transport.

9.1.2 Transport policy related general goals

In the Netherlands the Ministry of Transport, Public Works and Water Management (MINVENW) is responsible for transport policy. A second important public authority regarding transport policy is the Ministry of Housing, Spatial Planning and the Environment. The national government is responsible for general regulations and standards for transport, spatial planning, environment and transport infrastructure financing. The regional authorities are responsible for regional transport policy and regional spatial planning.

The main objectives for national transport policy are defined in the national transport and mobility plan. The last National Transport and Mobility Plan was drafted but never approved by the Dutch Parliament. At the 7th of October 2004 the National Strategic Mobility Plan (Nota Mobiliteit) was published by the Minister of


Transport. This Situation reveals a short-dated strategic change of national transport priorities.

The National Strategic Mobility Plan for transport policy till 2020 highlights mobility as a major request for the economic and social development of the forthcoming years and identifies similar issues than the National Transport plan. First draft key words are:

- Accessibility,
- Reliability,
- Safety,
- Traffic and transport growth,
- Public-private partnerships.

Currently the Ministry of Transport perceives the main goals of transport policy in maintaining the existing transport infrastructure, in improving the capacity as well as in a well selected construction of new infrastructure. Beyond that transport safety and security is a main issue. A further policy goal is to strengthen the coordination between transport policy, spatial planning and regional economic development at different administrative levels (municipal, regional and national).

9.2. Transport research and innovation system

9.2.1 Mapping of the country specific transport research funding system

Within the government, the Ministry of Education, Culture and Science (MINOCW) is the leading research funding organization, providing approximately two-thirds of national research funding budget. MINOCW provides about 70% of its financial resources for the funding of the universities and around 30 other large and small research organizations, including the “Netherlands Organisation for Scientific Research (NWO), the “Royal Netherlands Academy of Arts and Sciences” (KNAW) and “Netherlands Organisation for Applied Scientific Research” (TNO), the academic libraries, institutions for research in the art and social science, the international research organizations, institutions active in the area of technology assessment and technology advisory boards. The greatest part of the funding budget of the Minister of MINOCW is tied up in institutional funding. There are also limited resources for national and international co-ordination. A part of the available research funding budget do not remain in the Netherlands, but rather goes to research organizations abroad (CERN\textsuperscript{33}, ESA\textsuperscript{34}, ESO\textsuperscript{35} or EMBL\textsuperscript{36}).

The main key player for transport research funding is the Ministry of Transport, Public Works and Water Management (MINVENW) with its subordinate authorities like e.g. the AVV Transport Research Centre. AVV carries out and funds transport research projects with a funding budget submitted by MINVENW. AVV tries to translate policy questions into research questions and to translate research results into policy advice.

The financing bodies for research and development (R&D) are at the one side the already mentioned Ministries MINVENW and MINOCW and on the other side the Intergovernmental Committee for Economic Structure Improvement/Knowledge In-
structures (ICES-KIS-Fund). This situation of overlapping directions of funding organisations provide various levels of cooperation possibilities for R&D funding, especially for cooperation’s between companies and research organisations.

9.2.2 Mapping of the most relevant transport research organisations

The most important players in transport research in the Netherlands are:

- Netherlands Organisation for Applied Scientific Research, Division Transport and Traffic (TNO-VV),
- The national Information and Technology Centre for Transport and Infrastructure (CROW),
- The Netherlands Research School for Transport, Infrastructure and Logistics (TRAIL),
- Netherlands Bureau for Economic Policy Analysis (CPB),
- Research for Man and Environment, The Dutch Environmental Assessment Agency (RIVM-MNP)
- Institute for Road Safety Research (SWOV),
- The Netherlands Institute for Spatial Research (RPB),
- The Public-Private Innovation Network for Traffic and Transport (CONNEKT),
- National Aerospace Laboratory (NLR),
- Geo Delft,
- Delft Hydraulics (WL),
- Social and Cultural Research Center (SCP).

Primarily the Universities of Technology in Delft, in Twente, Eindhoven, Groningen, Tilburg, Rotterdam as well as the University Amsterdam and the Free University of Amsterdam are considerable in transport research. In applied transport research transport technologies and logistics are significant.

9.3 Policy process description along the policy circle

9.3.1 Policy formulation and policy determination

Generally spoken, at the national level decisions concerning transport research policy is predominantly made by the Ministry of Transport. But the business community (e.g. Nederland Distributieland), the research organisations (e.g. the University of technology Delft, University Tilburg, University of Technology Eindhoven and University Twente or Groningen, University and Free University of Amsterdam, or TNO) have a major influence on transport policy formulation. Other Ministries are involved in the formulation of transport research policy as well like the Ministry of Education, Culture and Science or the Ministry of Economic Affairs. They have partly small research funding budgets for transport research. The Ministry of Transport is - besides of its own regional offices - not involved in the transport research policy formulation at the regional level.

Informal procedures are playing an important role for the non formalized negotiation processes during the policy formulation process. There is no systematically defined cooperation process between the Dutch Ministries. Generally interministerial cooperation is on an ad-hoc and informal basis. Strong efforts are taking place to improve cooperation, also cooperation between the different departments within the Ministry of Transport. One area, were formalisation of informal cooperation procedures already takes place, is the preparation process for the annual corporate Knowledge Plan (KYP). The main inputs for this plan are the research pro-
grammes of the different departments. It is not obligatory that each department develops a programme, but the corporate KYP plan forces the different departments to do so.

At the moment the general intention of the Ministry for Transport is to stimulate a top-down approach (steering by the demand side) in transport research funding. The identification of research subjects is carried out by subordinate research organisations to the ministry like the AVV or internal research within the Ministry at the work floor of the departments. At this moment, a reorientation takes place concerning transport research: doing transport research by the Ministry itself or via outsourcing. The current motto is “market, unless…” 37.

9.3.2 Policy implementation and policy dissemination

Every year the Ministry of Transport puts down its goals in a transport research agenda, regarding the annual budget. This agenda sets direction for the research projects that will be funded in the next years. The ministry-wide Knowledge Plan (KYP) is set up by the central department of the Ministry, based on the inputs of all other departments. As KYP plan is generally short-term oriented, the central department has recently initiated a project to identify long-term strategic knowledge orientation to start up the discussion on the content of the top-down research programmes.

A lot of the research questions are ad-hoc, asked for by parliament and indirectly by different stakeholders in Dutch society. Bilaterally, the Ministry of Transport has contacts with different advisory boards, like the Advisory Council for Transport, Public Works and Water Management38 and independent research organisations like the CPB, RPB and SCP, in order to influence their research programmes.

In general, two major transport research funding programme types can be identified. Firstly, a project funding programme type heading towards the overall enforcement of the knowledge base on transport related issues for the economical benefit of the Netherlands. For that the funding budget of the sell of the Dutch natural gas resources is used. The Dutch ministry of Economic Affairs, on behalf of the Cabinet, directs a process of distributing this budget to the relevant Ministries in the Netherlands (ICES-KIS). The Ministry of Transport receives a significant share of this budget. Secondly, a project funding programme type: a internally distributed funding budget for each separate Directorate General Each Directorate has its one yearly budget and the responsibility for developing and financing research programmes and projects.

The main dissemination process of research results is done by the Ministry and its subordinate research organisations. This includes all media formats from comprehensive web services till printed reports, workshops and conferences.

9.3.3 Policy evaluation and policy monitoring

It is not a common practice in the Netherlands to evaluate research projects in research programmes, but the Dutch Ministry of Finance has ruled that all ministries has to evaluate their specific policy outcome (policy measures) every 5 years. The internal policy evaluation process within MINVENW is directed by the single departments (policy development, implementation and inspection departments), with

38 Raad voor Verkeer & Waterstaat
support of the ministries subordinate research organisations like AVV. In a corporate way, an audit system has been developed within the central policy department of the ministry. This audit is currently carried out and will be carried out for all subsequent departments. Each department (DG) within MINVENW has taken it up differently: Some DG’s evaluate all policy measures, others make a selection.

9.4. Institutional barriers for cooperation in transport research

The Ministry of Transport is currently exploring possibilities to develop solutions for structural and bi-lateral cooperation procedures for joint transport research programmes, especially with the two relevant German Ministries.

9.4.1 Policy and administrative barriers

Different thematically and structurally barriers for cooperation are identified. A main barrier is for instance the missing shared contextual focus between the different departments of the Ministry, the knowledge institutions (universities) and the industry as well as a lack of a clear focus on R&D and innovation in general. Structural barriers are the general fragmentation of the knowledge landscape in the Netherlands, the shortage of transparency regarding different parties in transport policy - their roles and the targeted added value. Furthermore the decentralised responsibilities within the departments of the Ministries cause heavy administrative burden regarding cooperation.

9.4.2 Legal and budgetary barriers

The most relevant barrier for trans-national cooperation is the funding procedures which have to be transformed. This is necessary to raise the financial interest from industry and business on the one hand and to clarify the functions and tasks of the different involved players.
10. Norway

10.1. Contextual patterns

10.1.1 Country description and Transport infrastructure,

Norway has a population of around 4.6 million people (2004 est.) spread unevenly on 324,220 sq km. This gives an average population density of around 14 people per sq km.

The population of Norway is concentrated around a limited number of cities with Oslo as the absolutely leading city (800,000 inhabitants). Other large cities are Bergen (200,000 inhabitants) and Stavanger (170,000 inhabitants).

The landscape of Norway is characterized by a large variation. A fairly large part is high glaciated plateaus and rugged mountains broken by valleys. Open plains are primarily found in the south. A very long coastline deeply indented by fjords and surrounded by high rocks, which makes it to one of the most rugged coastlines in the world making up a total of 21,925 km.

Norway has 4,178 km of railways. Paved roads accounts for 69,505 km, however, unpaved roads forms a quite large part of 21,949 km. Norway has 66 airports with paved runways, where almost half of them are small airports with runways less than 1,000 metres. The main airports are in Oslo, Stavanger and Bergen.

10.1.2 Transport Industries,

Due to Norway's position at the north of Europe and the long coastline the maritime sector is very influential. Also the large oil industry has an influence on the research themes in transport research. Norway has no significant automotive or railway industry.

10.1.3 Transport policy related general goals

In spring 2004 the Government of Norway presented the National Transport plan 2006-2015. Around 23.5 billions Euros (2.35 billions Euros per year) will be spent from the national budget for investment in transport infrastructure - for infrastructure development and infrastructure maintenance. In addition considerable grants (amount not specified) originating from road pricing and charges related to coast sea traffic, are distributed for transport infrastructure investments.

The main goals in transport policy are:

- Reducing the number of casualties in road traffic; general focus on road safety.
- Developing a more sustainable urban transport system with a main objective in reducing the dependency on cars.
- Improving the transportation network within and between competitive regions.
- Developing a more efficient transport system, including a competition based on a policy regime for public procurement.
- Making the transport system accessible for everyone, by strengthening the requirements for accessibility in infrastructure development, by giving grants for driving licences and by funding public transport services.
The key words regarding transport research in transport policy in Norway are:

- Strong emphasis on safety and security (e.g. tunnel safety),
- Strong emphasis on intermodality and ITS applications,
- Rail transport enhancement,
- Transport corridors and intermodal Transport Solutions,
- Improving decision-making tools for transport policy.

10.2. Transport Research and Innovation system

The main players in transport research policy in Norway are the Ministry of Transport and Communication, The Road Directorate, the Ministry of Trade and Industry, the Ministry of Fishery and the Norwegian Research Council. In relation to the general transport policy goals department competence is very important in Norway. Each department of public administration takes responsibility for organising and funding research. Regarding international cooperation the competence is shared: The overall responsibility for policy for international research cooperation is left by the Ministry of Education and Research. Whereas to put international policy cooperation into practice several departments of the above mentioned ministries are in charge. Since January 1st 2004 the responsibility for the coordination of Norwegian participation in the EU framework programme is placed directly by the Ministry of Education and Research. But the Research Council Norway is as well responsible for stimulating participation in the EU framework programmes.

10.2.1 Mapping of the country specific research funding system

There are five major public bodies involved in transport research funding in Norway: The Ministry of Transport and Communication, The Road Directorate, the Ministry of Trade and Industry and the Ministry of Fishery and the Research Council of Norway. The overall responsibility for financing higher education and research at universities and regional university colleges has the Ministry of Education and Research.

The Research Council of Norway is the largest research funding organisation in Norway and administrates approximately 2/3 of transport research funding. Funding budgets from the ministries are transferred to the Research Council. They are earmarked for transport research. The rationale behind that is twofold: Transport research often mislays in the competition with other research areas. The Ministries are still in charge to specify programme objectives and select research topics.

The above mentioned ministries and the Road Directorate administrate some smaller transport research funding budgets themselves. These budgets are partly used for in-house research and partly used for small programme initiatives. Research programmes managed by the Ministries and the Public Road Administration can be characterized as more “narrow” transport research programmes, whereas the transport research programmes administrated by the Research Council of Norway are larger and have a much “broader view”.

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39 Departementernes sektorsansvar for forskning, 2004
10.2.2 Mapping of the most relevant transport research organisations

In Norwegian transport research two major research organisations dominate the field of transport research. The Transport Economic Institute TØI is the largest research organisation in the transport sector. TØI is an independent institution with no formal relations to the Ministry of Transport or the universities. Around 20% of the research budget at TØI is financed through basic funding of which one part is direct national research funding earmarked for TØI. The rest of the research budget is attained in a competitive way. TØI employs around 60 researchers in the field of transport and emphasises specifically economic transport research. The private research institute Econ Analysis is another important research organisation in transport economics and related issues in Norway.

Another significant transport research institute is SINTEF focusing on applied transport research and transport technologies. 48 researchers are working in SINTEF. SINTEF is an independent institute like TØI, but has a close link to the University of Trondheim. Universities and business schools play a relatively small role in transport research. Agderforskningen, University of Stavanger and the Business School in Møre and NIBR have e.g. been involved in transport research. It is a clear policy from Norwegian research funding organisations to spread research funding not on too many institutions (argument: critical mass). As a consequence e.g. hardly any engineering and consultant agency is involved in transport research, except short-term, close to market policy analyses.

10.3. Policy process description along the policy circle

10.3.1 Policy formulation and policy determination

For the formulation process of long-term strategies in transport research the Ministry of Transport and Communication is main responsible. But the above mentioned ministries and public bodies as well as other representatives from the transport sector are clearly involved in an interactive process organized between the Ministry of Transport and Communication and the Research Council Norway. The Research Council Norway plays another important role as a coordinator between the public administration, the research organisations and trade and industry.

The Ministry of Transport and Communication and the Research Council Norway have regular meetings when new programmes are planned. The Research Council Norway operates on formal guidelines. Ministry of Transport and Communication is main responsible for the formulation of research topics and has to ensure that long-term oriented transport research is carried out in all relevant areas. However, ideas for research topics also originate (bottom-up) from transport research organisations. The current political focus plays as well an important role. The political focus is very often due to ad-hoc policy demands and based on short-term analyses.

The Public Road Administration supports research activities in the road sector. The funding budget for road research is assigned to the different departments in the Road Administration following internal procedures. In some cases the Public Road Administration organises research funding programmes with call for tenders partly open for international participation. The Road Administration does not directly join in EU – research funding programmes, but supports local transport researcher’s to participate. The Public Road Administration is very aware of areas where research and knowledge is still very limited in the field of road transport, and
with that tries to be updated concerning research results from other research environments.40

10.3.2 Policy implementation and policy dissemination

The Ministry of Transport and Communication, the Public Road Administration, the Research Council Norway and the Institute of Transport Economics (TØI) take part in the development of transport research programmes within their respective fields of competence. However, the Ministry of Transport and Communication and the Research Council Norway are responsible for the actual implementation of the programmes, e.g. the organisation of the call for tenders and the evaluation of the incoming project proposals.40 The project evaluation process is well defined: the project proposals are peer-reviewed by national and international experts, all applicants receive the result of their project appraisals. Evaluation criteria are for example the scientific quality and the policy relevance.40 The research programmes of the Ministry of Transport and Communication are based on explicit programme guidelines. The Ministry receives several requests for research projects each year.

Dissemination is receiving increasing attention in Norway. All key actors in transport research are in close contact and in an ongoing discussion on future transport research. The Ministry of Transport and the Road Directorate are more focussed on dissemination towards national policy, while the Research Council Norway emphasises dissemination towards national and international transport research. The research council Norway offers specific funding for instance for publications in international journals, for conference organisation and even to publish books on transport topics. The Institute of Transport Economics (TØI) publishes the magazine Samferdsel. TØI and the Research Council Norway organise yearly conferences on transport research. These conferences are fruitful arenas for personal contacts and contribute to strengthen transport research networks.

10.3.3 Policy evaluation and policy monitoring

The Ministry of Education and Research is responsible for the overall research programme evaluation. Regarding the evaluation of transport research programmes, the Ministry of Transport and Communications has the main responsibility. The Research Council Norway also takes part in evaluation and monitoring of research policy in general.41 Every funded research project administrated by the Research Council of Norway demands annual progress reports and to receive the final project funding and end-report is required. This project evaluation maps out the results of a research project in relation to the research funding programme objectives.

10.4. Institutional barriers for cooperation in transport research

10.4.1 Policy and administrative barriers.

Key players in the Norwegian transport research arena emphasise that the political focus on transport is high. But generally the time demand to generate accountable research results is underestimated due to limited understanding. The Ministry of Transport and Communication is in charge to translate transport research results into transport policy objectives – there are several good examples for that.

41 ENT, Questionnaire of Norway, 2004.
If transport research topics do not fit well into national transport research policy goals, for the participation in trans-national research projects only small support is available. National and international transport research policy goals do not necessarily complement each other.

Procedures concerning EU calls for tenders are complicated, lowering the motivation to participate. Often there is a very long period of time from the submission of the proposal to the actual start of the project. The participation in trans-national research projects demands considerable management resources. These costs are not funded explicitly.

10.4.2 Legal and budgetary barriers

The barriers for trans-national cooperation are mainly due to the general budget limitations as funding budgets are already assigned for national transport research activities. Especially the difficulties of co-financing trans-national research projects (e.g. 50% self-financing in EU projects) have to be mentioned.

Norwegian researchers can currently apply for funding when drafting a proposal for an EU-call. The Research Council Norway covers up to 50% of the costs (thus a maximum of 12,000 Euros). The Public Road Administration covers up to 100% of the costs warranted that the project has been accepted being beneficial for road transport research.40
11. Poland

11.1. Contextual patterns

11.1.1 Country description and transport infrastructure

Poland is one of the largest countries in Europe with a population of around 38.3 million people (2002) on a territory of 322,577 sq km. The capital city Warsaw is the country’s largest city with 1.7 Mio. inhabitants. Smaller cities are Lodz (789,318), Krakow (758,544), Wroclaw (640,367) and Poznan (578,886). The average population density is around 119 people per sq km.

Poland is divided into a number of distinct parallel regions that run from east to west. The northern zone is a vast region of plains and low hills, divided into the Central Polish Lowlands, the Baltic Heights, and the Coastal Plain. The Central Lowlands are traversed from east to west by a series of large, shallow valleys. At the north of the Central Lowlands the Baltic Heights region is situated, dotted with hills and lakes. The Coastal Plain consists of narrow lowland. The coastline (491 km) is remarkably smooth and regular, with a few natural harbours like Gdansk or Gdynia.

The southern part of Poland consists of upland areas of various kinds and adjacent or intervening lowlands. The Carpathian Mountains, located on Poland’s south-eastern border, include the Tatry and Beskid range. The Sudety, another major mountain range, are located on Poland’s south-western border. Mount Rysy in the High Tatry Mountains in the south is the highest mountain (2,499 m).

Poland is bordered on the north by the Baltic Sea; on the east by Lithuania, Belarus and Ukraine, on the south by the Czech Republic and Slovakia and on the west by Germany. The maximum distance from east to west is around 680 km and the maximum distance from north to south is around 790 km. Poland’s borders are marked by the Sudety Mountains (Sudetes) in the southwest, the Carpathian Mountains (Karpaty) in the southeast, the Odra and Neisse (Nysa) rivers in the west, and the Bug River in the east. There are around 9,300 lakes concentrated in the Baltic Heights and Coastal Plain regions of the north. Two rivers cross the country from the south to the north, the Odra and Wisla.

Poland has a relatively dense rail network that links most main cities and towns. The railway network consists of 22,560 km. Many of Poland’s paves roads are in poor condition - this is a result of more than 40 years of central planned economy.

Poland has nearly 4,000 km of navigable rivers and inland waterways. The country’s main rivers are connected by 1,215 km of inland waterways, major ports are Gliwice, Wroclaw and Warsaw. Poland several important sea ports at the coast of Baltic Sea.

There are five international airports situates in Poland: Warsaw, Krakow, Poznań, Gdańsk and Katowice. The country’s main airport “Fryderyk Chopin” is a major transit airport for Central and Eastern Europe.

11.1.2 Transport Industry

From 1989 Poland was experiencing wide-spread political, social and economical changes. The transition from a centrally planned system to a market economy, meant substantial alterations and restructuring for the national economy.
With over 37,000 employees the Polish shipping and maritime technology industry plays an important role for the national economy. This industry sector claims a share of about 5 percent of the country’s total export share. As one of the most important shipbuilding countries of the world, Poland is competing against Asian countries. Holding 5.7% of the world orders in the year 2000, Poland is the fourth largest ship manufacturer behind South Korea, Japan and China. There are two main centres of for manufacturing of sea going vessels determined by two major companies: the Szeczecin Shipyard and the Gdynia Shipyard.

Poland has no national automotive industry, but numerous global automotive companies run car manufacturing sites in Poland. The largest investor is the Italian Fiat Group followed by the Korean Daewoo Group and General Motors. Other Companies like Volkswagen or Toyota have no manufacturing sites in Poland yet. The automotive supply industry is one of the fastest growing industry sectors in Poland.

Manufacturing of railway rolling stock is regarded as a priority due to the strategic importance of the railway sector in Poland. Rolling stock are manufactured on a mass scale, whereas the production of railway engines is insignificant today. The whole railway industry sector covers around 140 manufacturing sites for railway equipment (around 22,600 employees).

Due to close cooperation with international aerospace industry, aircraft manufacturers in Poland have expanded in the recent years. 55 aerospace companies are manufacturing small sports and passenger aeroplanes, helicopters, aircraft parts and equipment. (Around 16,000 employees)

11.1.3 Transport policy related general goals

In October 2001 the Polish Cabinet accepted the document “The State’s Transport Policy for the year 2001-2015 for a balanced development of the country”. This document is focusing on the following issues:

- Provision of requirements of spatial planning to transport infrastructure,
- Regulation of the transport service market,
- Improvement of traffic control and traffic safety,
- Enhancing the competitiveness of the Polish transport sector.

In its programme "Przedsiębiorczość – Rozwój – Praca II", which was worked out by the Ministry of Infrastructure, the Polish government specify objectives concerning transport infrastructure development. The most important tasks concerning transport infrastructure are seen in the construction of motorways and the restructuring of the PKP railway system. The Ministry is planning to accelerate the construction of motorways to approximately 100-150 km per year. Until the end of 2005 the construction of about 550 km motorway, around 200 km expressway, and 47 new bypasses of townships and the reconstruction of 500 km road surface is scheduled.

The railway system is aimed to be considerably improved in standard and upgraded to link the European railway network. Restructuring and privatisation in the railway sector is proposed. For the following years the development of a combined transport system is intended by means an efficient intermodal transport network.

The Strategy Paper on Development of Transport’s Infrastructure for the years 2004-2006 describes the main objectives for Transport Infrastructure development for the Years 2004-2006 (beyond). The main objectives are to improve substantially
transport accessibility to Poland. The first priority is to improve transport routes between Warsaw and different European capitals. The second priority is an upgrading of the Polish inter-regional transport routes. The following issues are mentioned in this strategy paper:

- ensure effective transport routes to intensify trade in the Single Market;
- improve accessibility to the main Polish urban areas as important centres of economic growth;
- support regional development;
- improve transport safety (reducing the social costs of road casualties);
- reduce environmental costs (balanced development of the transport sector);
- development of inter-modal transport systems and interoperability of railway.

The Strategy on Development of Transport’s Infrastructure for the years 2004-2006 (National Strategy on Transport Infrastructure) is coordinated with the operational programme on transport (SOPT). The Operational Programme on Transport – as one of seven operational programmes of Poland - was as well worked out for the period 2004-2006 by the Ministry of Infrastructure. The SOPT is also considered as the Polish strategy paper for the Cohesion Fund and - setting general provisions applicable to the structural funds. The strategy document defines policy goals and funding request for the development of transport infrastructure in Poland. Total funding requests amount up to 1,55 Bn. €, of what 97,5 % is covered by EU commitment.

11.2. Transport Research and Innovation System

11.2.1 Mapping of the country specific transport research funding system

The Ministry of Scientific Research and Information Technology (MSRIT) is main responsible for research funding in Poland and as well responsible for international research cooperation. Some research funding initiatives are coordinated between MSRIT and other ministries such as the Ministry of Infrastructure, the Ministry of Economy and Labour as well as the Ministry of Environment. MSRIT supervises around 40 public institutions among them 5 institutions which are involved in transport research (e.g. Research Institute of Roads and Bridges in Warsaw, Railway Scientific and Technical Centre in Warsaw, Maritime Research Institute in Gdansk etc).

From 1991-2003 the State Committee for Scientific Research (KBN) was responsible for Polish research policy and the main funding organisation. When MSRIT was formally established in April 2003, KBN was reassigned under the roof of the ministry. Today KBN continues its activities on behalf of MSRIT. The Minister of Science is chairman of KBN. The management board includes 5 ministers and 12 representatives of the scientific research community. Each elected KBN member heads one of the twelve divisions responsible for a research area. One of them is the division for Mining, Geodesy and Transport - responsible for transport research. The overall funding budget administrated by the KBN covers meanwhile 11.4 Mio. €.

The Ministry of Scientific Research and Information Technology (MSRIT) supports institutional research funding as well as programme/project funding. The funding budgets are earmarked in the national research funding budget. Evaluation plays an important role. For the twelve research areas the total amount of institutional
funding in 2004 was around 350 Mio. €. Particularly funding budgets are assigned to other Ministries (e.g. the ministry of infrastructure).

Twice a year open calls for tender are initiated, funding grants for individual researchers and research teams. KBN funds as well strategic research projects by call for tenders. KBN accepted around 200-300 research projects in the last years for funding and was initiating up to 30-40 strategic research projects per year. Furthermore funding for laboratory equipment and infrastructure is provided as well as funding for research cooperation stipulated by intergovernmental agreements (e.g. co-financing requests) and funding of research promotion activities (publications, libraries, databases, conference organisation, knowledge transfer).

11.2.2  Mapping of relevant transport research organisations

University Institutes are much prominent in transport research in Poland. But there are as well several non-university research organisations in transport research. At the Universities several research centres (R&D) have a close link to industry. The research organisations have their own strategies and action programmes. As follows a list of the most relevant transport research organisations in Poland:

**Railway Transport**
- Department of Transport – Warsaw University of Technology
- Department of Transport – Silesian University of Technology
- Railway Scientific and Technical Centre Warsaw
- OBRPSz Poznań

**Air Transport**
- The Faculty of Power Aeronautical Engineering
- Faculty of Mechanical Engineering and Aeronautics
- Faculty of Aeronautic Technology

**Road Transport**
- Faculty of Civil Engineering
- Silesian University of Technology
- Cracov University of Technology
- Institute of Roads and Bridges
- Faculty of Civil Engineering - Cracov
- Automotive Industry Institute - Warsaw

**Marine Transport**
- Marine Institute
- The Faculty of Ocean Engineering and Ship Technology
- Szczecin Maritime Academy
- Ship Design and Research Centre - Gdańsk

**Inland Transport**
- Faculty of Civil Engineering
Other institutions:

- Transport Committee of Polish Academy of Sciences
- Polish Association of Engineers & Technicians of Transportation
- Centres of Excellence connected with transport
- Science-Research Centre connected with industry

During the last 10 years the number of research organisations cooperating with private companies has strongly increased. Several private companies are involved in transport research projects co-financed by the Government, but there is still a small share of industrial financed transport research in Poland.

11.3. Policy Process Description along the Policy Circle

11.3.1 Policy formulation and policy determination

The main responsibility in the formulation of long-term strategies in transport research policy lies with the Ministry of Scientific Research and Information Technologies (MSRIT). Other Ministries are involved in this process, especially the Ministry of Transport and Infrastructure. The transport research policy evaluation and monitoring is carried out by the KBN. As a next step it is planned to work out a strategy for transport research for the period 2005-2010 as well as a national transport research programme.

11.3.2 Policy implementation and policy dissemination

For Transport research implementation not only the Ministry for Scientific Research and Information Technologies (MSRIT) is responsible, transport research projects are as well funded by other Ministries. But these ministries – e.g. the Ministry of Infrastructure – have a particularly small funding budget.

With the Ministry of Scientific Research and Information Technologies (MSRIT) the twelve divisions of the state Committee for Scientific Research (KBN) are in charge for research programme and project implementation. The division for Mining, Geodesy and Transport is in charge for the implementation of transport research programmes and projects. A call for tender for strategic transport research projects is launched; the incoming proposals are peer-reviewed.

The following implementation process is recommended for a future transport research programme. According to the KBN criteria for the allocation of funding budgets, a KBN division is charged to draft a research programme, which has to be accepted by the KBN plenary meeting and as well approved by the Infrastructure Commission of the Polish Parliament. The programme will then be published in the newspaper "Rzeczpospolita".

In cooperation with the performing research organisation the Ministries are responsible for the dissemination of research results, e.g. the department for Scientific, Technical and Economic Information (ROI) of the MSRIT. The performing research organisations are obliged to present research results in seminars and conferences and publish them in books and journals.

11.3.3 Policy evaluation and policy monitoring

The Ministry of Scientific Research and Information Technology (MSRIT) is responsible for the evaluation of research funding programmes. A commission, which is assigned by the Minister of Science, is in charge for programme evalua-
tion. For project evaluation and project monitoring MSRIT has recently developed specific guidelines. Research project evaluation is carried out periodically and at the end of a funded research project. Research projects invited by other ministries are evaluated within these ministries.

11.4. **Institutional barriers for cooperation in transport research**

11.4.1 **Policy and administrative barriers**

The main barrier in Polish research policy is the lack of understanding of organisational and financial rules for cooperation in trans-national research. In Poland there is still a low language proficiency concerning the EU languages. Barriers for cooperation are as well the low emphasize on international cooperation of national companies as well as the poor financial opportunities of Polish industry.

11.4.2 **Legal and budgetary barriers**

In Poland there are in particular no legal barriers for cooperation in trans-national research. The largest problem nowadays is the low national research funding budget. Often Polish participation in EU programmes is limited as it proves difficult for Polish research organisations to provide co-financing in EU-projects.
12. **Sweden**

12.1. **Contextual patterns**

12.1.1 Country description and Transport infrastructure

Sweden has a population of around 9.0 million people (2004 est.) and a size of 449,964 sq km. Sweden is the fourth-largest country in Europe and has an average population density of around 20 people per sq km, which is in fact very little. The population of Sweden is spread out quite evenly. However, the capital of Sweden Stockholm has around 1,500,000 inhabitants. Other large cities are Göteborg (500,000 inhabitants) and Malmö (200,000 inhabitants).

The northern and the western parts of Sweden are characterized by mountains and lakes. To the south and east, there are central lowlands and south of them fertile areas of forests and plains. Sweden has a long rocky coastline of 3,218 km, split up by bays and many islands.

Sweden has 11,481 km of railway tracks. Paved roads accounts for 166,523 km, however unpaved roads are as well a large part the road network (45,879 km). Sweden has 145 airports of different sizes with paved runways.

12.1.2 Transport Industries

Due to the long coastline the maritime sector is very significant. In the maritime sector in Sweden various technical component are manufactured with a dominant position on the world market. However, the most influential industry of Sweden concerning transport is undoubtedly the automotive industry, e.g. Volvo, Saab and Scandia.

12.1.3 Transport research policy related general goals

The transport policy is seen as an important step to achieve important societal goals. Transport policy should contribute to socially, culturally, economically and ecologically sustainable development. A decision on this was taken by the Swedish Parliament (Sveriges Riksdag) in 1998, based on the Government Bill 1997/98:56 “Transportpolitik för en hållbar utveckling” (Transport policy for sustainable development).

The main transport policy goal is to ensure that citizens and the businesses sector in all parts of Sweden are provided with a good, environment-friendly and safe transport system that is economically efficient and sustainable in the long term.

The main transport policy goal is differentiated into six particular objectives:

- An accessible transport system.
- High quality standards for transport.
- Safe and secure transport.
- A high environmental friendliness.
- Favourable regional development.
- A transport system that is managed by and serves the interests of women and men equally.
The time horizon of the Swedish transport policy is 2000-2010. In the long term, all six objectives must be achieved. In the short-term, however, it may be necessary to prioritise among these objectives.

12.2. Transport research and innovation system

12.2.1 Mapping of the country specific transport research funding system

There are at least 10 national funding agencies funding transport research in Sweden. Up to 40 different transport research funding programmes are currently running. The four major funding organisations in Sweden are; The Swedish Agency for Innovation Systems (VINNOVA), The Swedish Energy Agency (Energimyndigheten), The Swedish National Road Administration (Vegverket) and The Swedish National Rail Administration (Banverket). The other funding organisations have a rather small share of funding budget for transport research.

The National Swedish Road and Transport Research Institute (VTI) is partly institutional funded as well as different transport research departments at the universities. The Road Administration and the Rail Administration have a specific funding budget for in-house transport research activities.

12.2.2 Mapping of relevant transport research organisations

The main players in transport research in Sweden are the following research organisations:

**National Research Institute in the transport area:**
- Swedish Road and Transport Research Institute (VTI).

**Universities and Business Schools:**
- Royal Institute of Technology (KTH),
- Lund Institute of Technology (LTH),
- University of Linköping,
- Blekinge Institute of Technology,
- University of Göteborg,
- Chalmars Institute of Technology,
- University of Umeå,
- Luleå Institute of Technology,
- Universities of Örebro, Karlstad, Växjö and Uppsala.

**Consultant agencies:**
- Transek,
- Trivector,
- TFK,
- Inregia.

The largest transport research organisation is the Swedish Road and Transport Research Institute (VTI). There are as well several university departments and engineering and consultant agencies significant for transport research. The automotive industry in Sweden has significant in-house research departments.
12.3. **Policy process description along the policy circle**

12.3.1 **Policy formulation and policy determination**

The Swedish Government and Parliament has the overall responsibility for the formulation of transport research policy. The Ministry of Education and The Ministry of Industry, Transport and Employment is responsible for the formulation of the direction of strategic research for different research areas. They set as well the direction for Swedish transport research and decide which of the funding organisations will be responsible for particular research areas.

The following state agencies are involved into transport research policy formulation; the Swedish Road Administration, the Swedish National Rail Administration, the Swedish Energy Agency and finally the Swedish Agency for Innovation Systems (VINNOVA). The picture for maritime and aeronautic is not so clear at the moment. Connected state agencies with a role in Transport policy formulation are the Swedish Institute for Transport and Communication Analysis (SIKA), Swedish Environmental Protection Agency, Swedish Rescue Agency and Swedish Council for Environment, Agricultural and Spatial Planning (Formas).

Ten state agencies with different responsibilities for transport research have established an informal network called TRANSAM, “Coordination of transport research in Sweden”. This might create a new climate of cooperation, which goes further than the previous attempts. The Swedish Government has recently given VINNOVA the task of working out a strategic plan for the coordination of transport research in Sweden and suggests a “cooperation structure” in areas of common interest. Due to this VINNOVA has listed the top 5 transport research areas for trans-national cooperation:

1. **Transport policy.**
   - Long-term sustainable transport systems.
   - Sustainable local and regional transport systems.
   - Individuals in harmony with the transport system.
   - Transport and elderly people.
   - Social marginal cost pricing.
   - Congestion pricing.

2. **Vehicle technology.**
   - Energy savings in vehicles.
   - Cleaner vehicles in all modes.
   - Alternative fuels.
   - Safer vehicles.

3. **Development of IT in transport systems and vehicles.**

4. **Freight transport and logistics.**
   - Best practices in logistics.
   - Innovation.
   - Telematics tools.
• "Motorways at Sea".
• City logistics and environment.

5. Safety at sea.

• Baltic Sea Area Perspectives.
• European Area Perspectives with focus on human factors and ship capacity to remain afloat.

Vehicle industry (e.g. Volvo, Scania, Bombardier, Saab Aero), IT-groups, energy producers, The Confederation of Swedish Enterprise, Swedish Public Transport Association (SLTF), BIL Sweden (association of car industry) and many others also influence the direction of transport research policy in Sweden. In future industry will be generally represented in the boards of the research programmes. The impact of Swedish automotive industry on transport research priority setting is significant.

12.3.2 Policy implementation and policy dissemination

The Swedish Agency for Innovation and Systems (VINNOVA) together with the Swedish National Road Administration (Vegverket) and the Swedish National Rail Administration (Banverket) are currently main responsible for transport research programme implementation. These agencies both co-operate but have specific research agendas. The government formulates objectives and targets for transport research and the agencies more or less find their own way to implement them.

There are no general formal procedures for research programme implementation. Traditions have formed the procedures and each funding organisation has developed their own process. There are exceptions when the Government is engaged through agreement with e.g. industry, or when the Government directly launches a transport research funding programme. An example for that are the actual automotive and maritime safety research funding programmes in Sweden.

The most frequent procedure for transport research programme organisation is to establish first a programme board, which helps the state agency to administrate the programme. Most of the agencies have established special boards of experts coming from industry, research organisations and public authorities. All major transport research funding programmes are managed by open calls for proposals. The incoming proposals are peer-reviewed by external experts. The final funding decision is taken by the programme board. Simpler organisation procedures are used when initiating strategic transport research projects with small funding budget.

Dissemination of research results is the responsibility of both the performing research organisations and the funding organisations. All research activities are disseminated with a final report. An annual transport research conference is an important meeting place between researchers, public authorities and other users of transport research results. Most research results are immediately disseminated to the public. But referring e.g. to research results in vehicle design time has to be provided to give the industrial partner the opportunity to arrange IPR.
12.3.3 Policy evaluation and policy monitoring

Normally external experts carry out programme evaluations on behalf of the re-
search funding agencies. In the major research funding programmes clear proc-
esses for project evaluation are establishes. Internal project evaluations with less
clear rules are as well common.

12.4. Institutional barriers for cooperation in transport research

12.4.1 Policy and administrative barriers

A major policy and administrative barrier is the fear of loosing influence in pro-
gramme administration within a broader cooperation (e.g. within EU). In special
cases there are of course clear national industrial interests, too. Industry can have
restrictions in their demand for cooperation due to their market judgement. Another
important barrier are the differences in opinions on the principle of public access to
official Records.

12.4.2 Legal and budgetary barriers

Budget restrictions and lack of resources (staff and money) for international coop-
eration is a barrier for expansion of the international cooperation. The research
funding programmes are however already partly open for foreign researchers to
participate. But it is a limited funding budget, which is provided for the participation
of foreign researchers and quite often only if no Swedish research organisation
has answered the call.
13. United Kingdom

13.1. Contextual patterns

13.1.1 Country description and Transport infrastructure

The United Kingdom has a population of around 59.6 million people (2004) and with the size of around 244,820 sq km it is one of the bigger countries in the European Union. The average population density is around 243 people per sq km. Population (mid 2003) of the constituent countries of United Kingdom is estimated as follows\textsuperscript{42}, England 49.855.700 (83,7 per cent of the total UK population), Scotland 5.057.400 (8,5 per cent), Wales 2.938.000 (4,9 per cent), Northern Ireland 1.702.600 (2,9 per cent).

Most people live in urban areas, for example London (2,77 millions| Greater London 7,17 millions) and in the other large cities like Birmingham (977.091), Leeds (715.404), Glasgow (577.869), Sheffield (513.234), Bradford (467.668), Edinburgh (448.624), Liverpool (439.476) or Manchester (392.819 | Greater Manchester 2.585.800).

The United Kingdom’s geography and landscape is varied and diverse. In total it is estimated that the UK is based on over one thousand small islands. Most of England consists of rolling lowland terrain, divided east from west by more hilly terrain: in the north of the Cumbrian Mountains and the Tees-Exe line, through the Pennines Highland moors, the limestone hills of the Peak District into the Cotswolds and Chiltons off southern England. The main rivers are the Thames, the Severn, the Trent & Ouse. Major cities are London, Birmingham, Manchester, Sheffield, Liverpool, Leeds, Bristol and Newcastle upon Tyne. Wales is mostly mountainous the highest peak is the Snowdon (1.085 m). North of the mainland is the island of Anglesey. The capital city is Cardiff, located in the south of Wales. Scotland's geography is varied, with central lowlands, where most of the population lives, and more mountainous terrain to the north and south. The highest mountain of the UK Ben Nevis (1.343 m) lies in the Grampians in the North of Scotland. There are many long and deep sea arms, firths, and lochs. A multitude of islands west and north of Scotland are also included, notably the Hebrides, Orkney Islands and Shetland Islands. Main cities are Edinburgh, Glasgow and Aberdeen. Northern Ireland, making up the north-eastern part of Ireland, is mostly hilly. The main cities are Belfast and Londonderry.\textsuperscript{43}

The United Kingdom has only one landside border. It is 360 km long across Ireland. The road transport network of the UK consists in total of about 391.700 km roads, of which 161.715 km are classified roads and about 3.477 km are motorways.\textsuperscript{44}

The railway network has a total length of about 5.167 km electrified and about 11.485 km non-electrified tracks with 2.508 stations in total.\textsuperscript{45}

The United Kingdom has several sea harbours like Aberdeen, Bristol, Harwich or the Humber ports. Besides that the UK has a dense inland waterway system with a

\textsuperscript{42} Office for National Statistics, UK population, 2004.
\textsuperscript{43} Countryside Survey 2000 (CS2000)
\textsuperscript{44} DFT, Public road length: by class of road and country: 2002.
\textsuperscript{45} DFT, National railways: route and stations open for traffic at end of year: 2002.
total length of 2.127 km, of which 1.065 are in freight use. The Yorkshire and the Humber region have the largest waterway track, whereas the London region has the highest percentage (55%) of inland waterway transport.\textsuperscript{46}

The United Kingdom has several larger and smaller civil airports. The most important with runways longer than 3.000 meter are London Heathrow, London Gatwick, London Stansted, Birmingham and Manchester Airport.

13.1.2 Transport Industries

The United Kingdom has traditional steel- and ship building industry and a modern automotive, aviation and aerospace industry (the last for military and civil purpose).

13.1.3 Transport policy related general goals

The current British transport policy is still deeply affected by the political decisions during the 80ties and 90ties and the strong tendency at that time towards liberalism and deregulation – the major transport research institute (TRL) was privatized. In 1997 with their first legislative period the new Labour government aimed towards new regulations and coordination in transport and made problem solving in the transport sector to a central policy goal and a long term commitment (10 years plan).

A long term strategy for a modern, efficient and sustainable transport system backed up by sustained high levels of investment over the next 15 years was unveiled on the 20th July 2004 by Transport Secretary, Alistair Darling. \textit{The Future of Transport} White Paper looks at the factors that will shape travel and transport over the next thirty years and sets out how the Government will respond to the increasing demand for travel, maximising the benefits

The White Paper identifies a need a transport network that can meet the challenges of a growing economy and the increasing demand for travel, but can also achieve our environmental objectives. This means coherent transport networks with:

- the \textbf{road} network providing a more reliable and freer-flowing service for both personal travel and freight, with people able to make informed choices about how and when they travel;
- the \textbf{rail} network providing a fast, reliable and efficient service, particularly for interurban journeys and commuting into large urban areas;
- \textbf{bus} services that are reliable, flexible, convenient and tailored to local needs;
- making \textbf{walking} and \textbf{cycling} a real alternative for local trips; and
- \textbf{ports} and \textbf{airports} providing improved international and domestic links.

The strategy is built around three central themes:

First, \textbf{sustained investment} over the long term. The spending review settlement honours this Government's commitment to deliver sustained improvements to transport networks. Spending by the Department for Transport will rise by an annual average of 4.5 per cent in real terms between 2005-06 and 2007-08. This includes an additional £1.7 billion GBP (2.4 billion Euro) transport reform package for the railways, over and above 10 Year Plan provision. 10 Year Plan spending

\textsuperscript{46} Waterborne freight benchmark report, 2003.
has also been increased by £0.5 billion GBP (0.71 billion Euro) each year from 2006-07. This higher level of spending will then grow in real terms (by 2.25 per cent each year) through to 2015. Meanwhile, the other reforms the government is putting in place will ensure that each pound of investment works harder for the British taxpayer.

Secondly, **improvements in transport management.** The Government is reorganising the rail industry to improve performance, drive down costs and get better value from public spending. To put our plans into effect, The Government DfT will legislate to put in place a structure where Government sets the strategy and controls public expenditure. Better traffic management will ease congestion on our road network. Where it makes sense, economically and environmentally, DfT will add capacity to our road network. Where this is done, steps will be taken to ensure that the benefits are locked in, and that the design is sympathetic to the environment. Options include, for example, measures such as tolling on new roads and the introduction of carpooling (High Occupancy Vehicle) lanes, where these make sense. DfT is also encouraging local authorities to procure bus services through Quality Contracts, where this is linked to a wider strategy including bold measures to reduce congestion, or modification of rail services.

And thirdly, **planning ahead.** The long term trends in travel are evident to all. The UK cannot build our way out of the problems it faces on our road networks. And doing nothing is not an option. So Government will lead the debate on road pricing. DfT will work with stakeholders to establish how and when pricing might provide the reliability and standards road users want. And it will work to ensure that the choices faced, together with their full costs and benefits, are well understood. The Government is also committed to sharing decision-making with regional and local stakeholders, and to ensure that regional and local planning is based on a shared view of priorities, deliverability and affordability. And at all levels of Government - national, local or regional - it will be ensured that transport decisions are taken alongside decisions on liveability, sustainable communities and other policy areas.

Underlining these themes, and an important underlying objective of our strategy, is balancing the need to travel with the need to improve quality of life. This means seeking solutions that meet long term economic, social and environmental goals. Achieving this objective will clearly contribute to the objectives of the UK sustainable development strategy. For example, DfT is working hard to deliver improvements in design and technology to improve air quality and reduce greenhouse gas emissions; and will ensure that the wider impacts of future developments are reflected in appropriate appraisal methodologies.

### 13.2. Transport research funding system

#### 13.2.1 A short mapping of the country specific research funding system

In the UK there are mainly two different ways of requesting research funding: Invitation and Open Calls. Department of transport (DfT) only funds transport research by invitation (exception: the small research programme New Horizons). Invitation means, that research interests are specified by DfT, and research contractors are

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invited to tender for the work. Normally, between 4 and 6 research organisations are invited to tender for a particular project.

The Office of Science and Technology (OST), located in the DTI, is responsible for the organisation of research funding in six Research Councils. The RCs are non-departmental public bodies. The actual six Councils are the Biotechnology and Biological Sciences Research Council (BBSRC), the Economic and Social Research Council (ESRC), the Engineering and Physical Sciences Research Council (EPSRC), the Medical Research Council (MRC), the Natural Environment Research Council (NERC) and the Particle Physics and Astronomy Research Council (PPARC).

The above mentioned research councils support research activities, in universities, through the provision of funding (institutional funding) with research programmes (programme/project funding) and individual grants (structural funding). The Research Councils use both Open calls and Directed programmes. 70% of EPSRC research funding is distributed by Open Calls. The overall coordination of the research councils is conducted by Federation of Research Councils UK (RCUK).

13.2.2 Mapping of the most relevant transport research organizations

In United Kingdom several transport research performing research organisations are situated at universities and in non-university research centres. With the privatisation policy in 1990 all other national transport research is carried out in the private sector.

13.3. Policy process description along the policy circle

13.3.1 Policy formulation and policy determination

In United Kingdom a strategic vision on transport policy was formulated in 2003/4 (White Papers on the Future of Transport, the Future of Railways and the Future of Air Transport). The Department of Transport (DfT) has a own strong strategy for future transport research policy. DfT is planning to renew this strategy by early 2005. Strategy for future transport research is outlined in DFT Evidence and Research Strategy Paper48. There are several more strategic documents and foresight exercises concerning transport research in the UK. On the other hand most key players in transport research follow their own strategic vision. The reason for that may be that the British government is quite centralized and a top down approach dominates political and strategic decision making49.

13.3.2 Policy implementation and policy dissemination

Formally, the Department for Transport has management guidance concerning transport research projects. This encourages cooperation where this helps to deliver transport policy objectives in a cost-effective way. However, this is not clearly mandatory50. Informally, Department for Transport research officers who administrate transport research projects have many contacts with whom they co-operate and consult. There are a large number of stakeholders and research participants. But the coverage of this cooperation is patchy50. Efforts hare being made to im-

50 ENT, Questionnaire - UK, 2004.
prove the situation, There are e.g. several instances of good cooperation with local authorities in transport research policy and with industrial partners. Any coordination will continue to be organised by individual research programme managers on the basis of business needs.

13.3.3 Policy evaluation and policy monitoring

The department recognizes that it would strongly benefit from ex post evaluations and peer reviews of its programmes and is working to improve matters in this area (source questionnaire). Improved evaluation and monitoring procedures are a major step towards policy learning.

13.4. Institutional barriers for cooperation in transport research

DfT is a member of the OECD/ECMT JTRC Steering Committee and a member of the COST Technical Committee for transport. The British Highways Agency has a Memorandum of understanding with the Japanese Government to share information on transport research. DfT also cooperates on research projects with individual organisation and Governments across Europe, on a hoc basis.

13.4.1 Policy and administrative barriers

There are no real show-stopping barriers for trans-national cooperation. However, such cooperation is perceived as being difficult for DfT. This is due to a preference for issuing invitations for tender against defined work specifications. The ministerial research officers are expected to be intimately involved in the running of research projects. This does not fit easily with the more generalised Call for Proposals approach used in other European countries.

13.4.2 Legal and budgetary barriers

There are in principle no legal barriers to trans-national cooperation concerning joint research projects - indeed DfT does participate in international research project, e.g. EU Framework Programme funded projects, euro-regional research projects etc. However, as a part of existing transport research programme management procedures, projects and their budgets are approved on an annual basis.
PART THREE - THE DIAGRAMS

The following diagrams show the major key-players of the described countries, along the three stages\textsuperscript{51} of the policy circle, which are involved in the several national transport research programmes.

For a structured comparison the diagrams are composed by four columns, where the stages of the policy circle are displayed, and six rows, where different categories of key-players are differentiated.

The first column reflects the \textit{policy formulation} stage, the second and third column reflects the \textit{policy realisation} stage, which is visualized by two columns in order to distinguish between the \textit{policy implementation} and the \textit{dissemination} more precisely, and the fourth column reflects the \textit{policy learning} stage.

The six rows provides a comparable overview of the diverse tasks, duties, responsibilities and functions as well as relations between the mapped key-players and within each stage of the policy circle.

They aim of this visualisation is to enable the reader a quick view on the country specific situation regarding relevant key-players. It has to be mentioned that it is not intended to fulfil a complete picture of national situations, and that it this diagrams are designed to complete the country descriptions of this deliverable.

The following graphical components are used:

\begin{itemize}
  \item Arrows with normal lines show official key-player relations/involvement.
  \item Arrows with dotted Lines for more informal relations/connections.
  \item Arrows with thick lines for more important/special relations.
  \item White boxes for normal key-players.
  \item Grey boxes for key-players who have their own funds or manage funds in charge of another key-player.
  \item Thickness of the box frames for the importance in the different phases.
\end{itemize}

\textsuperscript{51} Compare Chapter 1.1.
Transport Research Programme Policy - GERMANY
Key institutions and key players

Policy Formulation
Policy description (e.g., agenda setting) &
Policy determination (e.g., research programme design)

Ministry for Research and Education
(BMBF, 421, 424, 425)
Ministry of Transport, Building and Housing
(BMVBW, 1242)

Ministry for Research and Education
(BMBF, 421, 424, 425)
Ministry of Transport, Building and Housing
(BMVBW, 1242)

Ministry of the German Federal States

Policy Implementation
(p.e., research programme design)

Ministry for Research and Education
(BMBF, 421, 424, 425)
Ministry of Transport, Building and Housing
(BMVBW, 1242)

Federal Ministries
(BMBF, BMWBV, BMWA, BMU)

Ministries of the German Federal States

Policy Dissemination

Scientific Council
(Wissenschaftsrat)

Policy Learning
Programme evaluation &
programme monitoring

Ministries of the German Federal States

Funding Bodies

Public Authorities

Public funded
(Research) Agencies

Research institutions and private research centers and institutes

Nonpublic authorities (federations, NGOs, etc.)

Private Consultants

Ministry for Economy and Labour
(BMWA)
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
Ministries of the German Federal States

Federal Office for Building and Spatial Planning (BMUB)
German Weather Service (DWD)
Federal Highway Research Institute (BASt)

Projektträger TÜV Rheinland Group
Projektträger Jülich

Wissenschaftler
Beratung
(consulting members and
in different Universities)

German Aerospace Centre (DLR)
Fraunhofer Gesellschaft

Universities

Experts from Universities and Industry

Deutscher Solarbetrieb
Deutscher Industrieverband

Experts from Universities and Industry

Deutscher Industrieverband
Unions

Private Consultants and Experts

Projektträger Jülich (PTJ) Umwelt-
Forschung, Geowissenschaften,
Schiffahrts- und Meeresforschung (PT -
IMM)
Projektträger Jülich (PTJ) Material-
Forschung, Geowissenschaften,
Schiffahrts- und Meeresforschung (PT -
IMM)
Projektträger Jülich (PTJ) Umwelt-
Forschung, Geowissenschaften,
Schiffahrts- und Meeresforschung (PT -
IMM)

Projektträger Jülich (PTJ) Umwelt-
Forschung, Geowissenschaften,
Schiffahrts- und Meeresforschung (PT -
IMM)
Projektträger Jülich (PTJ) Umwelt-
Forschung, Geowissenschaften,
Schiffahrts- und Meeresforschung (PT -
IMM)
Projektträger Jülich (PTJ) Umwelt-
Forschung, Geowissenschaften,
Schiffahrts- und Meeresforschung (PT -
IMM)

Transport Research Programme Policy - SWEDEN

Key Institutions and key players

**Policy Formulation**
- Policy description (e.g., agenda setting) & policy determination (e.g., research programme design)
- Ministry of Industry, Transport and Employment
- Ministry of Education

**Policy Implementation**
- Swedish Agency for Innovation and Systems (VINNOVA)
- Swedish National Research Council

**Dissemination**
- Swedish Agency for Innovation and Systems (VINNOVA)
- Swedish National Rail Administration

**Policy Learning**
- Programme evaluation & programme monitoring
- Swedish Energy Agency
- Swedish Institute for Transport and Communication (SIKA)
- Universities (e.g., Chalmers University of Technology and Royal Institute of Technology)
- The University of Stockholm (KTH)
- The University of Gothenburg
- Business School of Örebro
- Konstfack, Vasa
- Non-profit organizations (e.g., researchers, etc.)
- Swedish Transport Research Institute (TPR)

External experts (VINNOVA) and internationally renowned research institutions carry out research on behalf of the state agency.

Both programmes and projects are evaluated (often after 3 years).
ANNEX

Sources

- Centre for Science and Technology Studies (CWTS) and Maastricht Economic Research Institute on Innovation and Technology (MERIT), Science and Technology Indicators 2003 – Netherlands Observatory of Science and Technology, 2003.
- Department for Transport, National railways, 2002.
- ERA-NET TRANSPORT, Questionnaire of Austria, 2004.
- ERA-NET TRANSPORT, Questionnaire of Belgium, 2004.
- ERA-NET TRANSPORT, Questionnaire of Denmark, 2004.
- ERA-NET TRANSPORT, Questionnaire of Finland, 2004.
- ERA-NET TRANSPORT, Questionnaire of Norway, 2004.
- ERA-NET TRANSPORT, Questionnaire of Poland, 2004.
- ERA-NET TRANSPORT, Questionnaire of the United Kingdom, 2004.
- Information Service on Finnish Science, Technology and Innovation, 2004
- Ministry for infrastructure, transport, housing, tourism and the sea; European and international initiatives, 2004.
- Ministry of Housing, Spatial Planning and the Environment, Fourth National Environmental Policy Plan.
- Nordic Transport Forum, “Roundtable discussions of national transport research in Denmark, Norway, Finland and Sweden”, yet unpublished.
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