Governance of Innovation Systems

VOLUME 3: CASE STUDIES IN CROSS-SECTORAL POLICY

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Governance of Innovation Systems

Volume 3

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Foreword

This publication constitutes Volume 3 of *Governance of Innovation Policy*, a three-volume compilation of the proceedings of collaborative work in the MONIT project (Monitoring and Implementing National Innovation Policies). This volume, *Governance of Innovation Systems: Case Studies in Cross-sectoral Policy*, provides an overview of analytical work on policy governance in OECD member countries participating in the project. The policy areas under scrutiny are the information society, sustainable development and transport policy. The aim of these studies is to draw lessons for innovation governance from policy areas with characteristics similar to those of the broader area of emerging innovation policy. The chapters also serve as empirical support for Volume 1 in the series: *Governance of Innovation Systems: Synthesis Report*.

The publication was prepared under the aegis of OECD's Committee for Science and Technological Policy (CSTP) and its working party on Technology and Innovation Policy (TIP). The report was edited by Svend Otto Remøe who also co-ordinated the MONIT project together with Mari Hjelt, Pim den Hertog, Patries Boekholt and Wolfgang Polt.

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EXECUTIVE SUMMARY

Mari Hjelt, Wolfgang Polt and Svend Otto Remøe

Background: the MONIT project

The OECD's project on National Innovation Systems (NIS) was initiated in 1995. Under the Working Party on Technology and Innovation Policy (TIP) it set out to explore the requirements for redirecting innovation policy in OECD countries, taking into account new insights into the innovation process that arose from the research on innovation at that time. While many accepted that the linear model of innovation did not capture the realities of the innovation process, it was acknowledged that public policy still relied upon the linear model and its implications for policy. Hence, the OECD NIS project became an important collaborative mechanism for generating new data based on the interactive model of innovation and for developing a set of recommendations for public policy.

Formally, the OECD NIS project was concluded in 2001. It generated several publications on industrial clusters, networks, human mobility, synthesis reports on the renewal of innovation policy, and it also fed into other OECD work. However, the concluding work (OECD, 2002) raised a critical question that was the starting point for the current MONIT project. If the developed economies are becoming more innovation-oriented and dynamic, can national governments and their policy-making modes remain largely unaffected? More precisely, given the changes needed in policy, how can or should governments change their structures and processes to better accommodate the dynamism in their environments?

To explore these issues, the OECD and its Working Party on Technology and Innovation Policy (TIP) endorsed in 2002 a new collaborative study called MONIT (monitoring and implementing national innovation policies). The project was organised in two work packages: one studied the main innovation governance issues in each country and the other studied selected policy areas with characteristics relevant to innovation policy. Volume 2 contains the results of the first of these packages and this volume contains the results of the second.

MONIT's basic assumption was that innovation policy and its governance require significant changes. While the linear and systemic models of innovation can be seen as the first and second generations of innovation, MONIT set out to explore the foundations of the third generation which views policy making as a process, along with its institutional, structural and political characteristics. Seen from the point of view of a firm, this model represents a nexus in which policies interact and produce innovation outcomes. Achieving coherence of innovation policy across ministerial boundaries is therefore seen as key to successful governance.

Learning from horizontal policy areas

Innovation policy has typically been seen as an extension of R&D policy involving a number of instruments and policies that stimulate the innovation process, such as science-industry relationships, intellectual property rights, and industrial networks and clusters. However, as economic development has become more dependent on innovation and as growth patterns worldwide become more volatile and dynamic, innovation and growth may need broader stimulus from governments than has generally been the case. Hence, innovation policy may increasingly need to be redefined and expanded to encompass a wider set of policy domains.

This raises at least two key issues. First, governments will need to develop capabilities for broader or more horizontal governance spanning ministerial and other institutional boundaries. This requires learning from policy domains with such characteristics. The MONIT project therefore included the study of policies on the information society and sustainable development as well as transport and regional policy.

Second, it raises the issue of the relationship between innovation policy and other areas. These relationships may be supportive or unsupportive, creating challenges for balancing the links between them. Governments will also need to learn more about options and barriers to integrating diverse policy areas and thereby develop a policy environment that is coherent and conducive to innovation in the economy.

A guide to the volume

In the MONIT project, the study of policies for the information society was a core activity, as most countries have given priority to national initiatives to promote development with the support of information and communication technologies (ICT). Further, several countries studied linkages between innovation policy and policies for sustainable development, as the latter have been given importance as a principle under which to subsume other policy areas and priorities. These topics are therefore at the heart of this volume.

The chapters are typically shorter versions of the studies conducted. Lessons derived from the studies are treated in Volume 1, the synthesis report, which also contains summary analytical reports on the information society and sustainable development (OECD, 2005a).

Part 1: Governance and the information society

In Chapter 1, Wolfgang Polt and Julia Schindler describe how Austria has failed twice to produce an overall strategy for information society policy, but has nevertheless succeeded in promoting ICT diffusion and use in various fields, such as e-government. They also describe obstacles and failures in specific policy domains and provide examples of policy learning from successes and failures.

In Chapter 2, Juha Oksanen analyses Finnish policy for the information society and the vital links with innovation policy. He argues that a principal driving force for both the information society and innovation policy have been concerns about countries' international competitiveness and wealth creation in the global economy. Also, innovation policy and development of the information society have many features in common. Both policy domains are based on a strong commitment and protection of consensus among major stakeholders representing the public and private sector.

In Chapter 3 Trond Einar Pedersen studies the Norwegian national plan for the information society and argues that the current governance situation represents a delicate policy dilemma. While overall economic policy takes a hands-off approach, with a lesser role for state involvement, the current organisation of eNorway (the term for the national policy) open possibilities for more hands-on implementation and co-ordination.

Chapter 4 contains an analysis by Paulina Ramirez, Murray Scott and Willie Golden of Ireland's information society policy and the missing linkages with innovation policy. They argue that an important reason for the lack of coherence between the two policy areas is the "science-push" character of Ireland's present STI policy which makes co-ordination with other policy domains difficult.

In Chapter 5 Pim den Hertog and Hilde de Groot present the Dutch information society, arguing that ICT has become an enabler of broad transformation processes in both industry and the public domain. However, most actors see ICT simply as an enabler in their primary processes and do not see a clear link to innovation. Thus, they do not develop an information society/ICT policy with a view to increasing innovation or developing a knowledge economy, and this impedes horizontal co-ordination.

In Chapter 6, Lena Tsipouri and Mona Papadakou study recent developments in Greece against a backdrop of inflexible hierarchies, low competitiveness and incomplete infrastructure. Innovation policy and information society policy had little in common, but Greece's introduction of an information society initiative highlighted governance gaps, and new governance structures were implemented to overcome the inherent weaknesses in horizontal co-ordination. If successful, this initiative may help to modernise Greek governance.

Chapter 7 by Kristina Larsen, Patrick Sandgren and Jennie Granat-Thorslund is an analysis of the governance challenges in Sweden. It highlights the high degree of decentralisation in the Swedish model which results in a high level of efficiency but also illustrates a need to improve horizontal co-ordination in the context of handling more substantial changes in policy agendas.

Part 2: Governance in sustainable development

In Chapter 8 Mari Hjelt, Sanna Ahvenharju, Mikko Halonen and Mikko Syrjanen study the need for integration between science, technology and industry policies and policies for sustainable development, and conclude that despite the challenges related to expanding science and technology (S&T) policy to a broader innovation policy, there is both a need and an opportunity, from the point of view of sustainable development, to broaden the policy scope. However, there are also several challenges and barriers. This suggests that policy integration requires basic changes in policy formulation and implementation to generate effective interfaces.

The issue of policy integration is also at the heart of Chapter 9. William Lafferty, Audun Ruud and Olav Mosvold Larsen develop a benchmark for assessing the integration between innovation and sustainable development policy as "green innovation policy". The findings indicate that Norway actively promotes vertical environmental policy integration, but that specific and direct efforts towards green innovation are practically non-existent.

Chapter 10 is a study by Ilse Dries, Peter van Humbeek and Jan Larosse of the linkages between policies for innovation and sustainable development. The focus is on the policy response to the industrial lock-in of the Flemish innovation system in material- and energy-intensive production systems. The way out in "system innovation" demands a long-term transition to a new, less resource-intensive and more knowledge-intensive economy.

In Chapter 11, Brigitte Ömer-Rieder and Katy Whitelegg illustrate the barriers to integration of innovation and sustainable development policies in Austria, and show that this partly hinges on the fact that sustainability policy is not an established policy field and that innovation policy is not recognised as an effective key driver for sustainable development.

In Chapter 12 Katy Whitelegg shows that even in cases where two policy areas are located in a single ministry, there are wide gaps between them. She highlights the importance for policy integration of lack of understanding of neighbouring policies and shows that perceived "missions" help to keep separate policies that might otherwise be more integrated.

References

OECD (2002), *Dynamising National Innovation Systems*, OECD, Paris.

OECD (2005a), *Governance of Innovation Systems, Volume 1: Synthesis Report*, OECD, Paris.

OECD (2005b), *Governance of Innovation Systems, Volume 2: Case Studies in Innovation Policy*, OECD, Paris.

Part 1

GOVERNANCE AND THE INFORMATION SOCIETY

Chapter 1

GOVERNANCE IN AUSTRIAN INFORMATION SOCIETY POLICY: PROGRESS WITHOUT STRATEGY?

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Against the background of developments of the past decade, this chapter takes a skeptical view of the possibility of steering developments in sectors as divers as e-government, e-business, e-health, e-learning, etc., through a "grand design" and an overarching strategy. It describes how Austria has twice failed to produce a general information society strategy, but has nevertheless succeeded in promoting ICT diffusion and use in areas such as e-government. Obstacles and failures in specific policy domains are discussed and examples are provided for policy learning from both success and failures. Among various ways of achieving policy coherence, some have also been quite successful. The study suggests that with sufficiently strong communication channels, institutions and incentives for self-organised co-operation and mutual policy learning, effective Austrian information society policies can be achieved.

Introduction

Austrian information society policies in the past decade have been marked by a discrepancy between the size and structure of the ICT-producing sector and the diffusion and use of ICT in various sectors of economy and society (for an overview of recent Austrian performance, see Schneider *et al.*, 2004). The former has been – according to most indicators – close to or even below the EU15 average. Investment in ICT is not very high and the Austrian pattern of industrial specialisation is not very geared towards ICT, although successful niche players in some fields have established themselves as highly competitive in their respective markets. As a result, unlike other small open economies such as Ireland or Finland, Austria did not profit from the new economy boom of the 1990s.

However, while Austria lagged in ICT diffusion in most fields in the 1980s, it later caught up rapidly and even approached top rankings in some fields, *e.g.* early up-take and high penetration rates of mobile telephony, broadband and wireless broadband access to the Internet, and e-government. Even taking these positive developments into account, however, the general perception is that there is still much room for better ICT use throughout the economy and society.

In Austrian information society policy, there is at most a weak link between horizontal science, technology and innovation (STI) policy and the relevant sectoral policy (*e.g.* health, business, transport). Thus, the current policy challenge for information

society policies in Austria is to further enhance ICT up-take by demand- and mission-oriented policies (especially in fields like e-government, e-education, e-health and transport) and to combine this with policies fostering R&D and innovation in the ICT-producing sector (Schneider *et al.*, 2004).

Against this background, in 2001 the Austrian Council for Science and Technology Development asked the three ministries with the main responsibilities for science, technology and innovation policy (*i.e.* the Ministry of Transport, Innovation and Technology, the Ministry of Economic Affairs and Labour, and the Ministry of Education, Science and Culture) to co-ordinate their information society/ICT programmes and to bring forth a common and coherent concept. For this purpose an inter-ministerial ICT working group was established, consisting of representatives from the three ministries and the Council. This inter-ministerial working group subsequently commissioned a study on the "Governance of Austrian Information Society Policy" in order to gain insight into the roles of the players, their interaction and co-ordination mechanisms. The study was produced in the context of the NIS MONIT project (Ohler *et al.*, 2004), and the main results are presented here.

The study started off from the observation that past attempts to formulate a coherent strategy for information society policy were not successful. It was therefore necessary to analyse not only the current institutional setting and its policy co-ordination mechanisms, but also the reasons why previous attempts had not succeeded. A process-oriented historical approach was adopted.[1] This allowed for analysing the actors' incentives and motives, the barriers to communication and co-ordination, as well as path dependency and policy lock-in. As there is no, or very little, quantitative data available on information society policy processes, a qualitative approach was used, based on structured interviews with key players (a list of institutions covered can be found at the end of the chapter). Furthermore, important strategy documents and institutional mapping, *i.e.* a description of the formal relationships and distribution of competences, were examined.

The chapter briefly describes historical developments in the different sub-fields of information society policy, namely e-government, e-health, e-learning, e-business and science, technology and innovation policy for ICT along with the institutional settings and policy agendas specific to each field. Next, the different stages of the stylised policy process are addressed: agenda setting, policy formulation and co-ordination, implementation, and policy learning. These stages of the policy cycle are analysed by applying key concepts of systems theory to the policy process. These concepts, such as context specificity, path dependency, localised learning and accumulated knowledge, can help explain the main characteristics of these processes. The final section draws conclusions about how the policy process might be (re)shaped to allow for the formulation of coherent policies under the constraints of multiple actors, divided competences and asynchronous policy agendas.

Historical development and formal organisation of information society/ICT policy

Historical development of Austrian information society policies

While some countries launched broad information society policy initiatives in the late 1980s and early 1990s, political awareness of the topic in Austria came only in the aftermath of the publication of the "Bangemann Report" (European Commission, 1994) and the US "Information Highway" initiative. The Alpbach Technology Forum in August 1994 marked the establishment of information society policy as an important policy field

in Austria. On this occasion, the Chancellor stated the need for political action and the government declaration of November 1994 took up the topic of the information society. Information society technologies and applications were "just around the corner". Several technologies were mature enough to enter the market. The government initiative was declared to be of highest priority, and this created high expectations.

Subsequently, a first attempt was made to create a coherent strategic view on information society policy. A number of working groups were created, involving a large number of the most important stakeholders. These working groups produced recommendations for action and listed fields of potential policy challenges, which were made public in a final report (Federal Chancellery, 1996). In March 1997 the report was accepted. This was the first strategic document for information society policy in Austria, but it never had the status of a White Paper as similar documents did in other countries. No funding was specifically allocated for the strategy as a whole, and no central responsibility was defined to supervise and monitor the process. Mainly, it was left to the respective actors in the various policy fields to use the document as a (non-binding) guidepost. Ten years later, interviewees hardly remembered it as having led to increased policy co-ordination or coherence. As a point of comparison, the Bavarian initiative "Bavaria Online", which was started at the same time, was allocated substantial financial resources and was put into practice within a couple of months.

A main reason for the reluctance of government to actually use the document as a means to formulate and implement an overarching strategy might have been that interests of stakeholders were diverging: while some were asking for rapid liberalisation of the telecommunications sector, powerful actors (public-sector trade unions) resisted change. As a result, the telecommunications sector was liberalised at the last moment in Austria, after all other EU countries. Moreover, the government did not pay enough attention at the time to the challenges arising for governance when dealing with such cross-cutting policy matters as the information society (whereas other countries had already established special responsibilities and structures within government to deal with information society matters in the form of information society "envoys" or "secretaries").

On the other hand, while it failed to provide an umbrella for the coherent strategic orientation of actors, the information society initiative mobilised the most important players, some of which then started follow-up activities. A number of national and regional Internet initiatives were started in 1994-95 (*e.g.* the Austrian Platform for Telematics Applications – APTA), a specific programme, Technologies for the Information Society, was started by the Innovation and Technology Fund (ITF), and e-government initiatives were launched (*e.g.* the digitalisation of the public administration) or envisaged (*e.g.* the creation of an electronic social security "e-card").

It was only in 2000 that another initiative to formulate an overarching strategy for information society matters emerged. The main impulse came from the EU in the form of the European Commission's "e-Europe" initiative. The Austrian "e-Austria in e-Europe" initiative was started as a large-scale effort to formulate an information society strategy. Another important reason why the information society topic returned to the Austrian policy agenda was the change of government in 2000. The Ministry for Public Services and Sports – established in 2000 – led the e-Austria initiative and set up an information society task force, Taskforce e-Austria. Its purpose was to propose aims and action lines to strengthen Austria's position in the e-technology environment.

The taskforce developed a concept paper, which again did not become an official document of the federal government. The reasons were twofold: first, there was insufficient involvement of major stakeholders and second, political responsibilities for information society matters were not clearly assigned from the start. As a result, the other ministries responsible for information society matters did not accept the Ministry for Public Services and Sports' *de facto* responsibility for the information society. Some ministries also felt that their work was being held up because they had to wait for an overall information society strategy and were unable to implement already well-developed sectoral information society measures.

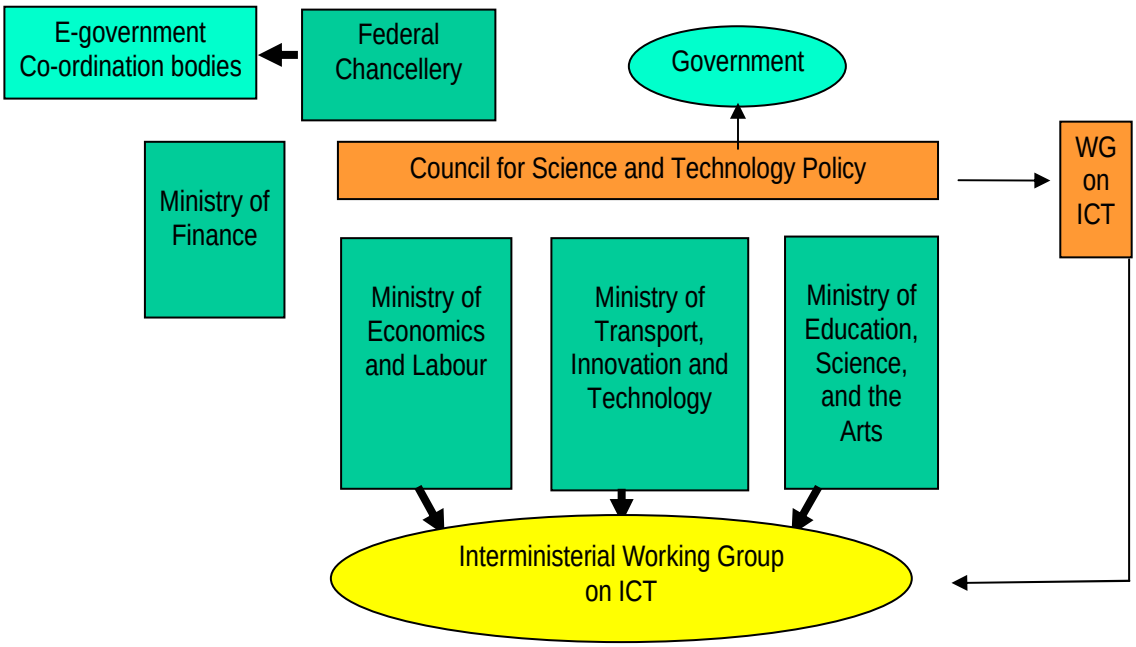
As was the case with its predecessor, although no overall, commonly accepted information society strategy was developed through the "e-Austria in e-Europe" initiative, it did motivate several information society activities in various sub-fields, giving rise to more coherent "sectoral" policy approaches, which are described below. For example, it led to the formulation of a strategy for the promotion of e-business activities by the Ministry for Economic Affairs and Labour and also paved the way for the creation of an e-government board and subsequently the creation of an e-government strategy.

In sum, two major attempts to formulate an overarching information society strategy failed. Some of the reasons can clearly be viewed as policy weaknesses (lack of allocation of funds, competences, process responsibility and process ownership, lack of awareness of the challenges for governing cross-cutting policy matters). Others are intrinsic to the complexity of the process (large number of actors, different incentives or disincentives to co-operate, time and effort needed for co-operation). If some of these barriers remain in place, there is little chance for future success. On the other hand, even in the absence of an overarching information society strategy, many policy initiatives in various information society sub-fields were successfully initiated. Institutional innovations were also triggered, as in the case of e-government. Where major projects failed, this was less because of a lack of co-ordination between the relevant information society policy sub-fields or with innovation policy, but because of reasons such as poor project management. Examples of successes and failures are given below.

Current setting: formal organisation of ICT policy at the central government level

To date, the main policy makers for information society policy are the Ministry of Economic Affairs and Labour (ICT innovations, e-business, e-content), the Ministry for Transport and Innovation (ICT innovations, R&D), the Ministry of Education, Science and Culture (e-learning, IT for schools, polytechnics and universities) (Figure 1.1). These ministries have formed an inter-ministerial working group on ICT, in which the Austrian Council for Research and Technology Development is also involved. Another important player is the Ministry of Finance (electronic documents and payments, *e.g.* of taxes). The Federal Chancellery is in charge of e-government. The dominant players are the Chief Information Office (co-ordination of horizontal e-government activities, development of strategies and solutions), the e-Government Platform (with political responsibility for e-government) and the e-Co-operation Board (with operational responsibility for e-government) (Figure 1.2).

Figure 1.1. Basic institutional setting of Austrian information society policies



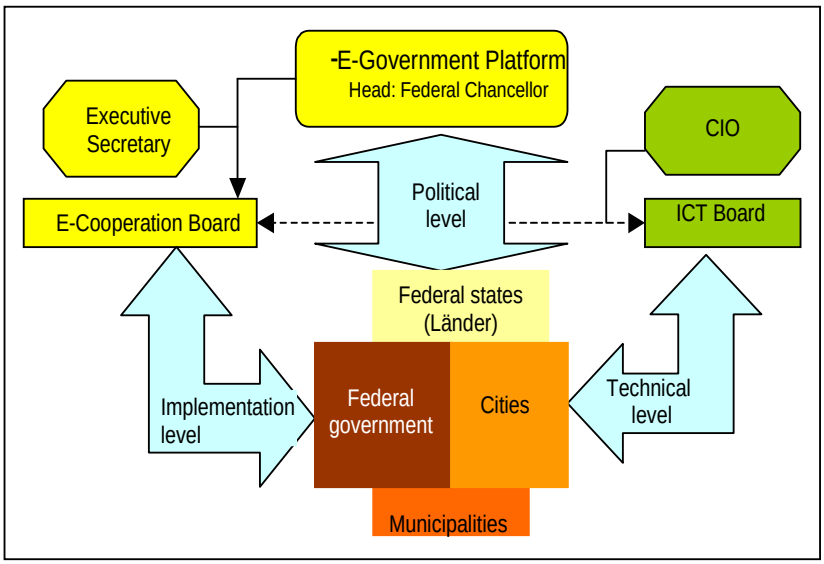
E-government

E-government initiatives have been a significant driver of Austrian information society policies, and, in the absence of a generally agreed overarching information society strategy, act as a major driver for other policy fields. In this area, major institutional changes have taken place in order to cope with information society matters.

The major institutional innovation in this realm was the creation, motivated by government and the Austrian Federal Economic Chamber, of the Chief Information Office and chief information officer in August 2001. This was done partly to overcome the shortcomings of the existing working groups for e-government issues, which worked somewhat at cross-purposes, partly as a reaction to a controversial e-government benchmarking study.[2] The expert group on benchmarking blamed the lack of an e-government strategy for Austria's low ranking, and an e-Government Platform was created, along with the chief information officer. Furthermore there has been institutionalised co-operation between the ministries, the federal government, the *Länder* (federal states) and the municipalities. Co-ordination between the federal government and the *Länder* takes place regularly through two working groups: one for technical and the other for legal issues (see Figure 1.2).

Figure 1.2 shows the dual structure of the technical and organisational strategic units, which helps overcome the problems associated with allocation of e-government responsibility to IT representatives who emphasised the technical dimension and neglected the organisational and political aspects.

Figure 1.2. E-government institutions in Austria



The ICT board is responsible for co-ordinating horizontal e-government activities on the federal level, seeking e-government solutions and planning relevant strategies. The position of chief information officer was entrusted to a professor of information technology, who had previously worked on the e-health card and the electronic signature.

The e-Government Initiative 2003 led to the establishment of the e-Government Platform at the political level, assisted by the e-Co-operation Board on the operational level. The e-Government-Platform led by the Federal Chancellor put forth a roadmap, including a master plan for joint projects, financing models, an implementation framework and general objectives. An e-government strategy consisting of several modules was established. Both the chief information officer and the executive secretary are assisted by the administrative officials of the Chief Information Office.

According to interviewees, the ICT board (headed by the chief information officer), the e-Co-operation Platform (headed by its executive secretary) and the e-Government Platform have been fairly successful. During interviews, policy representatives stated that e-government is well co-ordinated, that the mechanisms are suitable for achieving consensus and that e-government in Austria is very modern, advanced and highly competitive in international comparisons (especially for the back office and the electronic file). A key factor leading to the perceived success of the Chief Information Office was the fact that it was equipped with adequate resources, including about 20 employees. Also, the units are integrated. The Chief Information Office tries to build consistent and transparent e-government structures. The commitment of the Federal Chancellor was an important success factor.

As a result, Austria's performance in e-government has improved significantly over the past years, especially with respect to implementation and back-office applications. For example, Austria has a leading position in the category electronic file.

Among weaknesses can be noted the lack of integration of ministerial departments into e-government processes. Some interviewees stated that they did not know the Chief Information Office or the e-co-ordination representative of their own ministry. Likewise the Chief Information Office and e-co-ordination representatives of a ministry often did

not know who was working on information society innovation issues in their ministry. Clearly, there is a lack of transparency concerning responsibilities for information society issues within ministries. The breadth and cross-sectoral properties of information society matters make this difficult, but it is essential to improve transparency and awareness within ministries.

E-health: ICT in the health sector

ICT is used in the health sector for diagnosis, therapy methods and instruments. The main focus of the discussion of ICT use in the health sector, however, is on ICT use in administration and inter-organisational data transfer (*i.e.* health certificates, transmission of diagnostic findings and medical records). Health telematics has become an important topic in information society policy discussions.

In contrast to the homogeneous and hierarchical structure of e-government, the health sector consists of highly heterogeneous players: resident doctors, hospital doctors, hospitals, hospital operators, health insurance providers, health ministry, social ministry and interest groups. Hospitals are also heterogeneous owing to the diverse ownership structure (there are public, private and religious hospitals). ICT use is affected by these complex organisational-institutional constellations. Co-ordination, introduction of *de facto* standards and guidelines, compatible incentives and acceptance are essential but difficult to achieve owing to the heterogeneity.

Health policy, social security and retirement pension insurance policy are interlinked, but are divided among two ministries. The Ministry for Health and Women has to share some of its competence in health matters with the Ministry for Social Security, Generations and Consumer Protection. This divided responsibility has advantages and disadvantages. With respect to e-health the division is seen as a disadvantage.

The Ministry for Health and Women has authority for ICT applications in the health sector, but does not use it for various reasons, such as the low level of attention to ICT within the ministry, as well as the strength of institutions such as hospital associations and the social security carriers. Furthermore, some issues are dealt by the *Länder*. The ministry is not allowed to order a reduction in hospital beds or the shutdown of a hospital, although it can make suggestions. The ministry might intervene in other ways, *e.g.* cutting back government aid for certain hospitals, which might lead to a reduction in hospital beds or the closure of hospitals. However, it generally does not use this method, owing to local interests and the power of policy players. It also does not make use of its legislative and co-ordination powers for policy design and implementation.

The “e-card” offers an example of the difficulties of implementing an e-health strategy. The “e-card project” is the e-health project that has received the most policy attention in the past years. In 1999 the main association of social security carriers was given the assignment to introduce a wide-reaching electronic administration system, in particular to introduce a chip card to replace paper health certificates. A call for tender was held in 1999. In April 2001 the task was commissioned to a general contractor consortium EDS/Orga.

Conflicts about contract requirements and specifically the extent of services to be rendered led to the early termination of the contract on the part of the main association of social security carriers. In spring 2003 a new call for tender was issued. Instead of seeking a general contractor, the project was now split into several sub-projects. Currently, the main function of the e-card is to replace the paper health certificate, but it

should be designed to enable future extensions. For example, the storage of patient records on the e-card is being discussed. Widespread use of the e-card is expected for 2005. The e-card will not comply with the strict security requirements of the Austrian Signature Law, which would have enabled it to be used as a citizen card for other e-government services. Although the federal government had wanted the e-card to meet the high security requirements of the "citizen card", no one was willing to share with the social security carriers the high costs that would have been involved.

E-education and e-learning

The Ministry of Education, Science and Culture is responsible for the information society sub-fields of e-education and e-learning. As in other areas, impetus from the EU played an important role in policy formulation. The EU Council resolutions of Feira and Lisbon influenced the establishment of the "e-Fit Austria" programme, which promotes the broad and sustainable use of modern ICT in education, science and culture through numerous initiatives and projects.

The programme is an example of policy co-ordination by programme steering: e-Fit Austria integrates the activities of all units in a thematic programme. The decision to co-ordinate activities via a joint thematic programme was also used as a lever for internal institutional reforms. An IT steering committee was established to co-ordinate the programme. It co-ordinates the activities of ten ministry departments, related international activities, and strategic partnerships with industry and other national players. There are several working groups, ties with international co-ordination groups (the e-learning industry group) and strategic partnerships with industry. The concentration of activities helped overcome the diversity of activities, organisational barriers and the previously low degree of co-ordination.

The New Media in Teaching initiative is another successful sub-programme. It supports projects to develop software applications for teaching in universities and polytechnics. Its aims are quality improvements in teaching, easier access to education, interdisciplinary co-operation and networks, and systematic integration of the "funded innovations" into classes and teaching. Subsidies are an incentive for the continuous development of new media in teaching and the strengthening of the community. Detailed preparation involved stakeholders, and contacts were sought with polytechnics, universities, students and industry (federal economics chamber, multimedia firms). The involvement of stakeholders in the preparation process and communication and networking in the implementation process were important for enabling the very first example of co-operation between universities and polytechnics in development projects.

The programme builds on the "multimedia teaching material" programme of the 1990s. The early existence of ACOnet (the Austrian Academic Computer Network) is another important factor, as it made possible broadband data cable connection between universities as well as broadband Internet to European research and science networks. In the early 1990s, tertiary learning institutions were linked through medium-speed broadband. More recent programmes and initiatives were able to focus on content and pedagogy, because the infrastructure was already available.

The eFit programme and the New Media in Teaching programme serve as a basis for further programmes and reforms (within the ministry, schools and tertiary education). Awareness and acceptance will continue to be necessary, and diffusion is expected to become a more important topic. Among the important elements of a well-structured process are the following:

- Extensive research to define the target groups and the type of specific thematic priorities.
- Integration of existing institutions and initiatives.
- Selection of project carriers through a rigorous procedure involving a two-stage assessment.
- Existence of a person, generally with relevant know-how and competence, responsible for every thematic priority. Some priorities also received support from external project bureaus.
- High priority given to achieving sustainable results. Project participants are required to update their products.
- Feasibility and support studies to analyse and better co-ordinate demand, target groups and impact.

Within this policy field, as in e-government, an institutional setting seems to have been found that ensures a high degree of (internal and partly also external) policy coherence.

E-business

Explicit public measures to support ICT development and applications were taken as early as the late 1970s.[3] In the 1980s and early 1990s use of ICT for intra- and inter-firm processes received little attention, except for electronic data exchange (EDI) between organisations, which focused work on *i)* the development of standards, and *ii)* the spread of underlying technologies, standards and applications. Data exchange, between firms (the automobile industry was the pioneer user) and between banks and between firms and public institutions, especially tax and customs authorities, constituted the dominant field of application.

Until the mid-1990s the Ministry for Science and Research and the Ministry for Public Economy and Transport had the main responsibilities for this area of information society policy. The Ministry of Economic Affairs and Labour did not have an important role. The only information society activity for which the Ministry of Economic Affairs and Labour was exclusively responsible was representation of Austria in standardisation institutes concerning EDI. It also had joint responsibility with the Ministry for Science and Research for the IMPACT programme.

The beginning of information society discussions in 1994/95 and the establishment of the information society working group led to the Ministry of Economic Affairs and Labour's greater involvement in information society policy. The "Technologies for the Information Society" programme, carried out by the ITF, fell partly under the responsibility of the Ministry for Economic Affairs, which initiated two focus areas for the programme: EDI Business Austria and Multimedia Business Austria. The ministry decided to focus on areas in which it already had some expertise. This also ensured that the Ministry for Economic Affairs and Labour became a central player in information society matters.

In 2000 the Ministry for Economic Affairs and Labour widened its coverage of information society activities with the launching of the "E-business in a New Economy" initiative, also in the context of the EU's e-Europe initiative. This was a full-fledged strategy process involving a large number of stakeholders. A steering committee and