Chapter 12

PATCHWORK POLICY MAKING: LINKING INNOVATION AND TRANSPORT POLICY IN AUSTRIA

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This chapter examines the links between transport and innovation policy in Austria. It is based on key documents in the two areas and a series of interviews with policy makers and experts. It looks at the way in which the two policy areas interact in Austria and the kinds of mechanisms that exist to facilitate communication between them.

Following an overview of the main documents in the field of transport policy and an assessment of their approach to innovation, two case studies are described in detail. They help to understand how innovation policy and transport policy interact. The first case study concentrates on RTD programmes on transport technologies and the second on the transport telematics framework programme. Although the two case studies are very different, it is possible to gain a good overview of the barriers and problems that exist at the interface of the two policy areas.

Introduction

Over the last decade policy makers in many European countries have reached the conclusion that the current segregated approach to policy making is no longer adequate to address the complexity of the issues they face. The segregation of policy areas causes a number of problems for policy making. It not only leads to overlapping policies, it may even lead to policies that pursue contradictory aims. In addition, cross-cutting areas, which do not traditionally belong to a defined policy area, may not be adequately addressed by any ministry so that no responsibility is taken for the issues.

The trend towards greater coherence and co-ordination in the policy making process has been most pronounced in areas that are inherently cross-cutting. In areas such as sustainable development and science and technology the pressure to develop more appropriate co-ordination measures has been greater. A number of recent studies and workshops have supported the search for better coherence in the area of innovation policy (Edler *et al*., 2003, Boekholt *et al*., 2002, Arnold and Boekholt, 2003, Smits and Kuhlmann, 2002). Although there is no such thing as a model of optimal policy coherence, it is possible to conceptualise policy making for innovation policy so as to increase the overall functioning of the system.

The problems inherent in politico-administrative systems in general and innovation in particular in most OECD countries are characterised by Edler *et al.* (2003) as:

- A high degree of departmentalisation, sectoralisation of the political administration, and little interdepartmental exchange and co-operation.
- Heterogeneous, un-linked arenas, often with corporatist negotiation deadlocks.
- Failure to restructure responsibilities in government because of institutional inertia.
- Dominance of the "linear model" of innovation policy (and use of economists as consultants).
- An "innovation policy" focus on the introduction of new technologies in small and medium-sized enterprises (SMEs), intellectual property rights (IPR) or venture capital issues, etc.
- Emerging multi-level governance in the context of the European integration makes the launching of "bridging/systemic" policy approaches more difficult.

The high degree of segregation leads not only to closed policy arenas in ministries and departments but also in universities and among consultants. There is little opportunity for input from other sources and integration is made more difficult by the narrowness of the policy areas. This phenomenon is observed in innovation policy, especially when designed and implemented by different ministries and/or agencies. Innovation policies should be more focused around knowledge and less around the narrowly focused priorities of individual ministries.

Coherence and co-ordination are not goals in themselves but tools. Depending on the policy field and the actors involved, various mechanisms can be used to increase the ability of the system to think in terms of the whole. They are based on the increased need to manage interfaces, to embed innovation policies in the broader socio-economic context and to increase learning and experimentation. The state becomes a moderator and enabler that helps different parts of the system to communicate more effectively. This in turn supports collective decision making and implementation of policies and encourages learning within the system (Smits and Kuhlmann, 2002).

To alleviate overlaps and gaps between policy areas, an increasing number of governance mechanisms have emerged (Glynn *et al.*, 2002). Many of these take the form of councils, commissions or platforms which bring together individual policy makers from various ministries and non-policy specialists to discuss issues and formulate common policies and procedures. These bodies provide a useful basis for discussion and also improve the chances that initiatives in one policy area do not conflict with those in another and that policies are co-ordinated. They do not, however, replace the policy process. Policy decisions still remain within the ministries. The extent to which decisions taken in such forums have to be implemented or taken into account by ministries differs from country to country and according to the subject matter. Although these bodies are increasingly seen as one of the best mechanisms for integrating policy fields, this greatly depends on how they are set up and the powers they are given. Not all such councils support policy integration and some contribute to the further fragmentation of policy-making structures (Edler *et al.*, 2003).

Mechanisms specifically designed for horizontal areas of policy making are only one small aspect of the complex bilateral interactions that exist between individual policy areas. Recently, attention has turned to the way individual policy areas interact. Special focus has been given to innovation policy, not just as a horizontal policy area, but as a policy area with specific relationships with other policy areas. There is no single best-practice model for defining what co-ordination and coherence between policy areas should look like. Countries and policy areas differ and require co-ordination mechanisms tailored to suit their specific needs.

Policy coherence between transport and innovation

Transport is by its nature a policy area that requires a high level of interaction with other policy areas. A wide range of issues influence the direction and implementation of transport policy, including infrastructure, spatial planning and environmental policy. In transport policy, many different logics and policy levels converge. Although incremental change is the rule in this policy area, it is often confronted with very different logics in other policy areas. This is increasingly the case as transport moves centre stage in the transition towards sustainable development. Many countries have started to implement strategies for sustainable mobility and to create initiatives to link transport policy to other policy goals such as regional development and environmental policy. The benefits of "joined-up government" are perceived to outweigh the barriers.

In the joined-up approach, there are high hopes that new technologies can solve transport problems. As one high level policy maker interviewed remarked, there is no such thing as transport policy that does not take the development of new technologies into account and the more involvement between innovation and transport policy there is, the easier it is to benefit from development in the other policy area. However, technology should not be seen as the sole solution. Politicians should not be able to hide behind technological fixes to avoid tackling larger behavioural problems in transport policy. The development of technologies in transport should be linked to pursuing overall societal goals.

This report looks at the interaction of innovation and transport policy. This focus artificially narrows some extent the scope of policy aims addressed by transport policy, which normally include areas such as industrial policy and environmental policy. However, the two policy areas can shed light on the way interaction takes place in general and can also touch on the direction of policy making and on which other policy areas play a role.

Austrian transport policy

Strategic planning documents are an important starting point for assessing any policy area. Although they should not be taken as sole evidence of the existence of strategic policy making, the existence, or the lack, of policy documents gives an indication of how policy is made. In Austria, two important documents provide the framework for transport policy: the General Transport Plan (1991) and the Austrian Federal Transport Infrastructure Plan (2002). Neither defines an integrated transport policy. The General Transport Plan was written long before Austria joined the European Union. The Federal Transport Infrastructure Plan focuses on a single area of transport policy.

Austrian Federal Transport Infrastructure Plan

The Austrian Federal Transport Infrastructure Plan (BMVIT, 2002)[1] aims to develop a strategy for how the road and railway network should evolve by 2015. Its main focus is on the structure of the network. In addition to the road infrastructure, it also includes a strategy for developing other modes of transport, including rail and waterway transport on the Danube. It is the first successful attempt to create an Austrian federal transport infrastructure plan. The design process began in March 2002 and lasted nine months. It was based on a new approach to decision making and consensus building. It concentrated on building a consensus on the infrastructure projects to be financed among the main actors involved in planning and providing transport infrastructure. Non-infrastructure aspects of transport planning were not addressed. Safety, soft policies, legal aspects and financial support are mentioned, but not detailed as they are dealt with through other activities. The process involved the BMVIT, the Austrian federal states, representatives of the main transport carriers and other individual stakeholders. The academic community, the media and other stakeholders were informed about the process through a "general transport plan platform".

According to Rosinak and Snizek (2003) the key strategic aims of the plan are:

- To strengthen Austria as a business location: transport networks make or break the quality of a location.
- To ensure efficient and appropriate extension of the existing network. step-by-step modernisation.
- To increase safety (in the light of several tunnel accidents)
- To ensure the financing of projects, that is to co-ordinate short-term investments with long-term financial planning.
- To simplify implementation. to create dynamic project management between the conceptual and the project level.

The process was organised in a series of stages. All of the stakeholders (see above) defined their individual priorities. The BMVIT then organised the suggestions according to federal priorities and the states replied with comments. In parallel, the financial requirements were calculated according to the time horizon.

The federal priorities are based on infrastructure networks of national and international importance. They aim to link important Austrian nodes with each other and with other European nodes of importance for Austria. The Austrian nodes and the corridors were ranked according to their importance on a number of criteria. These included criteria for nodes: relevance for freight, for passenger transport and evidence of bottlenecks; and criteria for corridors: spatial integration of nodes, capacity, potential contribution to network, and efficiency (investment compared to use). The process consolidated 270 projects costing EUR 45 000 million into a series of infrastructure investment packages to be implemented in the near future worth EUR 17 100 million.

1. For more information, see *www.bmvit.gv.at/sixcms_upload/media/131/gvk.pdf*.

General Transport Plan

The General Transport Plan was finalised in 1991 and sets out the basic features of transport policy in Austria. It aimed to meet the country's transport needs and make it possible to switch to more environmentally friendly modes of transport. It drew up the following guidelines for Austrian transport policy:

- **Reduce transport:** this should take place through balanced spatial development and increasing the quality of life in cities to reduce urban sprawl, through more efficient use of transport and reduction of empty journeys by employing new technologies and through use of producer pays principle in pricing.
- **Support for environmentally friendly modes of transport:** establishing fair competition between transport modes, support for rail projects and other public transport initiatives including local accessibility, integrating pedestrian and cycle networks with rail networks, integration of public transport accessibility in planning regulations. In addition, increasing waterway transport on the Danube.
- **Earliest possible implementation of new technologies:** introduction of legislation to support innovation in areas such as noise and pollution prevention, support for the introduction of electric vehicles, implementation of technologies to increase road safety and traffic monitoring.
- **Involvement of stakeholders in transport policy:** inclusion of a wide range of stakeholders in the formulation and implementation of transport initiatives to give the authorities access to different opinions and evaluate the pros and cons of proposed initiatives; including a wide range of views can increase transparency and the acceptance of such processes.
- **True costs in transport:** the internalisation of external costs and the introduction of the producer pays principle. True costs in transport include: measuring the external costs of accidents, environmental degradation, etc., taking external costs into account in taxes, charging and pricing and employing the polluter pays principle, whereby regional and social differences should be taken into account.
- **Increased co-operation between modes of transport:** Increasing co-operation between modes of transport concerns both freight and passenger transport. In freight it means improving the logistics of freight transport and intensifying the use of information and communication systems for optimisation. It also entails creating freight centres for transferring from one mode to another and further developing technical systems for combined freight transport. In passenger transport it means connecting different modes of transport to build an integrated network including cycle networks, park and ride systems and taxi-buses.
- **Development of new transport legislation:** This entails including the latest developments in road safety and monitoring road safety, better protection for non-motorised road users and putting public transport first. It also includes introducing new technological standards to reduce the negative effects of transport.
- **Reducing the impact of transit traffic:** This includes a review of the relevance of transport activity on the international level and the implementation of the polluter pays principle. More extensive international rail and waterway networks and a long-term transit agreement with the EU based on environmental protection and acceptance by the local population.

- **Environmentally and socially acceptable organisation of transport in conurbations:** Use of planning tools to decrease traffic in urban areas, create incentives to use public transport including traffic calming and restrictive parking initiatives, road pricing and prioritising trams and buses over private transport.
- **Opening up the borders to eastern neighbours:** Opening the borders increases traffic and requires a co-ordinated transport policy with eastern neighbours that includes extending the rail and waterway networks and decreasing the impact of transport on people and on the environment.

Although the ten guidelines outlined above are relatively broad and can be said to form the basis of an integrated transport policy, they were never translated into practice. The plan set out impressive aims and is often referred to, but it was not implemented in a clear and structured manner.

These two documents are the only official documents that outline transport policy in Austria. As one is entirely devoted to infrastructure planning and the other is quite old, it would appear that transport policy is not presented in documents in Austria. In fact, policy making takes place more informally in smaller policy arenas. Overall, this approach has worked very well, whence the lack of other attempts to define an integrated transport policy.

There are few explicit links to innovation policy in the two documents. The Austrian General Transport Plan mentions the need to develop and implement new technologies at several points (logistics, transfer of freight from road to rail, public transport, etc.), but goes into no detail. The Austrian Federal Transport Infrastructure Plan explicitly states that other documents deal with transport policy and that it only addresses infrastructure planning.

Institutional mapping of actors, institutions and flows

The interaction between innovation and transport policy in Austria is easier to understand when one looks at the institutional setting. As the barriers to coherent and co-ordinated policy making are often inherent in the structures rather than in individual policies, a mapping of the main actors and their interactions forms the basis for looking at individual policies. The Austrian institutional set-up in innovation and transport policy goes a long way towards explaining the problems.

Innovation policy

Innovation policy is comprised of a large number of actors on both the strategic and the implementation level whose responsibilities are not clearly defined and often overlapping. Evaluations have frequently referred to fragmentation as one of the barriers to the design and implementation of a coherent innovation policy in Austria. A recent evaluation (Arnold *et al*., 2004) of the two main research funds in Austria, the Austrian Industrial Research Fund (FFF) and the Austria Science Fund (FWF) concluded that fragmented policy delivery limits the opportunities for building scale and for learning both about policy delivery and about policies themselves. It makes the funding system hard to understand, and this is a problem both for those who have to live in it and for connecting it to developments in European R&D funding and performance. Moreover, as there are many small agencies, it is hard to build critical mass and especially hard to afford the needed investment in capabilities for analysis and strategy development (strategic intelligence). Finally, there is a wide diversity of governance practice and

therefore unclear interfaces between the ministries (as principals) and the agencies (as agents). In some cases, ministries maintain different governance styles for different activities in their relationship with a single agency. Furthermore, the responsibilities and the organisation of actors within the policy field also change frequently, often within a single legislative period. The current minister of the BMVIT, Hubert Gorbach, is the fifth to take office during the coalition between the Austrian Freedom Party and the Austrian People's Party which began early in 2000.

A mapping of actors and responsibilities directly involved in the design and implementation of innovation policy can be divided into ministries, research funds and programme management organisations. Four ministries are involved in innovation policy issues: the Ministry for Economic Affairs and Employment (BMWA), the Ministry for Transport Innovation and Technology (BMVIT), the Ministry for Education, Research and Culture (BMBWK) and the Ministry of Finance (BMF).

The main research funding agencies in Austria are the FFF which concentrates on the private sector and the FWF which concentrates on basic research. The funds support "bottom-up" or non-programmed research. Although funding through strategic thematic programmes has increased in recent years, there are few thematic programmes and the "bottom-up" approach is preferred. Other agencies include the Austrian Wirtschaft Service, the Technologie Impulse Gesellschaft (TIG), the Christian Doppler Gesellschaft, the Austrian Space Agency, the Ludwig Boltzmann Gesellschaft and the Anniversary Fund of the Austrian National Bank. In addition to the agencies' budgets, other organisations manage and administer the thematic programmes on behalf of the ministries. Some of these organisations specialise in programme management and have less competence on the content side while others have expertise in a particular field.

The most important new addition to the innovation policy scene has been the Council for Science and Technology Development. The Council was established in August 2000 to advise the government, ministries and federal states on all matters concerning Austrian technology policy. The Council consists of eight members, four chosen by the BMVIT and four by the BMBWK. Most recently the Council was responsible for reviewing the special funds worth a total of EUR 508 million. The special funds were not part of the normal science and technology funding and ministries applied for their own initiatives. The Council reviewed and ratified each application according to a set of criteria that focused mainly on the leverage effect for private sector involvement. In addition, the Council also tried to build up a picture of all initiatives and to look for overlaps and cases where clearer definition would be useful.

Transport policy

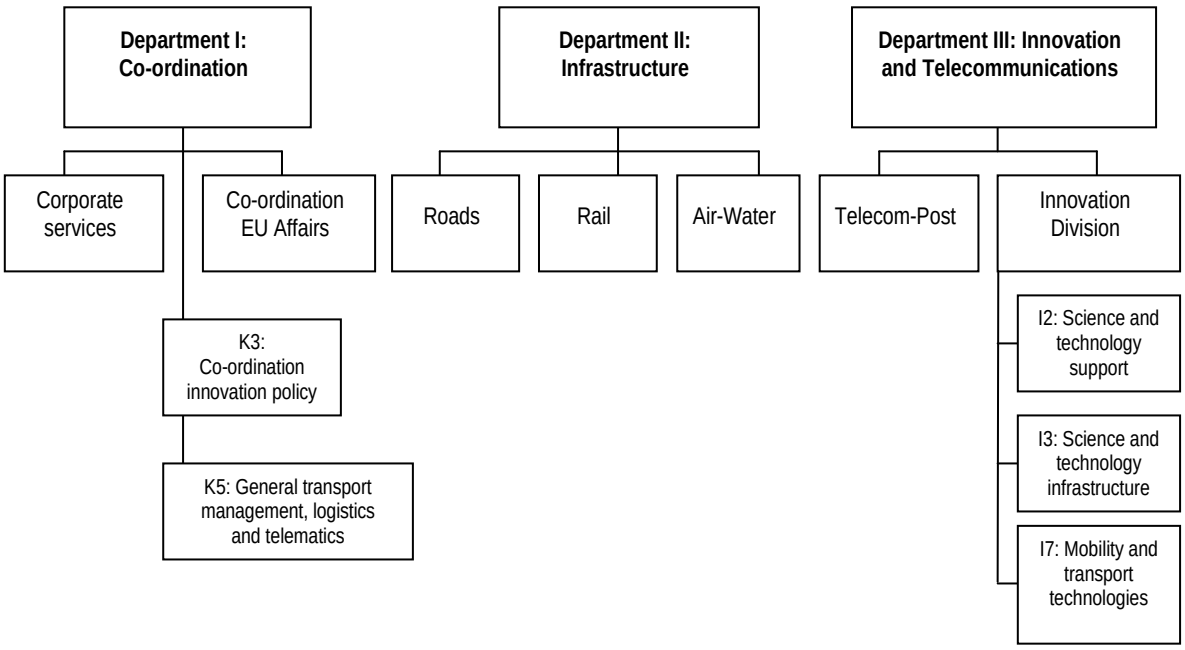
Austrian transport policy is the responsibility of the BMVIT. The ministry remit covers all modes of transport and the overall coherence of transport policy. Within the ministry two separate departments deal with the transport agenda, the department for infrastructure and the department for co-ordination. The department for infrastructure covers the individual transport modes and has groups for the individual modes: roads, railways, air and waterways, and the transport inspectorate. Each group is further divided into units that focus on legal, technical or sectoral issues. The co-ordination department is responsible for co-ordinating and integrating transport policy across the different modes and has three divisions: Co-ordination of Infrastructure Policy, International Networks and the General Transport Plan and Combined Transport. This is a relatively new

structure. Before a coalition was formed between the People's Party and the Freedom Party in 2000, transport policy was spread across different ministries.

Institutional linkages

On an institutional level there are potentially strong links between innovation and transport policy. Both policy areas are under the responsibility of the BMVIT. Figure 12.1 shows the relevant departments and units within the BMVIT.

Figure 12.1. Departments within the BMVIT with direct responsibility for innovation and transport policy



Source: Simplified version of the BMVIT's organisational structure.

However, according to most interviewees, the links stop here. Although both policy areas are covered by the same ministry, co-operation between the two has not increased very much and physical proximity has not significantly contributed to integrated policy making. A variety of reasons were given for the difficulties perceived in co-ordinating the two policy areas. They included:

- Confusion over which unit is responsible for which policies.
- Difficulty in understanding the division of labour between the transport divisions and the co-ordination division.
- Need to defend own area of responsibility in the light of changing organisational structures.
- Differences in thinking and in disciplinary backgrounds that influence the approach to change and to the concept of innovation within the departments.

- Misperceptions (which often have greater weight than the reality) about the way in which the other department approaches change and innovation.
- Lack of strategic guidelines.
- Lack of clear responsibilities as a basis for co-operation.
- Lack of trust and fear of responsibilities being taken away if co-operation takes place and other units build up competencies in the area.

It is well recognised that more co-ordination is needed but there is little knowledge about how this should take place. Sometimes the organisation's internal logic is not conducive to co-ordination. It is not known what co-ordination will imply and whether it will entail more in terms of loss of competence than gain in terms of co-operation. The current situation is a complex network of *ad hoc* and personal co-ordination and co-operation activities.

Co-ordination arrangements

Policy areas interact, whether as part of a co-ordinated process or on a more *ad hoc* basis depends on the structures and the need for interaction. The integration of transport policy and innovation policy in Austria provides an example of close physical proximity but little co-ordination on the formal level. Higher levels of interaction are found on the informal level where personal connections play an important role. There are few typical arrangements for interaction in the policy area; actors are rearranged for each new issue with a greater or lesser degree of integration.

This section looks at two activities that involve concrete interaction between transport policy and innovation policy. The activities were selected for two reasons. First, they represent arguably the most important interfaces between these two policy areas; second, both activities require interaction. RTD activities in the area of transport technologies have a long, but not entirely friction-free, tradition of interaction between the two policy areas. The Telematics Framework Programme is a more recent initiative to overcome some of the shortcomings in the interaction between different policy areas.

R&D activities in the area of transport

Research and development programmes that focus specifically on issues that are the responsibility of sectoral policy are an important interface between innovation and sectoral policies in any country. Although expertise on funding mechanisms and options is often located in the innovation and research ministry, contact with other forms of expertise is necessary to define the specific content of such programmes. Often the input comes from actors involved in research; however, during the design and development of programmes with a sectoral focus, ministries and agencies with responsibility for innovation and research often communicate with other sectoral ministries about their needs in terms of the focus and outcomes of RTD programmes.

Austrian transport-focused RTD activities are the responsibility of the BMVIT. Research activities are commissioned and designed by the Rail and Road Divisions under the Directorate for Infrastructure and the Innovation Division. The focus of the divisions differs. The Road and Rail Divisions commission research relevant to the development of their transport mode. The Rail Division has its own publications series and the road safety authority also commission research activities. The Innovation Division has a designated

unit that focuses on transport technologies and designs and develops transport technology programmes. The focus in this division is on innovative (both technological and organisational) solutions to transport problems.

It is more difficult to gain an overview of other transport-related RTD funding activities. Transport-focused research and development initiatives are also funded by other ministries and agencies, but on a smaller scale and often on an individual project level. In many cases, the focus on transport is often a consideration that is secondary either to the type of funding mechanism or the focal issue of the individual ministry. Other funding mechanisms that also encompass transport issues include the Austrian Science Fund (FWF) which funds basic research projects based on their academic merit. Such projects can cover transport issues as the FWF does not set funding targets. Another is the Ministry of Economic Affairs and Employment which supports networking activities between academia and business in competence centres. One centre concentrates on vehicle acoustics.

Transport technology programmes

Targeted funding of research and development activities in the transport area can be traced back to the early 1990s and the establishment of the Transport Technologies Programme (1992-97). There had been individual projects in the area of transport earlier, but there was no focused RTD programme. The subsequent development of the transport technology programmes can be divided into two periods: the Transport Technologies Programme MOVE: Mobility and Transport Technologies (1999-2003) and IV2S: Intelligent transport systems and services (2003-06).

Early transport technology programmes

The first transport technology programme was also one of Austria's first thematically oriented research programmes. It represented quite a new approach to R&D funding and a break with the previous response mode of project funding. The programme focused on the organisation of large-scale projects and umbrella projects. It therefore had to focus not only on developing thematic content but also on organising appropriate programme management structures.

The original idea and the motivation behind the development of the programme were to increase internal co-operation in R&D in Austrian Industries (AI) AG, a holding company. The first thematic focus of the programme, the Low Noise Rail Umbrella, was based on a theme common to a large number of firms within the AI company. Three other umbrella programmes or projects followed: Low Noise Road Project, Logistics Austria Umbrella (Logistics Control Systems and City Logistics) and LOFT (feasibility study for a logistics research terminal).

The overall goals of the programme were to raise the technological capabilities of the Austrian transport equipment industry, develop supplier consortia of integrated systems, create centres of competence on a national level and reduce the environmental impact of transport in accordance with the general transport policy. The programme was established and run by the Innovation and Technology Fund. However, as the ITF is a "virtual" organisation, day-to-day management took place through funding instruments of the operative funds that subsidise company R&D in Austria, the FFF and the ERP.

MOVE

The MOVE Programme: Impulse Programme for Mobility and Transport Technologies (1999-2003) *(www.movenet.at)* was established by the BMVIT (previously BMWV) to address "the strategic goals of Austrian transport policy on the one hand and the innovation potential of the Austrian economy on the other hand" (Grassegger, 1998). The programme intended to support innovation in the transport sector that would lead to a more efficient, environmentally friendly and intermodal transport system. Following an analysis of the challenges and barriers, it was decided to focus on increasing the attractiveness of public transport and optimising intermodal public and freight transport. The programme aimed to act as a moderator to stimulate interaction between different transport modes and to provide strategic impulses to decrease barriers to system innovations. The programme consisted of three programmes that addressed the individual thematic lines of the programme's aims: Take ÖV, Logistics Austria Plus and Innovative Mobility Services.

Thematic overview of current programmes

The Intelligent Transport Systems and Services Programme (IV2S)

This is a more recent programme that has been financed through the research special funds for research activities. It concentrates on three key areas: automotive suppliers, rail technologies and transport telematics.

Austrian Advanced Automotive Technology (A3)

The Austrian Advanced Automotive Technology A3 programme focuses on the automobile supply industry. Increasing pressure is being put on suppliers to change existing practices in light of new trends and challenges that can be described as "cleaner, lighter, quieter, more intelligent and more flexible". The programme covers six key areas: new propulsion systems, energy-efficient auxiliary vehicle systems, alternative lubricants and fuels, low-noise road vehicles, new vehicle concepts and intelligent vehicles.

Innovative Rail System (ISB)

The aim of the ISB programme is to support the realisation of the latest technologies in passenger and freight transport. It concentrates on long-term solutions in the area of interoperability of the European rail system, the relocation of freight transport to rail, increased customer acceptance in passenger transport and optimisation of the vehicle/ track. On the basis of other European initiatives (A Joint Strategy for European Rail Research 2020: Towards a Single European Railway System), the programme aims to develop long-term solutions to technological challenges

Intelligent Infrastructure (I2)

Intelligent Infrastructure is a research and development programme that supports integrated systems approaches to telematics applications and use in the transport sector. The programme was designed to increase innovative capacity in the transport telematics field, to support high levels of co-operation and co-ordination between suppliers, customers and different transport modes, and to increase the user transparency in telematics.

Programme actors and their responsibilities

Programme design and development

The BMVIT has overall responsibility for the development and implementation of the transport technology programmes. The Unit for Mobility and Transport Technologies, which is part of the Innovation Division in the Directorate for Innovation and Telecommunication, is directly responsible for the programmes and for the strategic development of transport technologies. The Innovation Division has responsibility for science and technology funding and science and technology infrastructure. It includes units that oversee research initiatives in the areas of air and space, information and communication technologies, nanotechnology, transport technologies, and energy and environmental technologies.

Programme management

The day-to-day management of the programmes is not performed by the ministry, but is carried out by an external programme management agency. In the case of the transport technology programmes, each programme line is managed by a different programme management organisation. These are selected through a competitive tendering process based on criteria such as previous programme management expertise and knowledge of RTD actors. In some cases, project management is chosen in part on the basis of its competence in the field of transport technologies; in others, programme management is carried out by an organisation specialised in programme management. Recent programmes have involved an additional actor, as administrative management has been separated from financial management. Financial control is carried out by the Austrian Industrial Research Promotion Fund (FFF).

The design process

The transport technology programmes provide an in-depth look at the way in which themes are determined and the content of programmes decided. This section focuses on interaction between transport and innovation policy. This narrows to some extent the focus of aims and objectives that are addressed in the programmes, as environmental and industrial development goals play an equally important role in their development. However, it would be extremely difficult to focus on the interaction of all policy areas.

Bottom-up programme development

Within the general framework in which the transport technology programmes are developed, two independent sets of actors influence design and composition. First, actors from industry and the research sector play an important part in the bottom-up definition of the content of specific programme lines. Second, actors in the research funding framework play an increasingly important role in influencing the direction of programmes. However, although the research policy framework has changed significantly over the course of the three programmes, the basic mechanisms for designing programmes have not changed. The design process for the programmes is characterised by policy-level definition of a need followed by translation into concrete programmes through a participatory process at the bottom level. It is sometimes unclear whether this process is underpinned by a strategic planning process.

The design model described above can be observed in the development of all three transport technology programmes. It was first used during the development of the Transport Technologies Programme which was initially conceived to develop the state-owned industrial sector. It aimed to enhance internal R&D co-operation in Austrian Industries AG (AI). Once this need had been defined on the policy level, the definition of individual programme lines and topics took place through a bottom-up process involving sector-relevant participants. This happened first within AI, then with AI and the ÖBB, and then with private sector companies, mostly in the construction sector. The outcome of the process was a focus on noise reduction as an area with a high degree of synergy among the partners (Ohler and Jörg, 1998). The 1998 evaluation of the ITF Transport Technologies Programme (1992-97) (Ohler *et al.,* 1998) further details the development of the individual umbrellas within the programme. These were also developed through a bottom-up process in which industrial companies proposed projects. The authors of the evaluation concluded that strategic priorities were not given first priority but that "Early involvement of potential participants in the envisaged programme worked to some extent as a substitute for a more systematic and broader analysis of problems and needs. Programme goals had not been defined beforehand in order to use them as a guideline for approaching the most appropriate stakeholders but evolved during the first brainstorming session." The evaluation further concluded, in its analysis of the low-noise rail programme, that "these considerations suggest that there was in fact a much larger problem of innovation deficit in the Austrian railways cluster than could be addressed by focusing on noise reduction. In the ideal case, this would have been revealed by analysis." (*Ohler et al.,* 1998)

The development of the two subsequent programmes, MOVE and IV2S, proceeded along similar lines. The policy need was defined at the top and individual programme lines were developed with the help of stakeholders from industry and the research field from the bottom up. These were then developed into strategy concepts that summarised the content of the programmes (Geyer, 2001).

IV2S: The Council's attempts at co-ordination

The IVS2 programme underwent a slightly different ratification process from the MOVE and ITF transport technologies programmes which was significant in terms of interaction. Since the earlier programmes, the research funding structure had changed and the Council for Research and Technology Development had been established to co-ordinate and develop research activities. In 2001 this meant that all research and technology development programmes submitted by ministries for funding under the special funds for research had to be submitted to the Council for approval. The Council assessed each submission and made a recommendation as to funding. The Finance Ministry released resources only on the Council's positive recommendation.

The Council took its role seriously and when it considered the transport programmes it initially refused to give a positive recommendation. The reasons were detailed in the Council's Recommendation of 27 June 2001 (Rat für Forschung und Technologie-entwicklung, 2001a):

> The Council initially postpones a recommendation on the programme Intelligent Transport Systems. Regarding the announced comprehensive transport plan in which this programme will be integrated, an alternative financing concept should be developed. This concept should be financed from sources other than the Research and Development Special Funds for the parts of the programme that are not directly

research-related or very applied (*e.g.* infrastructure installations, demonstration activities, etc.) owing to their high relevance for transport policy. Other sources could be resources from the transport divisions."

The Council was also unsure about the areas of competence for transport policy and innovation policy within the BMVIT and did not want to fund activities that were not research-related. In the Council's Recommendation of 20 November 2001 (Rat für Forschung und Technologieentwicklung, 2001b), however, the Council agreed to fund the proposed programme. It came to two conclusions: first, that the comprehensive transport plan would not be completed for some time and that the decision on the programmes could not wait; second, that the co-ordination of transport policy and transport technologies could not be achieved in such a short space of time and that the programme would be financed out of the special funds or would not be carried out.

Involvement of research, industrial and policy actors

The involvement of actors from research, industry and policy in the development of the programme can, if used appropriately, ensure the relevancy of the programme to policy needs, advanced research and industry. A wide range of stakeholders can also ensure that the goals of the programme are not tailored to a small group of players but include a variety of goals.

Actors from industry and the research sector were very involved in the development of all of the programmes and the individual programme lines were developed with the help of key stakeholders from relevant sectors. In addition, the programmes held brainstorming and ratifying workshops in order to gauge the reactions of the research and industrial sectors.

The involvement of policy makers from other policy areas has been more complicated. During the development of the recent IV2S programme attempts were made to include the transport divisions of the BMVIT in the design process. However, this was not entirely successful for reasons both of structural inconsistencies and of the divisions' perceptions of each other.

The transport divisions tend towards the view that the Innovation Division is responsible for innovation in the transport sector and that this does not concern broader transport policy issues. They see clearly demarcated boundaries between transport policy and transport technologies. The Innovation Division does not limit its remit to the development of transport technologies and interprets its agenda as also encompassing organisational aspects related to the implementation of new technologies. This causes two potential conflicts with the transport divisions.

One potential conflict between the innovation and transport policy areas is based on the fact that there are no clear areas of competence concerning responsibility for R&D in transport (as a whole). The more the Innovation Division concerns itself with issues of transport policy and not just transport technologies, the better they master transport policy issues and the greater the threat they present to transport policy. However, the Innovation Division is well aware that many interfaces between transport technologies and transport policy need to be addressed. This was one of the main reasons for including the transport divisions in the programme development process.

Another potential conflict is more subtle but no less important. It is the policy areas' perceptions of each other and how this affects their willingness to co-operate and learn from each other. The two policy areas have fundamentally different attitudes to innovation and its benefits. The transport divisions, such as rail, which deal with large and complex systems, are more sceptical of the benefits. They are suspicious of the Innovation Division's motives for pursuing new technologies and caricature it as jumping onto every new bandwagon with no thought for the impact on large systems. In the other direction, the transport divisions are depicted as being anti-innovation, traditional and set in their ways.

Addressing different policy goals

R&D programmes can address a variety of goals or focus on a single objective. In the transport area, many European programmes try to address more than one policy objective. An assessment of the three programmes reveals that the programme documents all state that, although their main focus is on innovation, they also aim to pursue transport and environmental policy goals. However, a closer look at the programmes reveals that their primary aim is to support Austrian industry through R&D collaboration. Following closely behind are other transport and environmental policy aims, such as increasing intermodal transport in order to reduce the environmental impact.

The programmes all refer to the transport policy documents. However, given that the General Transport Plan dates from 1991 and was never implemented and the Austrian Federal Transport Infrastructure Plan (2002) only concerns infrastructure, there is no transport policy document that defines the role transport technologies should play in an integrated transport strategy. It is up to the unit and the programmes to define their legitimacy and position and their links to transport policy.

Telematics Framework Programme

When looking at the interaction of innovation policy and transport policy, the issues quickly become complex, as the Austrian Telematics Framework Programme illustrates. Telematics is a horizontal policy issue that affects transport and innovation, among other policy areas. The development and testing of new technologies is the responsibility of innovation policy whereas their interaction with real situations and implementation is that of transport policy. This is not a linear process, however, and the costs and benefits of technological developments need to be communicated with the expectations from the transport side.

The Telematics Framework Plan provides a platform for a variety of actors to define jointly the future framework conditions for the development and implementation of telematics applications. It provides a common framework in which actors from specialised areas of policy making can express their requirements, interests and questions without having to understand the entire concept. The process is managed by an external organisation.

Table 13.4. Costs and benefits matrix for the advanced turbine system

Programme	Programme lines	Thematic focus	Timeframe	Strategic management	Administrative management	Content advice	Financial management
IVS2: Intelligent Transport Systems and Services (new programme lines)	A3	Automotive suppliers	2003-2006	BMVIT	Roland Gareis Consulting	Austrian suppliers forum (AOEM)	FFF
	ISB	Rail technologies	2003-2006	BMVIT Technologiepolitik and -programme, Abt. V/A/7	Herry/Rosinak		FFF
	I2	Transport telematics	2003-2006	BMVIT	Trust Consult		FFF
MOVE: current programmes	TAKE-ÖV	Telematics - public transport	1999-2003	BMVIT	Trust Consult	Energieverwertungs-agentur E.V.A.	ERP
	Logistik Austria Plus	Logistics	1999-2003	BMVIT	FAA Holding (from December 2002)		ERP
	Innovative mobility services	Urban passenger transport		BMVIT	EVA		ERP
	Pilotprogramm Donau		2001-2005	BMVIT	ERP funds	Via Donau	ERP
	Combined freight transport	Combined road, rail and ship freight transport	1999-2002	BMVIT	ERP funds		ERP
	ITF	Transport technology programme	1992-1997	BMVIT			

Structure of the Telematics Framework Programme

Transport problems have led to a need to find ways to optimise existing structures, link transport modes and use transport system more efficiently. Transport telematics have the potential to bring considerable benefits, but require a common approach. For this reason ITS Austria (Intelligent Transport Systems) was initiated to ensure that Austria's implementation of transport telematics is coherent and in line with European standards in terms of the definition of interfaces, user demands and the implementation of new technologies. A coherent strategy can provide stability for companies that want to invest in the area.

The basis of ITS Austria is the Telematics Framework Programme TTS-A (Transport Telematics Systems Austria). The framework programme's aim is to provide comprehensive guidelines for the implementation of telematics in transport. Four other elements (lead projects, technology programmes, investment programmes and further education and training programmes) contribute to the overall aims.

The five parts of the process

The highly structured Telematics Framework Programme aims to include many of the actors involved in the formulation and implementation of transport telematics. In order to structure their involvement, the process is divided into five clear stages: guiding framework, assessment and evaluation, functions and interfaces, technology portfolio and general telematics plan.

- **Guiding framework.** This part focuses on the definition of a guiding framework in which the development of the framework programme should take place. It is based on an assessment of user requirements. The guiding framework is based on four overarching themes: efficiency, safety, quality and usability.
- **Assessment and evaluation.** This part involves an assessment of the current and expected use of telematic applications in Austria. The data will be assessed according to the overarching themes and user requirements. Data collection includes analysing different systems and areas of application.
- **Functions and interfaces.** To develop an ITS system architecture for Austria. The aim is the interoperability and the inclusion of user requirements in existing and future telematics implementations. There are three parts: functional architecture, physical architecture and communication architecture.
- **Technology portfolio.** This part establishes recommendations for the implementation of telematics technologies in all areas of transport and traffic in Austria with a time frame to 2015. It develops a method for categorising existing technologies according to technical and economic factors and on the basis of the overarching themes. It aims to develop a priority list for the implementation of telematics technologies on the basis of the technology assessment.
- **Implementation plan.** This part aims to develop a unified country-wide basis for planning in the area of telematics implementation in order to ensure a common approach across all modes of transport and areas of implementation in Austria. It deals with broader organisational and legal framework conditions.

Design process

The transport telematics framework programme is an attempt to design a comprehensive strategy across all transport modes and areas of implementation. The process should not just produce a strategy on paper, but should include the commitment of all stakeholders from both the public and private sectors. They will then be responsible for implementing the strategy. For this reason the process involves a wide range of actors from senior policy makers through to field specialists.

Co-ordination through stakeholder involvement

The TTS-A Advisory Board, which has 16 members, including the heads of the transport and innovation divisions in the ministry and representatives from the transport operators (Asfinag, SCHIG, ÖBB), ensures high-level commitment for the work in defining the framework programme. Without this commitment the plan would remain a theoretical exercise.

Working groups include representatives from the departments involved and from the operators. They concentrate on different transport modes and the implementation of telematics in the various areas. The process also benefits from external expertise (European experts and civil servants from countries with expertise in designing and implementing telematics framework programmes).

Process management by agency

The responsibility of organising and co-ordinating the process of designing the framework programme lies with via donau, an agency belonging to the BMVIT which manages several RTD programmes.

Assessment

It should be stressed that the development of this plan is not a simple process and that it has required the commitment of a wide range of actors, including high-level policy makers, the heads of the transport operators and highly motivated individuals who have continued to contribute to the process. The results so far look positive and the process seems to be working. However, the plan can only be called successful if it is also implemented.

Assessment

This section looks at the extent to which horizontal policy integration of between innovation and transport policy in Austria exists. This assessment is based on an analysis of the two case studies based on the following stages in the policy cycle:

- Setting directions (agenda setting/prioritisation, stakeholder involvement, using strategic intelligence).
- Horizontal co-ordination in policy formulation (interdepartmental collaboration, policy co-ordination at strategic level).
- Horizontal co-ordination in policy implementation (multi-principle approach, cross-agency initiatives).
- Policy learning (accountability).

Setting directions

There are no strategic policy documents in the area of transport policy. The infrastructure plan cannot be considered an overall strategic policy document, as it only deals with one small, if albeit significant, area of transport policy. This is often considered due to strong localised policy areas with their own agendas. As a result, more top-down strategic planning documents are difficult to establish and even more difficult to implement. Co-ordination of the various areas of transport policy making is mainly informal and based on relationships between individual policy makers with a certain profile in the policy area. The lack of a strategic transport planning document means that each policy area in transport policy is free to pursue its own goals.

Direction setting at the highest level is not often done in collaboration with different policy areas. The initial impetus for a strategy or an instrument usually comes from one policy field. This was the case for both case studies in the transport field. This is also a result of the fact that the process through which initiatives evolve is *ad hoc* and not very structured. Initiatives often depend on an opening for a specific issue and not on strategic need for a certain policy instrument.

Horizontal co-ordination in policy formulation

The transport technology RTD programmes have had limited success in co-ordinating policy formulation. Co-operation between the transport and innovation divisions proves difficult owing to a number of factors, including differences in approaches and time scales, the potential threat of takeovers and the lack of clear process ownership.

The Telematics Framework Programme is a good example of co-ordination at the policy formulation stage. It involves a wide range of actors from the ministries and from the private sector. External management of complex political and technical processes is increasingly common.[2] This helps to move the process out of one policy area and also allows for a broader perspective. Individual policy areas often do not look beyond the next budget or the next large technology programme. External actors are not tied to such time horizons and are able to take a longer-term perspective.

Horizontal co-ordination in policy implementation

Implementation of the transport technology RTD programmes concerns the Innovation Division and the programme management. The transport division is not involved in this stage. Implementation of programmes is perhaps best left to the division with the most experience in programme management. For the Telematics Framework Programme it is probably too early to say how the implementation of the co-ordination mechanism will take place.

Policy learning

The establishment of the Telematics Framework Programme is a signal that learning is taking place in the policy system. This programme has addressed several of the main problems and barriers that exist between transport and innovation policy. First, it addressed the issue of process ownership and moved the process out of the ministry. By doing this, it decreased the threat of losing responsibility to another division, which is perceived as one of the main obstacles to policy co-ordination. Second, it has developed

2. The General Transport Infrastructure Plan was also developed with the help of an external moderator.

long-term strategic aims for a policy area that has the potential not to remain a theoretical exercise. However, it is still too early to assess the programme, as it is still in the conception phase. Its effectiveness will be tested when it can be seen whether individual actors use the programme as a basis for decision making.

On another level, the Council for Science and Technological Development is forcing parts of the innovation policy system to step back and consider gaps and overlaps within the system. It is able to take a wider perspective and to pinpoint weaknesses. It was able to do this when it examined all of the RTD programmes submitted for funding by the special funds. Many of the programmes were rejected at first because they were not co-ordinated with similar programmes in the same area. However, although the Council was able to pinpoint system failures, individual actors had little time to remedy the situation and it is not clear whether there is a long-term effect on the system.

Having looked at the level of coherence and co-ordination between the two policy areas in the different phases of the policy making process, the following section summarises the main barriers to policy integration. It shows that although the cases vary considerably depending on their success in attempting to co-ordinate policy areas, the barriers in both cases are remarkably similar.

Barriers to policy integration

There are many barriers to the co-ordination of policy areas. As mentioned above, there are structural, organisational and psychological barriers to co-operation between innovation and transport policy in the development of transport technology programmes. They include:

- The lack of clear structures and competencies increases mistrust and encourages each part of the system to try and strengthen its own area. There is too little openness and interest in what others are doing.
- Unstable structures, changing competencies and resources lead to an atmosphere of mistrust. Co-operation needs to be based on a degree of stability.
- A lack of strategic planning documents. The fact that there are no policy documents outlining the role of transport technologies in an integrated transport strategy inhibits the integration of policy areas.
- Transport goals are formulated implicitly and not explicitly.
- Lack of understanding of differences in thinking between the two policy areas. Policy areas do not make allowances for differences in thinking and believe the other should change.
- Lack of time to increase co-operation which is a time-consuming process.
- Lack of formal processes. Although informal processes function well then cannot always replace formal ones.

Success factors

- The external management of the Telematics Framework Programme by an organisation separate from the ministry that has a mediation function can be seen as learning within the system and therefore as a success factor.
- Policy niches are well informed about their specific area and connected to the actors in the area.
- There is a high level of informal networking and information flows that keep one part of the system informed about the other.
- Policy makers are in touch with what is going on in their area and able to make informed decisions.

Conclusions

This report has touched on a wide range of issues concerning overall policy making in Austria, on the organisation of transport and innovation policy and on interaction between the two policy areas. It has thrown up a number of questions that would warrant further investigation.

The pros and cons of long-term strategic policy documents that provide a framework in which individual policy areas and units can work are difficult to judge. It is not clear whether a strategic transport policy document which contains a clear link to innovation and the role innovation should play in supporting overall transport goals would help. First, it is not clear whether it would be possible to develop such a document in such a way that all actors are involved and feel that they own the process. Second, it is not at all clear that if such a document were produced it would be followed. Several attempts in ICT policy to create such documents have failed to have the intended impact.

In addition to a belief in strategic policy documents, there is a tendency to think that coherence in policy making means integration and that combining ministries or agencies is a way of ensuring they work more efficiently and effectively. The experience of the past four years in the BMVIT, where transport and innovation have been under the same roof, has shown that mere organisational proximity is not enough to overcome the barriers. There is no right amount of integration and coherence in a system. It is a case of finding out what does not work and where the system fails and finding appropriate mechanisms to fix it. Looking further into what policy coherence and co-ordination mean in the Austrian context would be an interesting study that would benefit both from a deeper understanding of the country's patchwork style of policy making and from looking at how other countries deal with the transport/innovation interface.

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