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Biegelbauer, Peter

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Learning from abroad: the Austrian competence centre programme Kplus

Peter Biegelbauer

In 1998 the first competence centre programme was introduced to Austria. The programme was a major policy innovation for the country, not only due to its novel instruments and goals, but also because it was created in a new way, breaking with the policy style dominant in the RTD policy field before. The paper looks into the question why this major policy innovation could take place. This analysis applies a policy learning approach, and considers the knowledge resources utilized for the programme creation, implementation and evaluation as well as the forms of learning which took place.

IN 1998 A NEW RESEARCH and technological development (RTD) policy programme was created in Austria, which was radically different from previous policy measures. This initiative, the competence centre programme K_{plus}, was not new by international standards — indeed it was strongly influenced by predecessors in other Organization for Economic Cooperation and Development (OECD) countries, such as Canada and Sweden. Yet for Austrian RTD policy-making it meant a radical innovation in the sense that the new policy instrument not only was large by national standards, but also that it was more complex than any RTD policy measure hitherto.[1] Moreover the process leading to the K_{plus} Programme was quite unusual for Austrian RTD politics, because it bore not much resemblance to the otherwise dominant style of policy-making. Previously in Austrian RTD politics all relevant ministries, various federal actors, external experts and social partners were included in intricate discussion processes. These resembled the policy style developed in other policy fields in the framework of neo-corporatist political arrangements — the Austrian social partnership of cooperation between employers' and employees' organizations (Karlhofer and Talos, 1999, 2005; Kittel and Talos, 2001; Pelinka, 1981).

The role of the K_{plus} Programme is all the more important as it was quickly perceived as a success story (OECD, 2004; Edler *et al*, 2004) and served as a model for other policy programmes on the national as well as the international level. Similarly the creation of an independent agency operating at arm's length from government, the Technology Impulse Agency (Technologie Impulse Gesellschaft, TIG), with the main task of managing the K_{plus} Programme, created a point of reference for Austrian RTD policy-making in the 2000s.

This paper tries to answer the question why a major policy innovation such as the K_{plus} Programme was possible in an RTD system, which before rejected changes for a prolonged period of time (Mayer, 2003). It is also interested in the question how the programme developed in the following years, marked by frequent and encompassing changes in the Austrian RTD system. In an attempt to answer these questions the paper analyses the policy process leading up to the K_{plus} Programme beginning from the mid 1990s, when the idea of having competence centres in which science and industry would work together in the form of public–

Dr Peter Biegelbauer is at the Institute for Advanced Studies, Stumpergasse 56, 1060 Vienna, Austria; Email: beagle@ihs.ac.at; Tel: 0043 1 59991 170; Fax: 0043 1 59991 555; Website: <http://www.ihs.ac.at>.

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Peter Biegelbauer is a senior researcher at the Department for Sociology of the Institute for Advanced Studies in Vienna.He holds academic degrees in political science from the University of Vienna and from MIT. His research work focuses on innovation policy, where he has coordinated several national and international research projects. He teaches at the Universities of Vienna and Innsbruck on social learning and public policy-making, political economy and economic, political and sociological theory. He has been engaged in the Austrian Political Science Association and has held various positions there, including Secretary General 2000 and 2001. In 2006 he was guest professor at the Charles University in Prague.

Research on policy learning has to resort to explaining political action by closely analysing actions, their justification and interpretations by the actors

private partnerships first came on the political agenda. Further analysis pertains to the creation of the K_{plus} Programme in 1998, its implementation in the following years and its assessment in 2003 as well as the following reformulation of the competence centre programmes (K_{plus} and others). Such an analysis then can chart the full policy cycle of a programme, thus attempting to tell the 'whole story' and circumvent a concentration on the first phases of the heuristic policy cycle, from agenda-setting to policy-making.

The analysis will be carried out from the perspective of policy-oriented learning, or 'policy learning' in short. Policy-learning approaches want to explain policy change by looking at the reflexive capabilities of political actors and their ability to adapt to changing environments, mostly by analysing longer periods of time. And indeed the case study at hand offers ample opportunities to look at policy changes over the time span of 10 years in Austrian RTD policy-making.

Several approaches have been developed utilizing the notion of policy learning, with different conceptualizations of actors, places and fora of learning, reflected in concepts such as policy diffusion (Bennett, 1991; Drori *et al*, 2003), transfer (Dolowitz and Marsh, 2000; Page, 2000; De Jong *et al*, 2002), learning (Hall, 1993; Sabatier, 1998; Griessler and Hadolt, 2006) and lesson-drawing (Rose, 1993, 2005).[2] The approaches utilizing the policy-learning notion proper share a conviction that the actions of policy-makers can be explained by understanding those actions in terms of feedback cycles used to assess previous actions. Policy-makers engage in learning in order to make sense of the world they live in, to gain a better understanding of the effects of their policies and to arrive at better decisions in the future.

Although there is a consensus on these basic ingredients of the notion of policy learning, no generally accepted standard definition of the term has been developed as of now. The definition utilized here is the following: 'policy learning' stands for the production of policy-relevant knowledge, skills or attitudes, which are the result of the assessment of past, present or possible future policies.

Furthermore, learning does not have to be based on some kind of strict evaluation that typically might be explicit, systematic and planned, although this may be the case. Learning, as understood here, may be a relatively unsystematic act, happen alongside other daily practices, as for example in the case of 'learning by doing'.

Actors follow a bounded rationality (Simon, 1957); they have limited resources and have to live with sub-optimal solutions due to their limited cognitive and material resources, this giving rise to satisficing behaviour in which they also may accept 'second-best' solutions in order to preserve scarce resources such as time. Moreover, they can draw the 'wrong' lessons, again because of limited resources, but also due to unclear information situations or inappropriate frameworks of interpretation.

This has several consequences for the observation and the ensuing analysis of learning. Most importantly, it is not possible to observe learning directly — a difficulty the concept shares with other social science notions and which has been discussed elsewhere (May, 1992; Maier, 2003). Moreover, participant observation most of the time cannot be employed in policy analysis. Research on policy learning therefore has to resort to explaining political action by closely analysing actions, their justification and interpretations by the actors as well as looking at the knowledge resources utilized in the policy process in order to draw inferences on the existence and nature of policy learning (Biegelbauer, 2007a).

With all the concentration upon learning, it is important not to forget about other categories of social science such as power, representation and interests. Without taking into account power relations between policy actors — visible and invisible (Bachrach and Baratz, 1962; Digeser, 1992) — it is not possible to arrive at a sensible interpretation of political actions. Policy learning takes place before and in the framework of power relations; sometimes it is even driven by these (Braun and Benninghoff, 2003).

The rest of the paper is structured as follows: First, a short overview of agenda-setting, policy-finding and -making, implementation and assessment of the K_{plus} Programme will be provided. Then an analysis of the specifics and origins of knowledge utilized in the policy process will be carried out, combined with an account of different elements of policy-learning found. As part of the last section the original research questions will be revisited.

The Austrian RTD system in the 1990s

A failed initiative

The decision of the Austrian Government to raise a milliard Schilling (approximately €70 million) for new RTD measures caused a small group of civil servants in the newly created Ministry for Science, Transport and the Arts (Österreichisches Bundesministerium für Wissenschaft, Verkehr und Kunst, BMWVK) to think about how the money was to be spent. In 1996 a paper was tabled, which featured the title 'Knowledge as a Factor of Production' (Stampfer, 1996). By this time both civil servants and researchers were disillusioned with the available RTD policy instruments in Austria, consisting mainly of institutional and project funding (interviews 3-5, 3-13; see Appendix). While the ministry officials wanted an instrument to structure the Austrian RTD system, the researchers wanted to have a longer planning horizon in order to engage in larger projects. For the first time in the Austrian discussion on RTD policy, the paper 'Knowledge as a Factor of Production' used the term competence centre for such a policy instrument combining treats of basic funding and project financing (Stampfer, 1996: 9). Although the instrument was largely under-defined, already by then it was clear that competence centres should be a cooperative RTD policy instrument in which different kinds of organizations, such as universities, extra-university research organizations, polytechnics and companies, should work together. There should be diverse funding sources, including the federal government, industry and the states (Länder).

In February 1997 the heads of the coalition government, Chancellor Klima and Vice-Chancellor Schüssel, declared Albert Hochleitner, the General Director of Siemens Austria, and Arno Schmidt, the Director of the Basic Science Research Fund (Fonds zur Förderung der Wissenschaftlichen Forschung, FWF), to be their technology advisors. They had the task of writing a concept for the RTD policy of the Austrian Government — something they fulfilled by presenting the paper 'Research and Competition: Technology Offensive for the 21st Century' four months later (Schmidt and Hochleitner *et al*, 1997).

As part of a planned reorganization of Austrian RTD policy, three funds were proposed: a new fund for competence centres, impulse programmes and governmental initiatives (KIR: Kompetenzzentren, Impulsprogramme, Regierungsinitiativen). The Industrial Research Promotion Fund (Fonds zur Förderung der gewerblichen Forschung, FFF) should stop financing RTD in all kinds of firms, but concentrate on small and medium enterprises (SMEs), whereas the FWF should keep its concentration on basic research. The Innovation and Technology Fund (Innovations- und Technologiefonds, ITF), until then the sole instrument of government to finance top-down RTD programmes, should be dissolved. One of the main funding sources for the new government initiatives should be the European Recovery Programme (ERP) Fund, which had been formed out of the remnants of the US Marshal Plan three decades earlier. The concept of competence centres had been concretized in the policy paper, 'Research and Competition'. It was now stipulated that the financing of such a centre should be secured for five years and that it should be evaluated frequently.

The months following the presentation of the paper were filled with lengthy discussions and lobbying by a number of actors. While the chancellor and vice-chancellor had given signals that they favoured the initiative, it faced resistance from several sides. First, the minister for science and transport and the minister for economic affairs had already been unhappy with the appointment of the two technology advisors to the government, as they had taken on tasks which under normal circumstances would have been theirs. In fact the ministers were confronted with a complete reorganization plan of the Austrian RTD system they had not agreed upon.

But not only the ministers were unhappy; a number of civil servants were, too. Especially the highest level of ministry officials would have lost influence to an outside agency in a way that was unprecedented in Austrian post-WWII administrative history. Another organization, which not only would have lost influence, but would also have been dissolved in the way it had existed before, was the ERP Fund. This organization, which had successfully financed infrastructure and RTD efforts of Austrian companies for more than three decades could raise concerns about a possible limitation of the usage of ERP funds because the money was a gift from the US Government, which however had limited the usage of these funds. In addition the ERP Fund also mobilized its clientele — Austrian firms — in order to defend its existence (interview 2-11).

In the face of the overwhelming resistance an inter-ministerial working group was established to further discuss these issues, a step described by an interview partner as a "funeral, first class" (interview 3-4). Indeed, for the time being, this was the end of the Schmidt–Hochleitner initiative. It was perhaps the most spectacular in a long row of failed attempts to reform the Austrian RTD system.

Radical innovation: the K_{plus} Programme

In September 1997 a mid-level civil servant from the Ministry for Science and Transport (BMWV) commissioned the preparatory work for a programme enhancing public–private partnerships. In a few months' time a group, which consisted of a few policy consultants involved in the Technology, Information and Policy Consulting Programme of the Austrian Government (Technologie, Information, Politikberatung, TIP) and the young official from the BMWV who already had taken an important role in the previous policy papers 'Knowledge as a Factor

of Production' and 'Research and Competition' came forward with a paper advancing a competence centre programme. An extended working group brought together by the BMWV consisted, besides the already mentioned ministry official and policy consultants, also of representatives of the social partners, that is the Chambers of Commerce and Labour, the head of the FWF and sometimes also included one personal assistant from the science and transport minister's cabinet. The policy paper was presented twice in front of a group of representatives of companies and the Austrian Chamber of Commerce as well as before a group of scientists and FWF representatives (interview 3-3).

By December 1997 the paper 'K_{plus} Research Competence plus Economic Competence' (BMWV, 1997) entailed most of the details of what later would be realized in the competence centre programme K_{plus}. The rationale of the programme was the reaction to three of the most hotly debated RTD policy problems in Austria during the 1990s: the weak links between universities and industry, the insufficient orientation of universities towards industrial research and the low level of our RTD expenditures of firms (BMWV, 1997: II).[3]

The K_{plus} Programme should promote the cooperation between academia and industry and "therefore foster the competitiveness of both, the Austrian economy and its science system" (BMWV, 1997: II). The paper proposed the establishment of 20 competence centres, which should be based on partnerships between universities, industry and the government. In these centres, researchers from universities and companies should work together, financed through federal and state sources up to 60%, with the private sector adding the rest of the budget.

One of the innovative assets of the proposed programme was that the selection procedures for the centres were to be strictly based on a set of criteria, which was to be published well before the calls for proposals and which would form the basis of a two-stage process. In the first stage only a small paper would have to be handed in, while in the second stage a fully fledged proposal would be evaluated. The selection would be based on international peer-review processes only. Furthermore foreign companies would be invited to take part in the centres so as to ensure that these were embedded in an international and competitive environment. The policy paper extensively elaborates the criteria after which the K_{plus} centres should be chosen and evaluated. Of foremost importance were the extent and the quality of the industrial participation, the research programme of the centres and the organizational and management plans. Several independent firms were to participate in one centre together with research organizations. This cooperation should not only entail common RTD work, but also include the training of young researchers and the exchange of personnel.

Of foremost importance were the extent and the quality of the industrial participation, the research programme of the centres and the organizational and management plans

The centres were to consist of 25 to 60 persons after an initial growth-phase of three years, which should end with an evaluation of the centre. In the case of positive evaluation, further funding should be granted for four more years. According to the paper after these seven years a second seven-year term could be applied for — a clause later dropped. The Minister for Science and Transport, Caspar Einem, was not involved in the processes which led to the K_{plus} Programme but was kept informed through his cabinet. When confronted with the plans for the RTD initiative, he quickly decided to use a part of the Technology Milliard, which had been realized through a law in July 1997, for a pilot phase of the K_{plus} Programme, which began in 1998 (interviews 3-3, 3-5).

Another problem waiting to be solved was where the new programme should be situated. Already during 1998 the decision had been taken that the programme should be not carried out inside the BMWV, but that the management of the initiative should be the task of an independent agency. The Technology Impulse Agency (TIG) was the first independent operative Austrian RTD agency that would initiate programmes and guidelines, engage in projects and feature a very specific mission, which was to manage cooperative research programmes. The organization was, similar to FFF and FWF, quite independent in its decisions, despite the fact that it managed programmes financed mainly by the BMWV, which two years later became the Ministry for Transport, Innovation and Technology (Österreichisches Bundesministerium für Verkehr, Innovation und Technologie, BMVIT). The TIG was founded in 1999, at a time when the pilot phase of the K_{plus} Programme was already well under way.

Another initiative: the K_{ind} and K_{net} Programmes

In 1998, some time after the efforts to create what later would become the K_{plus} Programme had started in the Ministry for Science and Transport (BMWV), the Ministry for Economic Affairs (Österreichisches Bundesministerium für wirtschaftliche Angelegenheiten, BMwA) engaged in a plan to construct its own competence centres programmes. These efforts were successful and led to the establishment of the K_{ind} industrial competence centres and K_{net}

competence networks. The K_{ind} and K_{net} Programmes also served the development of technology clusters and both were run by business enterprises and research organizations in the same time frames as the K_{plus} Programme.

Besides the general aim and the idea proposed in the cooperation between science and industry, many other similarities can be found between the competence centre programmes stemming from the two ministries. Examples are the goal to develop know-how to increase the chances of Austrian actors in international RTD programmes, the combination of resources to build critical masses for industrial RTD as well as the stimulation of private funding for RTD (Edler *et al*, 2004). Nevertheless there are differences between these programmes, too: K_{plus} was more formalized and structured than the K_{ind} and K_{net} Programmes; K_{plus} was stronger knowledge-driven and focused the promotion of excellence in research, whereas K_{ind} and K_{net} were stronger industry-driven and interested more in technology transfer; K_{plus} required the establishment of new structures, with the majority of researchers concentrated at one physical location, whereas K_{ind} and K_{net} could consist of virtual centres and networks.

In light of the strong similarities between the two programmes, the question arises why they coexisted in the comparatively small Austrian RTD system. And once again the main reason is the institutional set-up of the Austrian RTD system, one of which's characteristics is that several ministries compete for the competencies for RTD. Apparently there were efforts from the side of the BMwA to fuse the programme ideas of K_{plus} and K_{ind}, which had been blocked by the Minister for Economic Affairs, Hannes Farnleitner (interview 2-6). Two years later there was resistance from the highest management level of the BMWV against the inclusion of the administrative units of the BMwA into, in 2000, the newly established Ministry for Transport, Innovation and Technology (BMVIT), which would have brought a fusion of the two programmes (interview 2-6, 2-4).

Assessing the competence of the competence centre programmes

Since 2001 K_{ind} and K_{net} had been administered by the Research Promotion Fund (FFF), and were loosely coordinated with K_{plus} in project-clearing workshops in which TIG and FFF staff took part. By spring 2003 the BMVIT and the BMwA decided to start an inter-ministerial dialogue which included the other major federal RTD actors, the Ministry of Finance and the Ministry for Education, Research and the Arts (Österreichisches Bundesministerium für Bildung, Wissenschaft und Kunst, BMBWK). The goal was to decide whether the different competence centre programmes should be differentiated more or stay as they were. During the first meeting the representatives of the BMwA reportedly invited the BMVIT officials to join the evaluation of the K_{ind} and K_{net} Programmes — much to the latter's surprise — which the BMVIT after some discussions decided to do (interview 3-2, 3-4).

In the summer of 2001 a research consortium, consisting of the German Fraunhofer Institute for Systems Technology and Innovation Research (ISI) and the Austrian Institute for SME Research, started to evaluate the competence centre programmes. In a few months' time several dozen interviews, several workshops and an extensive data analysis led to the final report, 'Assessment of the Competence Centre Programmes' Future (K_{plus} and K_{ind}, K_{net}) and the Future of the Competence Centres', which was published in January 2004. The name of the whole exercise, "assessment", was carefully worded by the ministerial actors, who wanted to circumvent the necessity to stop or radically alter their programmes in the case of unwished and unforeseen evaluation results (interview 3-2, 3-4).

The report notes that the concepts and problem definitions of the programmes are adequate and, by and large, evaluates the programmes positively. All programmes are criticized on a number of accounts, with the K_{ind} and K_{net} Programmes drawing more criticism than the K_{plus} Programme. The researchers found that K_{ind} and K_{net} produced only limited effects for a number of reasons. One is that the programmes drew mainly large companies which led to windfall profits: the firms mainly used public money to carry out RTD exercises they would have engaged into otherwise, too. Further criticism addresses the lack of a separation between final decision-maker (BMwA) and the operational agency (FFF), hindering "greater independence, transparency and acceptance" (Edler *et al*, 2003: XIX).

Analysing the K_{plus} Programme, the evaluation team found that programme structure and organization of evaluation "serve[s] as role model" and can be "regarded as an example of 'best practice' worthy of imitation" (Edler *et al*, 2003: XIX). The K_{plus} Programme is criticized for the unclear future of the centres, which caused a lot of insecurity for the cooperation partners. All three programmes were criticized for not taking advantage of building synergies between different centres or even between the programmes.

The assessment ended with a number of suggestions for policy. K_{plus}, the researchers state, should remain being driven by science, whereas the K_{ind} and K_{net} Programmes should pursue the innovation targets even more clearly. It should be assessed for all programmes whether there is still sufficient need and demand from industry and universities. More coordination with the states should take place earlier and the K_{ind} and K_{net} Programmes should become more objectified in design and conduct. The criteria for evaluation and establishment of centres and networks should become clearer and the role division between political function, project management and evaluation should become clearer, too.

Re-positioning of the competence centre programmes

After several efforts to centralize the functions of the intermediary agencies responsible for carrying out Austrian RTD policy by the end of 2003 the federal government decided to form the Research Promotion Agency (Forschungsförderungsgesellschaft, FFG). Besides the FFF, the Austrian Space Agency (ASA), the Office for International Research and Technology Cooperation (BIT) and the TIG were fused into the new FFG in September 2004 (compare Kritzinger *et al*, 2006). The TIG staff took responsibility for Area II, the "Structural Programmes", into which also the K_{plus} Programme fell.

By 2005 around 270 companies of different sizes were cooperating with research organizations in 18 K_{plus} Centres. For 2005 the FFG spent €11.2 million on the K_{plus} Programme, which made it the second largest initiative among the structural programmes, only to be surpassed by the K_{ind} and K_{net} Programmes, which together accounted for €12.6 million. In the same year also 22 K_{ind} Centres and K_{net} Networks were active in which approximately 180 companies cooperated. Relating the competence centre programmes to the overall expenditures for RTD promotion of the FFG in 2005, which were €101.44 million, they were among the largest programmes (Österreichische Forschungsgesellschaft, 2006).

During the last stages of the assessment, representatives of the two ministries had begun to discuss the future of the programmes bilaterally. Their aim was to meet the widespread criticism on the two competing competence centre programmes and resist the outside pressure to merge these. To do so, they had to legitimize all three programme lines, which in general were perceived as successful (interview 3-13).

An opportunity arose with the final report of the assessment advocating a further differentiation of the programmes (Edler *et al*, 2004). The strategy was to allow a gradual transformation of the centres to arrive at a number of Fraunhofer-like organizations, linked to existing university and extra-university research structures and financed to a large degree by firms and the research organizations. This plan failed mainly due to the resistance of the states, who were not willing to pay for the centres without having a say in their set-up.

After simmering for one year, in 2005 discussions on the future of the competence centre programmes intensified again. Soon the major centre stakeholders accepted the decision of the two ministries that the programmes should be brought together. This consensus had two effects. First, the K_{ind} and K_{net} Programmes, financed by the BMwA, beginning with mid-2005, were also administered by the FFG's Area II (the former TIG). Second, another discussion process on the renewal of all the competence centre programmes was started. At the end of 2005 an internal paper was proposed, which was a shaky consensus between the major stakeholders of the programmes — the two ministries, the FFG, the states, industry and the Council for Research and Technological Development.[4] In addition several rounds of discussions took place with universities, polytechnics and extra-university research institutes. However it took another two years until the new programme could start. Fiercely led negotiations on funding and selection criteria were the reason for the delay (interview 3-13, 3-13).

The creation of knowledge is a historically contingent social process insofar as new knowledge always builds on and relates to older knowledge. This becomes apparent in the case of the establishment of the Kplus Programme

The new competence centre programme COMET (Competence Centres for Excellent Technologies), which was presented to the public in August 2006, is in fact a mixture of the K_{plus}, K_{ind} and K_{net} Programmes. Three programme lines have been created: the rather short-term K-projects, which are more flexible and less criteria-based, targeting among others the K_{ind} and K_{net} centres; the K1 centres, which are oriented at the K_{plus} centres selected by hard criteria; the longer-term K2 centres, which are a new and larger category and which should orient themselves on the global level. Financing comes again from three sources, the federal state, industry and the states, with the shares differing from programme line to programme line. The first projects and centres were selected in September 2007.

Policy-relevant knowledge and learning

Learning from experience: the ITF record

The creation of knowledge is a historically contingent social process insofar as new knowledge always builds on and relates to older knowledge. This becomes apparent in the case of the establishment of the K_{plus} Programme. Indeed this policy initiative can hardly be understood without taking into account the history of Austrian RTD policy, especially the experiences made by Austrian policy actors with the ITF. While the ITF certainly was not an efficient instrument of RTD policy, and only in some cases was an effective one (Biegelbauer, 2005), it was an important policy tool around which policy learning took place during the 1990s in Austria (interviews 2-1, 2-13, 3-5). The first lesson Austrian RTD policy actors learned from the ITF was that neither

ministries nor intermediary agencies could expect any deeper interest in the policy field from the side of politicians. This insight led actors from both ministries and intermediary agencies to regularly take the matter into their own hands when they came to create a new policy initiative.

Second, the history of the ITF made it all too clear that the lack of funding in RTD policy was there to stay. The hopes that any time soon more money would be available to develop larger and more complex RTD policy programmes had subsided for most, if not all, policy actors by the mid-1990s.[5] It was the first two issues, the marginal interest of politicians in the policy field and the lack of money, which had exacerbated the coordination problems between the different ministerial actors, which not only included the science, transport and economics ministries in their varying constellations and set-ups, but also the Ministry of Finance and the Federal Chancellery (Biegelbauer, 2005).

Third, the two issues mentioned above also invited the creation of different allotments or fiefdoms in the policy area, which had been created and were fiercely defended by ministerial actors (Griessler, 2003). It was very difficult to break through the mistrust hindering cooperative activities between high-ranking ministry officials on a larger scale. All of this led to a further increase in the short-termism of Austrian RTD policy, with ministerial actors often engaging rather in tactics and not in strategies (interview 3-5).

Fourth, Austrian RTD politics in the 1990s featured a policy style which had come into existence due to the prevalence of the Austrian neo-corporatist social partnership. Political decisions were often made in the framework of networks which, besides central ministerial actors and a small number of experts not only included social partners, but also were made in the very style in which decisions came into being in the framework of policy fields dominated by the social partnership. Such decision-finding and -making procedures frequently included little codification, often informal meetings of a relatively small number of decision-makers under exclusion of those experts, who were not affiliated with the social partners (interview 2-1, 3-13).

Put differently, it was mainly two lessons which were learned by policy actors from the ITF record: First, there was lots of learning of how (not) to run RTD programmes. Repeatedly interview partners pointed out how important the ITF was in the sense that actors could learn how to identify problems, write policy documents or evaluate programmes — including the possibility to fail in their initiatives (interviews 2-1, 3-5, 2-8, 2-9, 2-10). Second, policy actors learned that the ITF was not the right instrument for making successful RTD policies in a systematic and efficient way. The latter point was not only a recurring theme in interviews, but was driven home by one interview partner, who spoke of his impression, "that many people have almost experienced … a trauma, insofar as productive work for 10 years [in the ITF, PB] was very difficult" (interview 3-5).

The experiential learning as a result of the ITF experience took place in parallel on a personal level and on the level of the Austrian RTD policy community, which comprises of a few dozen individuals. Actors learned from their own 'traumatic' and frustrating experience in a very direct way. However they learned also indirectly, that is from each other, through communicative processes in formal and informal settings. In the end barely any interview partner argued that the ITF was a true success story (interview 1-1 was the only exception).

Learning from abroad: expert communities and (international) organizations

Several previous policy papers were formative for the competence centre programmes. The most important of these, 'Knowledge as a Factor of Production' (Stampfer, 1996) and 'Research and Competition' (Schmidt and Hochleitner *et al*, 1997) have been mentioned before. All of these papers are based upon up-to-date theoretical thinking from economics and social sciences. Most importantly, these papers are influenced by the vast literature on systems of innovation so influential in RTD policy-making beginning with the early 1990s (Freeman, 1987; Lundvall, 1992; Nelson, 1993; Lundvall and Borrás, 1999; Mytelka and Smith, 2002; Biegelbauer and Borrás, 2003; for Austria: Mayer, 2003). The international literature on innovation systems has found its way into the afore-mentioned documents either directly, or through the intermediation of policy experts, in many cases through TIP Programme participants.

Indeed the policy experts, who had been nurtured through the Austrian Federal Government's TIP Programme and other measures and were located in many cases either at the Wirtschaftsforschungsinstitut (Economic Research Institute), the Austrian Research Centres Seibersdorf (ARCS) or Joanneum Research, as well as to a lesser extent at the Academy of Sciences and the Institute for Advanced Studies in Vienna, over the 1990s had been in an increasingly closer contact with the policy-makers in the federal bureaucracy. They had taken on new functions over time: earlier RTD policy programmes had been conceived by civil servants from the federal ministries. Yet for the K_{plus} Programme the role of the experts was not only to provide knowledge, but also to actively participate in constructing the main policy documents upon which the K_{plus} Programme rested (interviews 3-4, 3-5). While these changes have to be seen in the framework of the restructuring of federal bureaucracies taking place in most OECD countries during the last two decades (Peters, 1996; Aberbach, 2003), in the case of Austrian RTD policy, they also show the significance of the rise of a part of the expert community in a policy field which did not exist before the mid-1980s.

The extensive co-production of RTD programmes by civil servants and policy experts from research organizations was made possible not only through the TIP Programme and the more far-reaching changes in the public understanding of structures and functions of public bureaucracies all over the world, but also by the internationalization of the RTD policy field. Networks of policy experts were formed around international organizations, most importantly the OECD and the European Union, from the 1970s onward (Armingeon and Beyeler, 2004; Marcussen, 2004). The impact of the OECD networks in Austria often was rather indirect in the sense that in RTD policy Austria often did not take part in policy initiatives of the OECD (interviews 1-5, 2-14). Yet the federal government sent national policy experts frequently to Paris, either as permanent residents, or to take part in the frequent workshops and meetings of the various working groups. Therefore, despite the missing grand strategy of Austria towards the OECD and the frequent reluctance to follow OECD suggestions (interviews 1-2, 2-14), there was a slow and indirect but steady effect of the Austrian OECD membership upon the broader knowledge base of Austrian expertise in the RTD policy field (interview 2-1).

The Austrian EU accession in 1995 had a more immediate impact. It affected not only civil servants responsible for international relations and experts from research organizations, as had been the case with the OECD, but also all the other ministry officials and policy experts due to the effects of the *acqui communautaire* on Austrian law and the binding nature of many of the agreements being struck in the very working groups and council meetings Austrian representatives were taking part in. Even although the EU activities were not taken serious by all ministerial staff at the beginning of the Austrian membership (interviews 3-5, 1-1), the effects of a large number of civil servants going to Brussels and coming back with new impressions and papers based upon other working styles and administrative traditions were being felt immediately. Knowledge of the way in which RTD policy programmes were made in other countries, the ways in which they were implemented and evaluated, began to seep into the workings of the ministerial machineries starting with the international departments responsible for working with the European Union from early on. As one former ministry official observes

> Policy developments in the national arena are often pushed forward via real or supposed 'Brussels' or 'European' standards, no bench remains unmarked. Ministry mandarins go to European meetings with their agendas in mind and come home with a kind of conviction that something must be changed in their country due to the 'standards' mentioned. (Stampfer, 2003: 150)

The effects of international organizations and transnational networks emanating from these are therefore twofold (compare Stone, 2004). International organizations reach into national RTD systems, such as the Austrian one, via the knowledge they offer, which is taken and processed through officials from national ministries, intermediary agencies and policy experts from research institutes and consultancies. They also have a more direct effect on actors in providing platforms in which experts exchange experiences and opinions, sometimes under the tutelage of the international organization, sometimes based on their own initiative (Marcussen, 2004).

In the case of the establishment of the K_{plus} Programme these international experiences were supplemented by a more direct knowledge transfer from three countries with ample knowledge of the policy instrument envisaged by the Austrian policy-makers.

In 1997, during the preparation of the policy document for the K_{plus} Programme, a group of policy experts (in many cases from the TIP network) and ministry officials travelled to Sweden and Canada in order to analyse the Swedish Competence Centres Programme, which had been set up in 1995, and the Canadian Networks of Centres of Excellence Programme, which had been running since 1989. In 1998 a last and most extensive study visit was made to Australia. There was a consensus among interview partners that these trips had been worthwhile, as they had led to a marked increase in knowledge of what was perceived to be international best practice in the area of competence centres (interviews 3-2, 3-5). The study visits were not only examples of direct learning; they also led to the building of an international network of experts, which later on was accessed by the TIG staff.

Indeed one instance in which the TIG personnel made use of these international contacts was a series of international projects which were directed by TIG/FFG staff. From 2002 until 2004 three EU-financed projects, the Multi-Actors Multi-Measures Programme Thematic Network, the starMAP and discoMAP were active, in which 11 international partners took part. The aim of the three projects was to exchange insights on multi-actor multi-measures programmes (MAPs) such as competence centres (RoadMAP, 2004; StarMAP, 2004).

One of the outcomes of the MAP projects was an evaluation of the international influences the analysed competence centre projects were subject to. In the final document of the MAP project (RoadMAP, 2004), the authors identified different families and pedigrees of MAPs. The Engineering Research Centres Programme of the US National Science Foundation in the 1980s was identified as the 'mother' of the competence centre programmes, directly influencing the Australian Cooperative Research Centre Programme and the Swedish Competence Centres Programme. The Austrian K_{plus} Programme studied the Australian, the Swedish and Canadian examples and the Hungarian Competence Centre

Programme was based upon the US model, but took into account the Swedish and Australian and Austrian experiences when it was established in 2000. The Estonian Competence Centres Programme was established in 2003 after Estonian policy experts had studied the Hungarian, Swedish and Austrian programmes.

Learning for policy and for politics

Sometimes a certain social practice has to fulfil several functions at the same time. Examples from the early history of the K_{plus} Programme are the meetings of the group consisting of ministry officials and policy experts setting up the original K_{plus} policy papers with representatives from science and industry. These meetings took place at a time when the central part of the policy paper had already been in existence (interviews 3-3, 3-5). They had a twofold purpose: First, they were to get feedback on the proposed programme from the two core communities, science and industry. Second, the meetings should legitimize the process leading to the new and relatively large as well as quite innovative policy programme. Given that according to an interview partner (interview 3-5) the original policy paper was not crucially changed by these discussion processes, it seems fair to say that the legitimation was at least as important as was the feedback function.

Indeed two reasons come to mind why such a legitimation might have been of increased importance for the political process leading up to the K_{plus} Programme. First, the proposed policy programme was radically different from other policy measures implemented in Austria by the end of the 1990s. It was not the policy goal of bringing together science and industry to cooperate more closely, but it was the way in which this cooperation was to be achieved that was so new. The competence centres were not only larger than most of the hitherto existing Austrian RTD centres, and not only was state funding to be terminated after seven years, but also they were to be closely monitored through these seven years. And perhaps most important of all, the way in which they should be selected formed the very centre of the policy paper advancing the programme, making the selection and evaluation procedures the proposed centres had to go through very strictly based upon preconceived criteria.

Second, the way in which the policy idea came into existence and the following policy document was drafted was quite unusual for Austrian RTD policy-making. As has been pointed out before, neither were the social partners granted a privileged position in the discussion process, nor were other ministries asked for their opinion: a procedure which otherwise was common practice and which under the specific circumstances of the Austrian RTD policy structures — lack of funding, unclear responsibilities, little interest from politicians — was quite cumbersome and partially responsible for stifling the creation of innovative policy instruments during much of the 1990s. In light of previous experiences with policy initiatives, the way in which the K_{plus} Programme was conceived could be seen as a form of political learning. Different from the term policy learning, political learning relates to strategies of "selling" a policy to stakeholders and constituencies (May, 1992).

An instrument supporting policy learning

The assessment of the competence centre programmes, which was carried out in 2003 and 2004, was an instrument facilitating policy learning. The assessment exercises fostered learning in different forms. First, the fact that an evaluation-like analysis of the competence centre programmes had already been made forced policy actors from ministries as well as intermediary agencies to look back and reflect upon their role in the policy programmes and their work in the first years of these measures. These reflective activities often had a quasi-binding quality, since they were done in a semi-public way, in interviews to be transcribed, in statements to be taken up into the assessment reports or in reactions to the expert's reports in workshops, where other policy actors would take notice of them (interview 3-11).

Second, the interactions of policy-makers took on a different character since they were structured by a planned common activity, that is the assessment exercise, entailing workshops and an itinerary with milestones. Policy-makers from different ministries, who were barely communicating with each other due to antagonistic relationships, now had to interact in one way or another (interview 3-11).

Third, the mixture of outsiders to the Austrian RTD system, the experts from the German Fraunhofer Gesellschaft, and insiders, from the Austrian KMU Research, helped to provide the team carrying out this study a more neutral position, acceptable to all actors taking part in the process (interview 3-4). The competence centre programmes were discussed with their strengths and weaknesses in a way that did not exclude, let alone stigmatize, some of the discussants. High-ranking ministry officials began to communicate with each other and learned about their counterpart's views (interview 3-11). The already existing conflicts between the two involved

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ministries' leading civil servants had reached into some of the competence centres, where actors held the belief that one ministry and one programme were to be preferred over the others. Through the process of the assessment this polarization was weakened. The discussions in and around the assessment exercise started a communicative process, which led to a concentration of management functions regarding the three competence centre programmes in the same FFG unit and to plans to reform the programmes and ultimately to create a single programme with different programme lines (interview 3-11).

Conclusions

The main focus of the paper was to answer the question why a radical policy innovation such as the K_{plus} Programme could take place in the Austrian RTD system, which before had rejected changes for a prolonged period of time. It could be established that the K_{plus} Programme indeed was innovative for Austria. The policy initiative was quite large in Austrian terms, and it was more based on formal criteria than any top-down RTD policy measure in existence before, with all the targets of the policy set *ex ante*.

Moreover the K_{plus} Programme was highly internationalized. It was set up under consideration of similar programmes in other OECD countries, namely Australia, Canada and Sweden. From the very beginning the main instrument for the selection of competence centres was the utilization of international peer reviewers.

In addition the K_{plus} Programme was quite reflective. On an international level the MAP projects have been used as instruments for reflection and discussion. An internal evaluation of the programme was performed in 2001 followed by an international assessment in 2004 (Edler *et al*, 2004) and further work by others, such as Steyer (2006), who analysed programme outputs at the firm level.

Several reasons have been provided for why a major policy innovation such as the K_{plus} Programme was possible in the framework of an RTD system, which before had been resisting major change for a decade. The most important observation is that this policy innovation cannot be explained by looking at the Austrian political system. Neither had there been major changes in the Austrian Government preceding the introduction of the K_{plus} Programme — a new coalition government between the Conservative Party and the Freedom Party took power more than two years later, in early 2000. Nor can political activism be found on the highest level of politics — the major policy reform proposed as part of the paper 'Research and Competition' (Schmidt *et al*, 1997) had been rejected the year before.

An important reason for the establishment of the K_{plus} Programme was that a sizeable part of the Austrian RTD system was unsatisfied with the at that time largest Austrian top-down RTD policy instrument, the ITF. The lack of political steering, the cooperation problems between the different ministries and other actors and the lack of funding made the ITF an inefficient policy instrument in the eyes of a number of political actors (interview 3-5; Griessler, 2003; Biegelbauer, 2005).

It was precisely the lack of funding, a key component of Austrian RTD policy over most of the 1980s and 1990s, which the new K_{plus} Programme in 1998 had not had to face. Funds from the Technology Milliard and from the privatization of the Austrian Federal Railways glass-fibre network saved the policy actors proposing the programme from the fate of many policy initiatives: having to combine financing from a multitude of different sources in order to be able to keep a programme running (interviews 3-5, 3-12).

The above-mentioned reasons made it easier for the BMWV civil servants to construct the programme. The introduction of the new initiative was also eased by the fact that a single programme caused much less upheaval than a major policy reform such as the one which had caused so much discussion in 1997: it could be 'sold' much more easily to the RTD policy community.

Another element of an explanation addresses the strategy of the BMWV, which deviated from the policy style typical for the Austrian RTD policy in the 1980s and 1990s and therefore caught other actors by surprise. Indeed the ministry officials did not invite other ministries, most importantly the BMwA, to discuss the establishment of the new programme but went ahead with a small group consisting mainly of experts from intermediary agencies and the social partners. Even in this process there was a core group which drafted the policy document and which consisted only of a handful of persons, a BMWV civil servant and a few experts from extra-university research organizations, which were part of the TIP Programme. At the time when the policy paper was presented to other actors in the Austrian RTD system, not only was the programme already fully worked out, but the ministerial actors were not willing to change the planned programme on a large scale anymore (interview 3-2, 3-5).

Another task of the paper was the analysis of the K_{plus} Programme through the perspective of a policy learning approach. It was found that learning indeed played an important role in the establishment, implementation and evaluation of this competence centre programme. Already in the early phases of problem definition, the role of international and national experts has been found to be important, with the policy documents leading to the K_{plus} Programme referring among others to the national innovation systems approach. As part of the decision-finding and -making processes, experiences from other countries were used to set up the new policy initiative in Austria. Furthermore a co-evolution of the still quite young national RTD policy field and an increasingly internationalizing Austrian community of experts has

been proposed. Globalization and Europeanization processes have fuelled the internationalization of external policy experts as well as civil servants, with the Austrian EU accession in 1995 having a clear threshold effect (interviews 2-1, 2-4, 2-8). In the mid-1990s the internationalization of the whole policy field accelerated markedly, among other developments changing the predominant policy style in RTD policy-making into a more formalized and internationalized one (interviews 2-1, 3-12).

Several instruments have been found to facilitate learning processes. On the operational level of programme management these were among others the MAP projects and the involvement of TIG into the Austrian chapter of the Society for Organizational Learning. Predominantly on a policy level, learning processes were triggered by the assessment exercises in 2003 and 2004. It was especially the latter activities and the structural changes taking place in the Austrian RTD system in the early 2000s which led to the reassessment of all three Austrian competence centre programmes and to the idea of establishing the new programme COMET, which replaced the previous programmes and fused them into one policy instrument.

The learning perspective was helpful as it allowed focusing the analysis on processes of the creation of policy goals, causality structures inscribed in policies, and political discourses which the policies were embedded in. When the notion of policy learning is applied in this way, it serves as an invitation to take a step back and look not at isolated political incidents, but rather at political processes taking place over longer stretches of time — in this case, the decade of RTD policy-making from the mid-1990s to the mid-2000s. Over such a time period, the longer-term development of Austrian RTD policy becomes better identifiable. Indeed the whole policy field has become more international and professional and the way instruments were conceived and employed changed gradually. The K_{plus} Programme set an important example and was living proof that policies could be set up and run differently.

The already-mentioned internationalization processes had effects on the central actors of the policy field: politicians came into contact with colleagues from other countries, who were used to do things differently, and got a sense of international standards (Stampfer, 2003). Civil servants similarly were confronted with ideas new to them on a much more frequent basis than before and experts became part of an international community exchanging ideas (Mytelka and Smith, 2002; Stone, 2004). Indeed learning took place in all of these three groups on both the individual and organizational levels. Moreover learning through internationalization effects was both direct, for example in cases of actors coming back from international meetings with new insights, and indirect, in cases in which policy-makers gained a better understanding of policy-relevant issues through policy experts, who themselves profited from the increasing internationalization of the expert community.

Ultimately the K_{plus} Programme became possible because of the more readily available knowledge of foreign countries' policy instruments and a spreading recognition among experts that international standards in RTD policy-making were above Austrian ones — especially in lieu of the sometimes dire experiences with the ITF. The cognitive processes at the basis of this policy change are therefore a case of experiential learning.

Appendix: List of interviews

Interview partner	Date	Code
Policy expert	29 July 2003	2-1
Retired civil servant, BMWF/BMVIT	12 September 2003	1-1
Staff member, intermediary agency	29 September 2003	3-2
Director, intermediary agency	27 October 2003	3-3
Staff member, intermediary agency	11 November 2003	3-4
Civil servant, BMWF/BMVIT	11 November 2003	1-2
Civil servant, BMwA	24 November 2003	2-4
Former civil servant, BMWF/BMVIT	22 December 2003	1-5
Civil servant, BMBWK	13 January 2004	2-6
Director, intermediary agency	2 February 2004	3-5
Former civil servant, BMFin	30 April 2004	2-8
Civil servant, BMVIT	6 May 2004	2-9
Civil servant, BMVIT	1 June 2004	2-10
Director, intermediary agency	1 June 2004	2-11
Policy expert	16 January 2006	2-13
Civil servant, BMVIT	2 March 2006	2-14
Staff member, intermediary agency	3 March 2006	3-10
Policy expert	24 April 2006	3-11
Civil servant, BMVIT	3 July 2006	3-12
Staff member, intermediary agency	5 July 2006	3-13

Notes

1. For overviews on Austrian RTD policy, see Gottweis and Latzer (2006); Pichler *et al* (2007).
2. For overviews see Page (2000), Maier *et al* (2003), Bandelow and Schubert (2003), Biegelbauer (2007b).
3. All of these problems had already been recognized in studies, eg Müller *et al* (1996), and policy papers, eg BMWV (1996).
4. The Council for Research and Technological Development was established with the year 2000 as an independent body advising the government on its research and technology strategy.
5. Only in 2004 did the GDP Austrian expenditures on RTD reach the OECD average of 2.25%. A slow but steady expansion of funds had led Austrian expenditure on RTD from 1.13% of GDP in 1981 to 1.88% in 1999 and accelerated in the 2000s to reach an estimated 2.47% in 2006 (BMWF, BMVIT, BMwA, 2007).

References

Aberbach, Joel D 2003 Introduction: administration in an era of change. *Governance*, **16**(3), 315–319.

Armingeon, Klaus and Michelle Beyeler eds. 2004 *The OECD and European Welfare States*. Cheltenham, UK: Edward Elgar.

Bachrach, Peter and Morton Baratz 1962 Two faces of power. *American Political Science Review*, **56**, December, 947–952.

Bandelow, Nils and Klaus Schubert 2003 *Lehrbuch der Politikfeldanalyse*. Munich: Oldenbourg.

Bennett, Collin 1991 Review article: What is policy convergence and what causes it? *British Journal of Political Science*, **21**, 215–233.

Biegelbauer, Peter 2005 The Austrian Innovation and Technology Fund: Between Power Play and Policy Learning. Working Paper No 72 of the IHS Sociology Series. Vienna, IHS.

Biegelbauer, Peter 2007a Wrestling with methodology: considerations about policy learning. *Concepts and Methods*, Newsletter of the IPSA Committee on Concepts and Methods, **3**(1).

Biegelbauer, Peter 2007b Ein neuer Blick auf politisches Handeln: Politik-Lernansätze im Vergleich. *Österreichische Zeitschrift für Politikwissenschaft*, **36**(3), 231–247.

Biegelbauer, Peter and Susana Borrás eds. 2003 *Innovation Policies in Europe and the US: the New Agenda*. Aldershot, UK: Ashgate.

BMWF, BMVIT, BMwA 2007 *Österreichischer Forschungs- und Technologiebericht 2007*. Vienna: BMWF, BMVIT, BMwA.

BMWV 1996 *Technologiepolitisches Konzept der österreichischen Bundesregierung 1996*. Vienna: BMWV.

BMWV 1997 *Kplus. Forschungskompetenz plus Wirtschaftskompetenz. Vorhabensbericht des Bundesministeriums für Wissenschaft und Verkehr zur Errichtung von Kompetenzzentren in Österreich*. Vienna: BMWV.

Braun, Dietmar and Martin Benninghoff 2003 Policy learning in Swiss research policy: the case of the national centres of competence in research. *Research Policy*, **32**(10), 1849–1863.

De Jong, Martin, Konstantinos Lalenis *et al* eds. 2002 *The Theory and Practice of Institutional Transplantation: Experiences with the Transfer of Policy Institutions*. Dordrecht, Boston, London: Kluwer Academic Publishers.

Digeser, Peter 1992 The fourth face of power. *Journal of Politics*, **54**(4), 977–1007.

Dolowitz, David and David Marsh 2000 Learning from abroad: the role of policy transfer in contemporary policy making. *Governance*, **13**(1), 5–24.

Drori, Gili S, John W Meyer *et al*, eds. 2003 *Science in the Modern World Polity: Institutionalization and Globalization*. Stanford: Stanford University Press.

Edler, Jakob, Susanne Bührer *et al* 2003 Assessment: Zukunft der Kompetenzzentrenprogramme (Kplus und Kind/net) und Zukunft der Kompetenzzentren. Executive Summary. Karlsruhe: Fraunhofer ISI, KMU Forschung Austria.

Edler, Jakob, Susanne Bührer *et al* 2004 Assessment: Zukunft der Kompetenzzentrenprogramme (Kplus und Kind/net) und Zukunft der Kompetenzzentren. Karlsruhe: Fraunhofer ISI, KMU Forschung Austria.

FFG, Forschungsförderungsgesellschaft 2005 *Jahresbericht 2005*. Vienna: FFG.

Freeman, Christopher 1987 *Technology Policy and Economic Performance: Lessons from Japan*. London: Pinter.

Gottweis, Herbert and Michael Latzer 2006 Forschungs- und Technologiepolitik. In Herbert Dachs, Peter Gerlich, Herbert Gottweis *et al*, *Handbuch des politischen Systems Österreichs*, pp. 711–725. Vienna: Manz.

Griessler, Erich 2003 Innovation und Politikgestaltung: Administrative Kulturen in der Technologiepolitik. Ein Vergleich zwischen Österreich und den Niederlanden. In *Innovationsmuster in der österreichischen Wirtschaftsgeschichte*, ed. R Pichler, pp. 290-312. Innsbruck: Studienverlag.

Griessler, Erich and Bernhard Hadolt 2006 Policy learning in policy domains with value conflicts: the Austrian cases of abortion and assisted reproductive technologies. *German Policy Studies*, **3**(4).

Hall, Peter 1993 Policy paradigms, social learning, and the state. *Comparative Politics*, **25**, April, 275–296.

Karlhofer, Ferdinand and Emmerich Tálos eds. 1999 *Zukunft der Sozialpartnerschaft*. Vienna: Signum Verlag.

Karlhofer, Ferdinand and Emmerich Tálos eds. 2005 Sozialpartnerschaft. Österreichische und Europäische Perspektiven. Wien: Lit Verlag.

Kittel, Bernhard and Emmerich Tálos 2001 *Gesetzgebung in Österreich. Netzwerke, Akteure und Interaktionen in politischen Entscheidungsprozesse*. Vienna: WUV.

Kritzinger, Sylvia, Barbara Prainsack and Helga Pülzl 2006 System oder Netzwerk? Veränderungen forschungspolitischer Strategien in Österreich. *Österreichische Zeitschrift für Politikwissenschaft*, **35**(1), 75–92.

Lundvall, Bengt-Åke ed. 1992 *National Systems of Innovation: towards a Theory of Innovation and Interactive Learning*. London, Pinter.

Lundvall, Bengt-Åke and Susana Borrás 1999 *The Globalising Learning Economy: Implications for Innovation Policy*. Luxembourg: Office for Official Publications of the European Communities.

Maier, Leonhard Matthias 2003 Wissens- und Ideenorientierte Ansätze in der Politikwissenschaft: Versuch einer systematischen Übersicht. In *Politik als Lernprozess. Wissenszentrierte Ansätze der Politikanalyse*, eds. L M Maier, F Nullmeier, T Pritzlaff and A Wiesner, pp. 25–77. Opladen: Leske & Budrich.

Maier, Leonhard Matthias, Frank Nullmeier *et al* eds. 2003 *Politik als Lernprozess? Wissenszentrierte Ansätze in der Politikanalyse*. Opladen: Leske & Budrich.

Marcussen, Martin 2004 Multilateral surveillance and the OECD: playing the idea game. In *The OECD and European Welfare States*, eds. K Armingeon and M Beyeler. Cheltenham, UK: Edward Elgar.

May, Peter 1992 Policy learning and failure. *Journal of Public Policy*, **12**(4), 331–354.

Mayer, Kurt 2003 Running after the international trend: Keynesian power balances and the sustainable repulsion of the innovation paradigm in Austria. In *Innovation Policies in Europe and the US: The New Agenda*, eds. P Biegelbauer and S Borrás, pp. 157–188. Aldershot: Ashgate.

Müller, Karl *et al* 1996 The Austrian Innovation System, Project Reports I-VII. Vienna: Institute for Advanced Studies.

Mytelka, Lynn K and Keith Smith 2002 Policy learning and innovation theory: an interactive and co-evolving process. *Research Policy*, **31**(8–9), 1467–1479.

Nelson, Richard ed. 1993 *National Innovation Systems: a Comparative Analysis*. New York: Oxford University Press.

OECD, Organization for Economic Cooperation and Development 2004. *Public-Private Partnerships for Research and Innovation: an Evaluation of the Austrian Experience*. Paris: OECD.

Österreichische Forschungsförderungsgesellschaft 2006 *Jahresbericht 2005*. Vienna, FFG.

Page, Edward C 2000 Future governance and the literature on policy transfer and lesson drawing. Introduction prepared for the ESRC Future Governance Programme Workshop on Policy Transfer. Britannia House, London.

Pelinka, Anton 1981 Modellfall Österreich? Möglichkeiten und Grenzen der Sozialpartnerschaft. Wien: Braumüller.

Peters, Guy B ed. 1996 *Lessons from Experience: Experimental Learning and Administrative Reform in Eight Democracies*. Oslo: Scandinavian University Press.

Pichler, Rupert, Michael Stampfer and Reinhold Hofer 2007 Forschung, Geld und Politik. Die staatliche Forschungsförderung in Österreich 1945–2005. Innsbruck: Studienverlag.

RoadMAP 2004 *Good Practices for the Management of Multi*

Actors and Multi Measures Programmes in RTDI Policy. Vienna: TIG.
Rose, Richard 1993 *Lesson-Drawing in Public Policy*. Chatham, New Jersey: Chatham House.
Rose, Richard 2005 *Learning from Comparative Public Policy: a Practical Guide*. London/New York: Routledge.
Sabatier, Paul 1998 The advocacy coalition framework: revisions and relevance for Europe. *Journal of European Public Policy*, **5**(1), 98–130.
Schmidt, Arnold, Albert Hochleitner *et al* 1997 Forschung und Wettbewerb. Technologieoffensive für das 21. Jahrhundert. Bericht an die Bundesregierung. Vienna.
Simon, Herbert A 1957 *Models of Man: Social and Rational*. New York: John Wiley & Sons.
Stampfer, Michael 1996 Produktionsfaktor Wissen. *Aktionslinien des Bundesministeriums für Wissenschaft, Verkehr und Kunst*. Vienna: BMWVK.
Stampfer, Michael 2003 European Research Area: new roles for national and European RTDI funding programs? In *Changing Governance of Research and Technology Policy: the European Research Area*, eds. J Edler, S Kuhlmann and M Behrens, pp. 135–164. Cheltenham, UK/Northampton, MA, USA: Edward Elgar.
StarMAP 2004 A Comparative Guide to Multi Actors and Multi Measures Programmes. Vienna: TIG.
Steyer, Franziska 2006 Behavioural Additionality in Austria's K-Plus Competence Centre Programme. *Government R&D Funding and Company Behaviour: Measuring Behavioural Additionality*, pp. 75-89. Paris: OECD.
Stone, Diane 2004 Transfer agents and global networks in the 'transnationalization' of policy. *Journal of European Public Policy*, **11**(3), 545–566.