

Chapter 3

Regional Innovation Policies in Switzerland

The Swiss New Regional Policy (NRP) places a focus on promoting innovation across the whole country. This chapter presents a critical analysis of the current framework of federal and regional innovation policies. It first discusses the instruments implemented at federal level and their potential role for promoting innovation in the region. It then assesses the state of development of innovation promotion initiatives at regional level, including those supported by the NRP, with a specific focus on the case of Eastern Switzerland. The chapter then concludes by identifying the main challenges for developing innovation policies in, and for regions in Switzerland, and derives policy recommendations for better articulation between policies and instruments developed at the levels of the Confederation and the cantons.

Key messages of Chapter 3

- **Switzerland is a leading country in science, technology and innovation; however there is a worrying tendency of stagnation in R&D and innovation activities.** Untapped potential exists in traditional sectors, in intermediate and rural regions: small firms with lower absorptive capacities could further develop into innovative ventures and contribute both to sustained national growth and to balanced territorial development. Federal innovation policy, and in particular the instruments deployed by CTI, address very well the needs of the science and technology-based innovators. Companies with lower absorptive capacities, innovating without R&D, or involved in other forms of innovation (*e.g.* organisational innovation) are not a target of CTI. To serve their needs, proximity matters: they should become the target of regional innovation policies and supported under the NRP.
- **There are no explicit regional innovation policies in Switzerland.** A large number of uncoordinated and very diverse innovation promotion initiatives are developed and implemented by the cantons, as part of their economic development mission. The NRP helps to reveal and provides a boost to those initiatives. The type of innovation support developed at cantonal level is complementary to federal instruments as it involves advice and support for start-ups, small companies, networks, technology transfer activities on a sub-national scale, based on proximity relationships. There is a lack of visibility and of quality assessment of those dispersed initiatives. There are also occurrences where unnecessary competition and lack of co-ordination take place between federal and cantonal initiatives, *e.g.* in start-up support where services are created by cantons in parallel with CTI initiatives.
- **The inter-cantonal level emerges at the most relevant for innovation promotion on a sub-national scale, and the cross-border dimension should be further developed.** Only a few initiatives are implemented at the inter-cantonal level, but they demonstrate the possibility to overcome barriers for inter-cantonal co-operation in innovation. The NRP should use its leverage potential on inter-cantonal co-operation, by increasing the share of funding dedicated to joint programmes and projects. The cross-border dimension of innovation could also be exploited further given the specific location of the country and the potential for synergies with neighbouring regions.

Key messages of Chapter 3 (cont.)

- **A clearer division of roles between federal and sub-national authorities in innovation promotion should be reached.** Federal authorities should continue to use their instruments to support high-tech and science-based innovation, while sub-national authorities (cantons acting in partnerships) should support knowledge absorption capacities in more traditional companies and sectors. In this configuration, the KTT should acquire a national dimension, and be defined on a thematic rather than regional basis. The demand-led instruments at sub-national level should be expanded, evaluated, professionalised and managed at inter-cantonal level. Their implementation should rely on well-co-ordinated actors and initiatives by regions and cantons, as part of inter-cantonal partnerships.
- **The NRP eligible areas should also cover agglomerations,** since these play a key role in innovation. This would facilitate the establishment of integrated regional innovation policy initiatives, enhancing knowledge spillovers across the various territories.
- **Strategic management capacity of regional innovation should be strengthened.** This involves: ensuring transparency and performance-based NRP funding for innovation; implementing better evaluation mechanisms and enhancing incorporation of business perspective.

The Swiss New Regional Policy (NRP) has placed an important accent on promoting innovation as a driver of regional development, as indicated in the previous chapter. Given the position of Switzerland in the global economy, it is clear that Swiss companies cannot hope to compete on the basis of costs, and have to develop high value-added products and services, competitive in an international context. The new policy has changed the focus from a redistributive towards an endogenous growth approach: this places a premium on developing innovation capacities in the regions. The NRP “has the goal to stimulate innovation, to generate value added and improve competitiveness in certain territories (mountain regions, rural areas and border regions) with the aim to contribute to job retention and creation in the supported zones (approach targeted on growth)”.¹ At the heart of the NRP, Pillar 1, entitled “Stimulate innovation, generate value added and competitiveness in regions”, provides direct support to projects and initiatives geared towards the promotion of innovation and entrepreneurship in the regions. Hence, with the NRP, cantons get new incentives, along with funding, for supporting structural change and finding new sources of growth in their territories. This new orientation responds to a key recommendation from the OECD 2002 Territorial Review of Switzerland: develop new growth poles in the regions based on a “learning regions” strategy.

Until the launch of the NRP, the federal level was the only governmental level explicitly active in innovation policy. With the NRP, which presents a radical departure from the previous regional policy geared towards physical infrastructures, regions and cantons are given new impulses in this domain. Hence the core question of this chapter is: what should be the role for the sub-national level in innovation policy? And how should regional innovation policy be implemented to ensure good synergies with federal policy? To answer this question, the chapter unfolds as follows:

- First, Section 3.1 presents a critical analysis of the current state of federal and regional innovation policies in Switzerland. It starts with a brief overview of the situation of the country with respect to innovation performance and makes the case for enhancing innovation promotion at regional level. It then discusses key orientations and main instruments of innovation policy at federal level. In particular, new federal instruments aiming at knowledge transfer, and with special relevance to the regions, are discussed in more detail. This analysis deals with the question of the functioning of Pillar 2 of the NRP: how does the NRP create synergies with policies in other areas (in this case innovation)? Next, that section analyses the current situation with respect to innovation strategies and initiatives developed at the sub-national level in Switzerland. This covers initiatives and strategies developed by regions and cantons independently of the NRP, as well as plans that have been developed within the NRP framework. The governance arrangements for innovation policy are discussed, in line with the more generic comments that have been made for the NRP as a whole in the previous chapter. The case of Eastern Switzerland is given specific attention in this section, in order to illustrate the discussion with the example of a border region facing specific challenges with respect to innovation promotion.
- Second, Section 3.2 concludes on the challenges and perspectives for developing innovation policies in, and for the regions in Switzerland. Four challenges emerge from the analysis: i) the need to clarify the respective roles of federal and regional actors in innovation promotion; ii) the importance of building strategic management capacity; iii) the necessity to strengthen the inter-cantonal and cross-border dimension in innovation promotion; and iv) the relevance of a Swiss-wide eligibility for NRP regions.

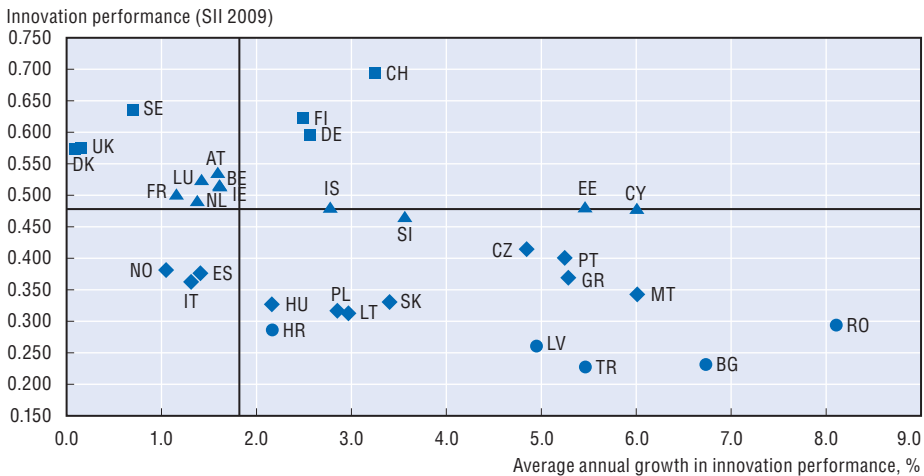
3.1. Swiss federal innovation policy

3.1.1. *The Swiss Innovation system: great performance, but emerging policy challenges*

Switzerland is performing well on innovation criteria. In addition to being one of the richest and most developed countries in the world, Switzerland is also an innovation leader, especially on the high-tech side. Many large Swiss

companies are world leaders in pharmaceuticals, bio-technology, medical technology, machinery and equipment, and other high-tech goods. The country also hosts new-technology-based firms active in niche specialties, and the federal institutes of technology and several universities generate high-tech spin-offs. Figure 3.1 indicates that, according to calculation of the European Innovation Scoreboard, Switzerland is the leading country in the top group of European innovative countries. The growth rate of its innovation performance is less impressive, but still above that of the other leading countries.

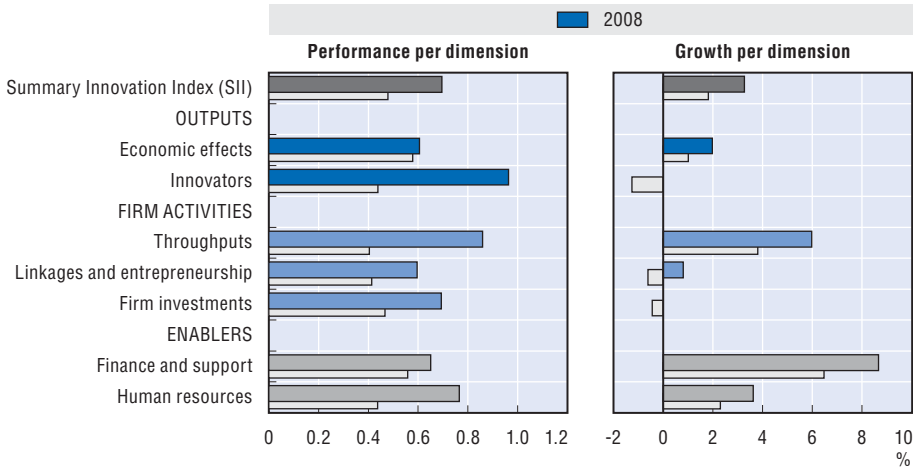
Figure 3.1. **Innovation performance of Switzerland in European comparison**



Note: Squares are the innovation leaders, triangles are the innovation followers, losanges are the moderate innovators, and circles are the catching-up countries. Average annual growth rates are calculated over a five-year period. The dotted lines show EU27 performance and growth.

Source: European Innovation Scoreboard (2009).

The framework conditions for innovation are excellent in Switzerland. Figure 3.2 details the components of the European Innovation Scoreboard summary innovation index: the innovation performance sub-indicators exceed EU average on all dimensions, both in static and dynamic terms. In addition, other determinants of innovation performance, which are not measured by these indicators, are also favourable in Switzerland (OECD, 2006a). Framework conditions are of excellent quality: the good macroeconomic situation, the political and regulatory stability, the relative strength of the financial system, a favourable tax system, a well-educated and multi-lingual population, a flexible labour market, and high standards of living, all contribute to the attractiveness of the country both from individual and from company's perspectives. Innovation enquiries (Arvanitis *et al.*, 2010) reveal that, in general, innovation obstacles tend

Figure 3.2. **Innovation performance of Switzerland per dimension**

Source: European Innovation Scoreboard (2009).

to lose importance over time, suggesting that the quality of the environment for innovation is improving. State regulations do not emerge as a problem in those enquiries; and the share of companies wishing more R&D subsidies is almost negligible. Furthermore, a Swiss characteristic is that both large firms and SMEs are innovative, the latter being much more innovative in European comparison. The co-location in Switzerland of top level public research institutions, with a high degree of international excellence, and of global R&D active multi-nationals, is a strong attractiveness factor for innovative activities. These indicators confirm the very good performance of Swiss regions on indicators such as patent applications, as illustrated in Chapter 1.

However, the Swiss innovation system presents also some weaker aspects, related to barriers to entrepreneurship, limited diffusion of innovation across regions and sectors, and a tendency of stagnation in R&D and innovation dynamics. Barriers to entrepreneurship are reported, such as deficiencies in venture capital availability, or a punitive bankruptcy law. In the General Entrepreneurship Monitor, Switzerland holds only an average position (these aspects are discussed in the *OECD Review of Innovation Policy in Switzerland* [OECD, 2006a]). Business investments in R&D are remarkably high, but the spread of innovation across the whole economy (sectors, regions) is limited: there are still many companies active in traditional sectors, which need to develop into more innovative ventures. The points of vulnerability of the Swiss innovation system can be identified through the examination of innovation processes and performances in firms. The Swiss Institute for Business Cycle Research conducts regular innovation enquiries on a panel of Swiss firms. Innovation in these

enquiries is defined as the implementation of new or significantly improved good (product or service), or process, or marketing method, or a new organisational method in business practices, workplace organisation or external relations. The results of the latest enquiry conducted in 2008 confirms the good innovation performance of Swiss firms but points also to some dangers when the results are looked at in a dynamic perspective over the last 15 years (Arvanitis *et al.*, 2010). According to the enquiries, innovation activity of Swiss firms tends to stabilise over time: the share of enterprises involved in product or process innovation is progressively reducing and these enterprises invest less in innovation. This decline is even stronger for firms active in R&D and patenting. Within R&D active firms, the trend is towards investing in more applied research. An empirical analysis confirms the positive relationship between innovation indicators (inputs and outputs) and labour productivity: hence a stabilisation of innovation activity will result in stagnating productivity. The enquiry identifies a few sectors which are only moderately or not innovating such as: food, watch making, wood, metalworking, banking and insurance, trade, transport, hotel. One positive trend aspect is the fact that the share of sales linked to new products is evolving positively despite a decrease in expenditures for innovation, indicating that enterprises become more efficient in translating innovation inputs into outputs. Two typical barriers for innovation – funding and availability of qualified personnel – have lost their importance over the long term but tend to regain strength recently.

Many Swiss firms also innovate without conducting R&D. Innovation enquiries measure innovation outputs in the form of, *e.g.* share of sales due to new or improved products or processes. Like in other countries, data collected in Switzerland show a discrepancy between firms investing in R&D and innovation-active firms: many firms are responsible for product and process innovations without investing in R&D. In the 2008 survey, 62% of Swiss industrial firms were innovative, but only 43% were involved in R&D (Arvanitis *et al.*, 2010). This underscores the importance of “innovation without R&D”, and the fact that innovation is a multi-faceted phenomenon, involving many other investments and capacities at the firm level than R&D. We return to this point when discussing the respective role of federal and regional policies in the area of innovation.

Extending innovation activities in more Swiss firms, sectors and regions, is a relevant policy opportunity. The conclusion of this short overview of the performance of the Swiss innovation system is that, despite the current excellent innovation performance of the country in a European comparative context, there is a need to further reinforce this performance, for two reasons. First, competition from outside of Europe is affecting all European countries, including the leading ones: even if Switzerland outperforms European countries on all innovation-related indicators, it shares with them some typical weaknesses such as bottlenecks for new enterprise creation or a

stagnating innovation activity. Second, enhancing the spread and growth rate of innovation activities across the whole economy would help to tackle the problem of Swiss sluggish productivity growth. Here the regional dimension comes into play, since the less innovative sectors tend to be over-represented in rural and intermediary regions. Increasing the number of companies involved in innovation over a wide range of sectors is one option to address the problem of stabilisation of innovation activities in Switzerland.

3.1.2. Swiss Innovation policy: shifting towards a more demand-led innovation policy

The Swiss Confederation has adopted a robust and effective science and technology policy, based on a market failures rationale. This policy is notably expressed in the four-year “Message with respect to the encouragement of education, research and innovation 2008-11” by the Swiss Confederation. This policy targets actors falling under federal competence: federal polytechnic schools, professional training institutes, universities of applied science (a shared competence with the cantons), support to research and innovation and international co-operation. The key components of this policy are summarised in Box 3.1. In addition, other ministries, such as the Department of Energy, also fund innovative projects under their own competences.

Switzerland does not have a broad-based innovation policy extending beyond technology transfer promotion. Even if official documents refer to “Research and Innovation” policy, the key policy components mentioned in Box 3.1 indicate that the Swiss Confederation carries out a science, research and technology transfer policy but does not deploy an innovation policy in the broader sense. Overall, Swiss innovation policy is characterised by a non-interventionist stance: instruments target mainly research in the public sector and care for framework conditions. Funding programmes for public R&D refrain from selecting specific fields for research and leaves this decision to researchers themselves. This is true both for the Swiss National Foundation (SNF) for fundamental research and the Swiss Innovation Promotion Agency (CTI) for applied research, with the exception of SNF National Research programmes on themes of socio-economic importance. Technology transfer is part of the policy portfolio and managed by CTI, including knowledge transfer with the KTTs, but does not include public-private structural initiatives such as “competitiveness poles” or similar endeavours. There are very few initiatives targeting innovation in businesses directly, no direct support for non-technological innovation in companies, and no direct support for business R&D (a quite unique situation in Europe). The direct promotion of innovation-oriented inter-firm networks or co-operation is not part of the Swiss federal policy portfolio either. The only part of the portfolio that addresses companies directly consists in initiatives by CTI to support entrepreneurship by soft activities (not involving direct funding). This

Box 3.1. Key components of Swiss Research and Innovation Policy

i) Key orientations of policy

- Investing in **fundamental research** to consolidate the position of Switzerland as a top laboratory of ideas at international level. Key actors are polytechnic federal schools, acting as models of excellence for the entire research system. Cantonal universities and cantonal Universities of Applied Science also perform fundamental and applied research and educate students at the master level.
- Funding special measures for **training** of young researchers.
- Encouraging **transfer of knowledge** from all types of Higher Education Institutions to enterprises.
- Supporting promising, practice-oriented **research projects**.
- Reinforcing **education and professional training** at polytechnic federal schools, universities and Universities of Applied Science, to create a sound technical and professional basis for the national economy.
- Creating the best **framework conditions** for Science, Technology and Innovation (STI) actors and associating them with strategic EU programmes.

ii) Main governance mechanisms

- **Key policy document:** four-year strategic plan for education, research and innovation (currently 2008-2011).
- **Key decision-making and advisory bodies:** the Ministry of Internal Affairs is responsible for higher education and basic research; Ministry of Economy is responsible for Universities of Applied Science and support to applied research. The Swiss Science and Technology Council (SSTC) is the advisory body for the federal government. The Confederation and the cantons jointly manage the university system.
- **Key implementing bodies:** the Swiss National Foundation (SNF) provides funding for basic research at high-level education organisations and manages national research programmes; the Swiss Innovation Promotion Agency (CTI) supports applied research and technology and knowledge transfer. CTI's budget is 20% of that of SNF.

iii) Science base, universities, public research

- **Public research system:** the university system has been progressively reformed since the 1980s, with the aim to increase universities' autonomy, introduce deregulation of hiring and salary policies, and establish strategic planning practices. This evolution is most visible with polytechnic federal schools, and diversity holds across cantonal universities. Refocusing on main strengths is a currently ongoing process supported by federal funding of cross-university co-operative projects. Re-allocation of disciplines across the two polytechnic federal schools has taken place. Quality assessment procedures are being scaled up. The research system shows a dual profile with the successful creation of Universities of Applied Science in 1997: these are geared towards professional education and have a mandate to focus on the needs of industry, while Polytechnic federal schools concentrate on top-level fundamental research. The university system as a whole is widely open to foreign students.

Box 3.1. Key components of Swiss Research and Innovation Policy (cont.)

- **Structural funding:** polytechnic federal schools of high standard, cantonal universities and new Universities of Applied Science (UAS, oriented towards professional education) are funded through block grants by the Confederation. This funding is ruled by four-year performance agreements. The cantons fund their own universities (ten cantons have their own universities), and these also receive supplementary funding by the state (based on student numbers). The role of public research organisations in the country is limited.
- **Competitive funding:** shift of the balance between core and competitive funding to the benefit of the latter type. SNF provides funding for: individual R&D projects in academia; networks of excellence and centres of competence linking departments of various types of universities together; national research programmes conducted in collaboration between several university laboratories; grants for researchers at universities, covering various careers stages.

iv) Knowledge and technology transfer and public-private research partnerships

- **Universities of Applied Science:** main instrument for fostering public-private partnerships as they have the mission to co-operate with companies. **CTI funding:** supports joint applied projects between universities and private companies, with funding allocated to the public actors only (this is the main instrument of CTI). **CTI KTT:** knowledge and technology transfer networks (KTT) geared towards SMEs, with the aim to facilitate their access to knowledge sources in universities.
- **University technology transfer offices.**
- **No public-private competence poles or clusters-types** of instruments in the Swiss innovation policy portfolio, with the exception of the CTI Biotech and CTI Medtech, which are information platforms and hubs for interested companies and research institutions in these sectors.

v) Private R&D and innovation

- **Absence of direct support for companies' R&D and innovation.** The only exceptions are the recently introduced innovation cheques, allocated to companies but redeemed in knowledge institutions, and the Innotour programme, which funds innovative projects in the tourism sector.

vi) Entrepreneurship and start-ups

- **CTI start-ups:** advisory and coaching services for entrepreneurs, and the granting of a CTI label to best performing start-ups (used to facilitate access to finance).
- **CTI Venturelab:** entrepreneurship training programme, in co-operation with several universities and polytechnic federal schools.
- **Venture capital schemes:** no public intervention.

Source: European Innovation Trendchart (2009), Country report Switzerland, www.proinno-europe.eu/trendchart.

liberal approach is supported by executives of the large multi-nationals, responsible for the majority of private R&D in Switzerland, who militates against intervention of the state towards private actors (Economiesuisse, 2008).

In addition, the Swiss innovation policy, targeting excellence in research, is largely a-spatial, which makes sense in the Swiss context. CTI supports research- and technology-driven innovation in a bottom-up perspective, letting research institutions and firms determine the direction of projects to be supported. The support takes the form of project funding and consortium funding. CTI manages the information and exchange platforms Medtech and Biotech, to promote R&D and partnerships in those two key domains of the Swiss economy, but there are no preferential treatments either on a sector or regional basis. Only excellent projects with high promising impacts are retained for funding by CTI. There are convincing arguments for this in Switzerland: the quest for research excellence and effective technology transfer needs to rely on best performing laboratories, firms and individuals, and should not be influenced by regional considerations. CTI promotion is ensured at the national level, and the regional spread of CTI interventions reflects the capacity of actors throughout the country. In countries where other aspects than science and technology-driven innovation are the focus of policy, the importance of proximity for enhancing firms' absorptive capacities (involving other elements than R&D) generates policies that have a spatial dimension. Hence, it is relevant for the Swiss federal policy, as currently defined, to remain a-spatial.

There are various ways in which Swiss innovation policy could become more demand-driven. The 2006 *OECD Review of Innovation policy in Switzerland* (OECD, 2006a), taking on board conclusions from OECD work on the economic situation of the country (OECD, 2006b) acknowledged the success of the current policy for promoting excellent research capacities in Switzerland. It provided several recommendations for further improvement along the existing orientations (recommendations i to iii below) but it also introduced the need for new considerations pertaining to innovation from a demand-led perspective, complementing the existing technology-driven approach (recommendation iv):

- i) Further improving framework conditions, by fostering competition, removing regulatory and financial barriers to entrepreneurship, pursuing the reform of the higher education system.
- ii) Improving the governance of the innovation system: securing planned increases in R&D funding in budgets, reinforcing the role of Swiss Science and Technology Council and the use of strategic intelligence tools (including inputs from SNF and CTI), facilitating inter-sectoral mobility between academia, industry and public sectors
- iii) Improving university-based research through notably more attention to career paths, better evaluation procedures, etc. The role of UAS and their

connection with the business sector is an important point of attention in the recommendations.

- iv) Extending the scope of innovation policy through: increase in CTI funding, shift towards demand-led interventions, envisaging direct funding for innovation schemes, promoting public-private partnerships for innovation, extending support to innovation in services. The latter recommendation, if followed, would represent a marked shift from the traditionally non-interventionist, technology-driven, and public-sector oriented, Swiss STI policy. But it may also pave the way towards a complementary role for regions in innovation policy.

Recent evolutions of the Swiss STI policy show an increasing attention to technology transfer and innovation support, involving some limited spatial considerations. Following the 2002 *OECD Territorial Review of Switzerland*, which recommended an increased focus on technology transfer and greater orientation on society's needs for Higher Education Institutions (HEIs) and Public Research Organisations (PROs), several initiatives have been put in place. The key actor here is CTI, the Swiss Innovation Promotion Agency, and relevant instruments are: the KTT (Knowledge and Technology Transfer) Networks, CTI innovation cheques, CTI entrepreneurship and start-ups promotion. The CTI instruments share two characteristics: their mode of delivery incorporates a regional dimension and they have the private sector as a target group. They are thus important for the discussion of the regional dimension of innovation policy in Switzerland. In addition the Universities of Applied Science play a role of applied research and technology in support for SMEs needs, with a regional dimension. These instruments are discussed below.

3.1.3. Technology transfer with a territorial dimension: the KTT consortia

Since 2005, Knowledge and Technology Transfer Networks (KTTs) have been put in place to promote research collaboration between enterprises and universities. CTI have taken on a new role with the KTT instrument launched in 2005: promoting knowledge and technology transfer between universities and companies throughout Switzerland, including a territorial dimension. This role is designed as an extension of CTI's core business: supporting individual joint R&D and technology transfer projects between public research organisations and companies. The KTT is an initiative originating from the Swiss Parliament.

The KTT Consortia are networks of Higher Education and Research Institutions, managed by CTI, as an extension of its core business: supporting individual joint R&D and technology transfer projects between public research organisations and companies. They have been established after the failure of

two previous initiatives: one was a network of technology transfer institutions at universities (the Swiss Network for Innovation, SNI), and the other an Internet-based resource gathering supply and demands for technology in the private and public sector in the country. Both initiatives failed due to the lack of interest from the knowledge institutions. For the formation of the KTT consortia, CTI called public research organisations and asked them to form coalitions. Companies were not part of this process. The drivers of the networks were the universities with the weakest links with regional SMEs, whereas the Universities of Applied Science were less interested as most of them already had established connections with companies. The main rationale for the universities was to gain more visibility and get business partners for their technology transfer activities. Four generic KTT were established, each covering broad regional areas in Switzerland, and one thematic KTT on eco-technology and energy, covering the whole country. During the selection process some proposed networks have been merged, such as Alliance (western Switzerland) and Ticinotransfer (Italian Switzerland). Advisors in each KTT have a broker mission between the universities part of their consortium and Swiss companies: they refer companies to university partners for joint R&D or technology transfer activities and facilitate communication between SMEs and university researchers.

NRP aims at complementing the technology- and science-driven mission of the KTT with a demand-led function. The CTI is financing KTT for companies having high-tech absorption potential, and the NRP finances activities for firms having a low technology absorption potential for innovation. It should be noted that the NRP does not finance directly KTTs. Some KTTs take advantage of the NRP, but this happens through the cantons. Based on cantonal programmes including KTT in their strategies, the NRP provides funds to the cantons that are allocated to some KTT, the idea being that a “demand-led” function is added to the “technology-driven” mission around which the KTT were constructed. With this added “demand-led” function, KTT would additionally serve a mission to raise awareness and detect needs in companies, especially SMEs, which still need to build innovation capacities and initiate innovation processes. The aim is to enlarge the base of potential clients for the KTT of CTI in general. The history and structure of KTT indicate that they are driven and run according to the technology-push philosophy of Swiss policy and respond to the “science to market” credo of CTI: as such, if properly run, they are suitable instruments for the objective of valorisation of research results in the economy.

However, the need for a territorial dimension for these consortia is unclear: for a technology transfer mission, proximity does not matter as much as it does for an innovation awareness mission. And indeed the KTT are in line with the philosophy of operation of CTI, which to promote innovation at the level of the whole country. As mentioned above, the regional dimension is not

the key focus of CTI promotion: differentiated impacts of CTI activities across Swiss regions is a natural result of the variety in capacity and absorption level from companies and PROs in different parts of the country, not the result of a strategy from CTI. While thematic grouping of expertise under the KTT appears useful for companies, to ensure more visibility on available scientific and technology potential, the territorial definition of the KTT does not seem to respond to the reality of functional regions in Switzerland. The four generic regional KTTs are similar in size but different from the *Grandes Régions* or functional regions identified in Chapter 1. The identification of joint mission and co-operation opportunities by PROs on a purely territorial basis is also more difficult to achieve than on the basis of thematic expertise.

The KTT face some challenges: matching the demand of companies, boosting quality of co-operation, and competition with regional and cantonal initiatives. A first challenge for KTT is to access and detect technology needs in companies with low absorptive capacity. The high costs and weak returns of targeting such an audience act as a strong barrier towards such an evolution. In addition, competences and profile of the advisers in charge of a demand-led mission should be different than technology advisers: technology advisors attached to specific centres have a principal interest in finding clients for their own parent organisations rather than spending efforts to connect them to other providers, hence it is a challenge to recruit advisers that can play this more generic role. The responses from KTT to companies' needs can only be partial since these responses cannot properly cover the multi-faceted dimension of innovation: companies that are not yet organised for innovation need more than technology only to evolve along this new trajectory. One symptom of this difficulty is the fact that companies' views have been downplayed during the whole process of establishment and launch of the KTT. A second challenge relates to the quality of co-operation in the KTT consortia. The KTT have been established from a top-down perspective despite the fact that there were calls for tenders for submission of potential consortia ideas. As a result, some consortia are the result of "forced marriages", a situation that impinges on the quality of co-operation at the heart of the consortia. Third, the various KTT enter into competition with bottom-up initiatives from regions and cantons, claiming to follow similar goals: since sub-regional authorities have not been involved at the origin of the initiative, distrust and competition are likely to emerge whenever they feel that the KTT overlap with their own initiatives, as will be assessed in more detail in Section 3.3. Overall, these are classical difficulties also experienced in other countries and regions, when trying to turn technology-driven instruments into demand-led ones (Box 3.2). Learning from these difficulties can help Switzerland avoid some of the pitfalls experienced in similar initiatives.

Box 3.2. Supply-driven or demand-led innovation policy instruments

The first Scientific and Technological (S&T) intermediaries were established in Wallonia begins in the 1960s: collective research centres have been implemented by sectoral organisations and supported by the Belgian state. Their role was to carry out applied research activities in their fields and to transfer those results to enterprises belonging to their sector. Since that time, many others intermediaries have been set up, some organised at local or sectoral levels, others directly attached to universities and research centres. Together they form a rich set of organisations, but the question of the collective effectiveness of their support for technology diffusion and innovation promotion in the industrial fabric, remained open.

Acknowledging the importance of innovation for its regional development, the Walloon Region launched a new framework for innovation policy in the late 1990s. A priority was placed on the co-operation between S&T suppliers and enterprises as well as the valorisation of university research results. Companies needs in S&T field and the role and position of S&T intermediaries regarding these needs were not really well known. A study was therefore carried out in 2004 and organised as a participatory process involving the main stakeholders of the regional innovation system. The final objective was to propose a systemic reform improving the support to firms and in fine the innovative capacity of the regional industry.

The study found that:

- The system is large, not clearly visible by its target group, and mainly funded by public money. Intermediaries belong to various families: university interfaces; research centres; business and innovation centres; specific networks; public institution specifically set up for transferring technologies.
- These intermediaries do not form a real system, but show rather an addition of self-oriented strategies: most of these institutions offer connecting services to firms in order to serve their own business which is research activities. Very few of them are real intermediary services. Their strategies in that field may be summarised as self-oriented, mainly driven by a (sub-) regional supply-side approach. Although many of these centres are complementary and do not compete with each other, the level of co-operation is quite low, except between members of a family (universities) and between more organised networks. Most of the actors don't know what the others do and what they are specialised in. They are therefore unable to inform and to advice firms on others competencies they may find in Wallonia.
- Intermediaries' clients are often well-known innovative enterprises. Small firms with low innovative capacity are difficult to bring into the system. Many centres work with regular clients belonging to their own sectors or close to their business. Only 20% of the clients are firms with low-innovative capacity while these firms represent around 60% of the total number of firms. An effective intermediary system should lead to a regular increase of small firms with low innovative capacity as new beneficiaries of public funded services.
- The system remains driven by a supply side approach and not by the actual needs of regional firms. Answering the technological needs of regional firms, including non innovative firms, does not appear at the top of the agenda of most of these services providers. The first criteria to organise their activities are the benefits for their own institutions.

Box 3.2. Supply-driven or demand-led innovation policy instruments (cont.)

- Both the efficiency and effectiveness of the whole system are low. The effectiveness of the intermediary system, measured as the link between the inputs and the performances of the system, seems quite low. Even if results are not evaluated on an individual or collective basis, this analysis shows that regarding the size of the system and the number of suppliers, the performances in terms of number of clients or more generally in terms of innovative firms and level of innovation remain quite insufficient.
- The group of most innovative firms represents a very limited share of the regional industry. They have significant S&T needs, but don't really use intermediary services. These firms have developed their own access to S&T suppliers. The role of intermediaries appears thus limited for this target group. The other two groups are firstly innovative firms adapting existing technologies incorporated in new equipments and less interested by specialised S&T services but looking for more applied and technical service. Finally, the largest part is the firms with limited innovation capacity which don't develop innovation strategies and are not involved in the S&T network. The needs of this last group are much larger than S&T support. The main impediments to innovation for them are a lack of management skills, financing support, a lack of internal qualifications and of adequate information.

The main challenges for improving the effectiveness of the Walloon S&T intermediary system were spelled out as follows:

- To shift from a self-oriented approach towards a more open and interactive approach giving room for new questions and for enlarging the number of potentially interested firms;
- To ensure services providers are connected to each other and able to better take advantage of their complementarities and their knowledge and goodwill;
- To increase the incentives for co-operation and the development of common tools facilitating the exchange of information and of "clients";
- To better articulate a first stage support on innovation covering all related aspects (management, finance, design,...) to a more specialised high-tech service requiring highly qualified experts;
- To better articulate a first stage support on innovation covering all related aspects (management, finance, design,...) to a more specialised high-tech service requiring highly qualified experts;
- To improve the visibility of services offered and to better inform enterprises on the structure and organisation of the system;
- To enlarge the number of firms with limited innovation capacity accessing to S&T and intermediary services and finding a real value added in the support offered.

Source: Nauwelaers, C., J. Pellegrin and M. Van Overbeke (2004), "Fonctionnement du système d'intermédiation scientifique et technologique en région wallonne", report for the Walloon Government.

3.1.4. Developing demand for innovation by innovation cheques

In order to kick off a process of research collaboration between SMEs and universities, innovation cheques were launched in 2009. In 2009, as part of the Swiss crisis stabilisation package, CTI launched innovation cheques, with a budget of CHF 1 million. The objective of the scheme is to facilitate access to research by companies that are not yet clients of CTI and increase R&D carried out in co-operation between public and private actors. The cheques, of a nominal value of CHF 7 500, are accessible with minimal procedures to companies (on a first come, first served basis), and can be redeemed in Swiss universities. They give access to around ten days of free work from universities: this is aimed at facilitating the start of R&D partnerships. Following numerous sensitisation events organised by CTI and the KTT, concentrated in the cleantech and smart material sectors, the cheques have been distributed in less than a month.

The innovation cheque is an appropriate scheme for starting new collaborative projects, but less so to attract new companies into such partnerships. An evaluation of the scheme has been carried out after a few months of operation (Good and Geuer, 2009). The evaluation delivered positive results in terms of: the popularity of the scheme (both for SMES and knowledge institutions), its ease of access, its follow-up in the form of a CTI project, its additionality. The cheques were mainly used as a feasibility phase for a larger project. A positive fact is that 77% of companies are not clients to CTI. The scheme seems particularly relevant for smaller companies, active in traditional branches of activities. However the evaluation of the scheme stated that the proportion of companies with pre-existing linkages in the Swiss university system is too high (54%), considering its goal to increase the number of SMEs newly engaged in research co-operation. Hence the scheme acts more as a first step for starting a co-operative R&D project rather than as an awareness raising channel for companies that are not yet connected to knowledge sources (the 46% of companies that are newly engaged in partnerships with research organisations can be seen as a positive outcome of the scheme). This is in line with CTI's mission, which is to focus on the strongest actors, but leaves the question of how to ensure more widespread innovation in the economic fabric open.

Evaluations of the scheme are recommended, with a view of possible adaptations. Lessons from similar schemes in the Netherlands (Box 3.3) point towards the danger of one-off stimulation without lasting effects. This needs to be checked through further independent evaluations of the Swiss innovation check over time. The option of extending the range of knowledge providers to private and foreign actors, like in the Netherlands, deserves consideration in Switzerland.

Box 3.3. Innovation voucher in the Netherlands

The Dutch Innovation voucher has its origin in a small scale project launched in the Dutch province of Limburg in 1997, under the name “research voucher”. After a positive evaluation of this first experience, it was subsequently extended to two other provinces and to the whole country under the name “innovation voucher”. Its aim is to support innovation in SMEs through enhanced co-operation between SMEs and knowledge producing organisations (universities, public research institutions). Similar to the Swiss innovation check, the Dutch innovation voucher, of a face value of EUR 7 500, can be used by a company to get access to research work at a public research organisation. In 2004 and 2005, 1 120 vouchers have been distributed in three waves, for a total budget of EUR 8.25 million. The demand exceeded by far the supply, as in Switzerland. At that time, there was a main difference between the two schemes: the Dutch voucher was assigned randomly to companies through a lottery, rather than on a first-come, first-served basis. This original procedure eliminates the selection bias (the fact that the more active and innovation-aware companies are more likely to become owners of the vouchers).

An evaluation on the 2004 and 2005 rounds (Cornet, 2007) finds that as a result of using the scheme, Dutch SMEs commission more research to public research institutes. However, this evaluation warns that this effect might not last: after project completion, SMEs do not seem to continue to co-operate with the research organisation. Like in Switzerland, most companies are new clients of the innovation agency (Senternovem), additionality is high (80% of companies – the same figure as for the Swiss voucher – would not have carried out the project without the voucher), and administrative burden perceived as low. The main effects of the vouchers seem relatively marginal: the use of vouchers has impacts on improvements in innovation processes, but not on product or process innovation. Another evaluation was carried out on the period of 2005-2006, and was again very positive. However, it noted that up to 40% of innovation vouchers are actually not used, a downside of its ease of access.

Following successive evaluations, the Dutch scheme has grown in size and evolved. A new important evolution is that Dutch SMEs are now able to use their vouchers not only with domestic public research institutions, but also with private large companies, private non-profit research organisations, and foreign public research organisations (in Belgium, Germany, Sweden and Scotland). The allocation procedure in the form of a lottery starts only after a certain point of demand saturation. Two types of vouchers are available: small vouchers of EUR 2 500, which can be used in public research organisations, and large schemes of EUR 7 500, for which the company has to pay one-third of the costs (this is a new feature from 2006). Companies can access the big vouchers if they have not been recipients of large subsidies in the past three years, and can access small vouchers only once. The 2009 budget for vouchers is EUR 26.25 million.

Source: www.senternovem.nl/innovatievouchers.

The innovation cheques scheme does not foresee a role for sub-regional organisations. In addition, the role of cantonal and regional actors and initiatives in promoting the scheme has been minimal, which raises again the issue of complementarity and synergy between federal and regional initiatives for innovation promotion.

3.1.5. Promoting entrepreneurship and start-ups

CTI is active in supporting new firms creation in Switzerland through two initiatives: CTI Entrepreneurship and CTI Start-up. CTI Entrepreneurship has the broad goal of promoting entrepreneurial spirit and support the creation of new companies throughout Switzerland. The instrument used is the advisory and training programme “venturelab”: it offers targeted training modules to potential young entrepreneurs, as well as those who are already active. It is carried out by the three types of universities. CTI Start-up has existed since 1996: it supports innovative individuals to set up new companies by means of coaching and advice. Regionally based CTI coaches perform this function. CTI also distinguishes the most promising ventures by means of the CTI Start-up label, which helps these companies get credibility on the financial market.

Complementarity between CTI and cantonal/regional activities in start-ups promotion is not ascertained. CTI had the first move with these initiatives and has developed a visible network of start-up coaches, but several cantons or regional organisations promote such services too. It is not clear whether these target different groups and act hence in complementarity, or whether there is duplication or unnecessary competition. In the canton of Bern, the view is that of a complementarity: high flyers are the target of CTI and they are given long-term support, low flyers are cared for by inno-BE, which provides short-term support. In western Switzerland, the feeling is that there is rather substitution and overlap and lack of recognition of existing competences in cantons. Venturelab is perceived by some as an initiative by the University St. Gallen only.

3.1.6. The Universities of Applied Science

An increasingly important role is played by the Universities of Applied Science. The Universities of Applied Science (UAS) have been founded in 1995 via the merger of a large number of engineering schools spread over the country. These seven UAS have received a triple mission: education (including lifelong learning), applied research and services to society. Attracting one-third of the country’s student population, they have acquired an important and specific position in the Swiss higher education system. Their main characteristic which distinguishes them from other HEIs is their practical orientation. UAS are jointly run by the Confederation and the cantons, which involves a complex governance structure (OECD, 2006a). The Confederation funds one-third of UAS’ operating costs. They receive money

from cantons, which fund parts of the costs (often on a cross-cantonal basis). The rest of the funding comes from student fees and third-party funding (CTI grants, specific projects). Two-thirds of the CTI innovation vouchers are used in UAS. This funding arrangement creates a challenge for UAS. The danger is that CTI grants for collaborative R&D projects or for KTT are seen primarily as means for filling funding gaps rather than as means to undertake projects driven by industrial demand. During the implementation phase of the UAS, several peer reviews have been carried out in order to secure the quality of studies at UAS, and accreditation and quality-control systems have been put in place in line with the Bologna agreement. New constitutional arrangements have been voted in 2006, which place the UAS under the same regulations as other universities, in order to secure their full integration in the national and international higher education landscape.

Despite common challenges, there is a large diversity amongst Universities of Applied Science. An evaluation of the CTI funding for UAS, carried out in 2006, noted that the various UAS showed a large diversity of profiles and specialisation, and that the notion of applied R&D differs quite a lot from one establishment to another (Mayer *et al.*, 2006). The UAS are confronted with difficult challenges in attracting and retaining good researchers, since their positioning on the research front is quite unclear. The impact analysis revealed that:

- At project partner level (companies), the main impact lies in the improvement in thematic and R&D competences and in the ability to cooperate with UAS partners, rather than in economic impacts. Most of the firms participating in the funding schemes are companies that were previously involved in CTI projects;
- At UAS level, CTI funding helps establish R&D competences and plays a role in providing legitimacy to UAS as technology transfer institutions recognised by companies. The evaluation stated moreover that CTI contributes to, but is not in a position to influence strategic positioning of the UAS directly. The evaluation gathered evidence of a continuous learning curve from CTI to adapt its funding to the needs of UAS. The thematic diversity of applied R&D projects at UAS poses challenges for the CTI selection process.

KTT should help UAS to match their goal of responding to SMEs needs. The “third mission” of UAS has a regional dimension, since it is expected that the UAS would deliver services in priority in their regional environment. A challenge for the UAS is to develop thematic priorities in line with SMEs’ needs. Creating more direct links and co-operation with demand-led structures such as clusters or industrial associations is one option. In practice, it proves difficult to organise a strict matching between UAS thematic orientations and the economic specialisation of the regions in which they are

located. It is the role of the KTT to organise networks involving the UAS in order to improve accessibility to UAS knowledge from companies or other stakeholders: efficient networking is one answer to this need for better match.

The complementarity between “top-down” federal innovation policy and “bottom-up” regional innovation promotion initiatives needs to be clarified. A possible evolution of Swiss innovation policy, towards a more demand-led approach, incorporating spatial considerations, was suggested by previous OECD work on Switzerland (OECD, 2006a). The critical overview of Swiss federal innovation policy in the above sections has shown that existing policy instruments at federal level fall short of addressing such a shift. This raises the issue of possible complementarities and a division of labour between national and regional innovation policies in Switzerland. To this end, the next sections analyse the situation with respect to innovation policies developed at the regional level and the role played by NRP. The last part of this chapter will address the question of multi-level governance of innovation in the country: what should be the general objectives of policies at the various levels? What should be the target groups, instruments and co-operation mechanisms between the various levels, to ensure synergies and effectiveness of the whole system?

3.2. Swiss regional innovation policy: state of play and role of NRP

3.2.1. Innovation promotion at regional level in Switzerland

There is a large diversity in the nature, scope and funding arrangements for cantonal initiatives for innovation promotion. Even if the NRP is expected to fund new initiatives, these did not emerge from a vacuum: they rested on existing innovation promotion activities at sub-national level. With the launch of the NRP, the huge diversity in regional innovation promotion activities, at regional and cantonal levels has become more visible. These initiatives fall under the economic promotion activities of the cantons, for which the traditional instruments are infrastructure provision and taxes. The type of innovation promotion activities found across cantons include: collective awareness-raising events; first line generic short business advice; second-line more specialised business advice; start-up advice; training services for entrepreneurs, support for projects development; cluster facilitation (*e.g.* a major orientation in Nidwalden), see Box 3.4; brokerage towards specialised resources, including finance providers; technology brokers and coaches; provision of hard infrastructure (incubators).

The mix of activities and the balance between them vary greatly: some offer a narrow range of them, others a full range. Many structures target the whole economic fabric, but some are specialised in specific sectors (*e.g.* i-net Basel). It seems that often, because of their small scale, delivering agencies have in reality a core business which defines their main activity despite a

Box 3.4. Cluster initiatives in the tool box of regional innovation promotion

An analysis of cantonal clusters initiatives in Switzerland has been carried out in 2008. This analysis reveals that clusters are a frequent object for cantonal economic promotion, but that they also cover a wide variety of different initiatives, under various labels (clusters, poles, networks, economic motors, etc.). Many cantons have undertaken analyses of existing clusters, based on a mix of economic diagnoses and consultations of actors. The existence of synergies between local actors is often an important criterion for deciding about clusters in a region. The analysis has found 62 clusters initiative, half of which of cantonal scope. Those clusters are almost equally spread in three categories: i) clusters with a market orientation; ii) clusters with a value-chain focus and iii) clusters with a knowledge and technology transfer dimension.

The instruments used to support clusters fall in two categories:

- i) General economic promotion instruments: taxes, support to enterprises creation, industrial spaces. Some cantons use these generic instruments in a selective way to promote certain activities
- ii) Specific cluster initiatives: support for promotion, information or knowledge transfer in the domain of activities of the cluster. In this case, the private sector is often strongly involved and the support takes the form of public-private partnership, with the public sector playing a catalyser role.

The analysis notes that few cluster initiatives are subject to evaluations. Half of cantonal plans produced under the NRP include cluster promotion activities. This raises the issue of the need for co-ordination and of checking additionality and value-added.

Source: Ecodiagnostic (2009), "Les clusters dans l'économie suisse : regard statistique et regard politique", rapport final au SECO, Geneva.

wider menu offering (e.g. cluster management for inno-BE in Bern). These activities are delivered either by economic promotion services of the cantons directly or by dedicated agencies funded by the cantons (e.g. inno-BE for Bern, Creapole for Jura) or several cantons (Platinn). The funding structures vary greatly, from fully publicly funded structures, to privately funded structures (e.g. inet-Basel), and a majority of mixed funded structures. CTI funds the KTT, and some of them also get funds from the cantons within the NRP framework. In some cases such funding can make an important quantitative difference from the pre-NRP period. Linked to that diversity, the financial contribution of companies range from "all free" services to "all paying" services, but in most or all cases price paid is below market price. The borderline between such services and private consultancy services might get blurred in some cases.

The visibility of regional innovation promotion initiatives is limited. These regional innovation promotion activities are mostly small-scale, locally-focused, and local resources-based activities (now complemented by national funding from NRP). Due to the institutional structure of the country, there is no complete view on these initiatives, which are run in full autonomy at cantonal (or sub-cantonal) level. Systematic information covering these practices does not exist.

The quality of these regional innovation promotion activities is highly variable. The SWOT analyses in the cantonal plans are limited in scope and often the task of a few officials in charge rather than the result of a thorough independent analysis. There is no evidence that adequate quality control mechanisms are in place for innovation promotion actions, and independent evaluation practices are extremely scarce. When quality control and/or evaluations are present, they are most often conducted internally, without inputs from external actors. Because of the fragmentation and lack of exchange on cantonal activities for the promotion of innovation, there is a high danger for reinventing the wheel across the country. The small scale of many initiatives and agencies prevents an investment in professional development of tools and methods to support innovation.

3.2.2. The expected changes in regional innovation policy with the NRP: lessons from the past

The NRP requires regional innovation policies to become strategic and more effective. As developed in Chapter 2, the advent of the NRP brought a major change in perspective with respect to previous instruments of regional policy, especially Regioplus and LIM. Regional initiatives under the NRP need to display a stronger strategic orientation, as the supported projects should develop more synergies and contribute to higher level development goals. The nature of the support has shifted from infrastructure towards integrated, innovation-oriented economic development initiatives. In addition, public funding should act as an impulse for initiatives that can become self-supported over time; and the centre of gravity for the elaboration and implementation of regional development policies has shifted from the regions to the cantons. These evolutions present important challenges in terms of governance and capacity at the sub-national level.

It might be difficult to achieve this due to lock-in in past policy paradigms. An evaluation of Regioplus, which shares with the NRP the goal of promoting competitiveness through structural change and innovation in rural regions, carried out in 2007 points at challenges that are also relevant for NRP (Ecoplan *et al.*, 2007). The majority (two-thirds) of projects supported by Regioplus falls under the domain of tourism. A few projects were also

supported under the category “competences centres”. The evaluation rightly notes that the dominance of individual projects in the tourism area did not really respond to the general objective of Regioplus. The assessment of the innovative character of the projects differentiates between projects with the following degrees of novelty, and calculates the share of projects which cover innovative ideas at each level.

Half of the projects (49%) are innovative at the sub-cantonal or cantonal levels only. Cross-cantonal (19%) and national projects (22%) are more seldom, and international projects rarer (10%). This illustrates the difficulty to move beyond the cantonal level for defining regional development projects. As noted in Chapter 2, this problem of scale persists in the frame of the NRP. Another finding from the Regioplus evaluation is that most of the projects remain dependent from public funding after the period of public support. In terms of impacts, the evaluation suspects that Regioplus must have contributed to a rise in regional value-added, but without being able to quantify this impact or to exclude crowding out effects of the programme² (i.e. a possible lack of additionality). The job and value-added creation impact of RegioPlus was deemed impossible to estimate, due to the too large distance between impulses created by Regioplus and the job and value added creation phenomenon. The small scale of Regioplus (CHF 69 million over 10 years) also militates against searching for a direct relationship between the outcomes of such a programme and economic impacts.

NRP presents challenges in terms of the scale of action and capacity development at regional level. This Regioplus evaluation points towards difficulties that are likely to remain under the NRP, due to inertia in policy making, to persistent capacity problems, to difficulties for inter-cantonal co-operation, and to the small scale of NRP funding and its indirect links with economic performance. Most of these points have been discussed in Chapter 2 for the NRP as a whole, and apply to the innovation dimension of the NRP.

3.2.3. Achievements with respect to innovation under the NRP

Limited strategic monitoring of the NRP hampers a detailed analysis of the innovation content of cantonal plans. In Chapter 2, it was pointed out that capacity limitations are likely to act as barriers for the development of innovation strategies at cantonal level. Two main questions arise here: how far is innovation present in those plans, and what is the content of the innovation-oriented part of the plans. The lack of detailed and harmonised information on projects supported under the cantonal plans makes it difficult to answer these questions accurately. A more detailed reporting process for NRP at project level is needed to ensure a strategic monitoring of the programme.

Innovation promotion is part of cantonal plans, but the weight of this dimension remains unknown. The first question above can be approached by looking at the synthesis of development plans' content carried out by Regiosuisse.³ This synthesis includes 20 categories, but none of them refer explicitly to innovation. Hence initiatives under innovation might be hidden in several categories and cannot be easily extracted from the data. One category is "transfer and knowledge management in industry, trade and services" and might be closest to a (narrow concept of) innovation (e.g. innovation in tourism may also be found in other categories). This category includes 30 projects out of a total of 337 projects. Since the indicator: "number of projects" as a measure of priority orientation of the plans has clear limits, few conclusions in terms of overall innovation intensity of the plans, can be drawn from this analysis. Relative budget values would need to be assigned to these projects to improve this approximation, but the monitoring procedures of the NRP do not allow this (see Chapter 2).

Where successful strategic innovation policy exercises are carried out, innovation seems to stand out more prominently. The 30 projects with an innovation label are spread over 18 cantons. The cantons of Jura and Vaud stand out for their large number of innovation-oriented projects. This is most probably linked to the successful process followed under the RIS Western Switzerland, as a support for the preparation of the plans (see below).

Numerous innovation-oriented projects are funded under the NRP. They tackle a very diverse range of initiatives: some overlap and some differ from federal instruments. An important component of the plans is technology transfer initiatives, in line with the main orientation of the national innovation policy. But there are also numerous initiatives which target companies directly, either new ones or existing ones, and address wider innovation needs through e.g. cluster initiatives, and offer soft support (advice, coaching) for which geographic proximity matters. An example of promotion of innovation in enterprises is the inter-cantonal project Platinn, an innovation support network linked to RIS Western Switzerland. Those orientations point towards possible complementarity with the national policy orientation (see Section 3.2 for a discussion on this point). Those projects often include a thematic or sectoral focus, which is another differentiating factor from the federal approach. The innovation-oriented programmes and projects in the plans cover the following topics:

- **Organisation of technology transfer** (technology transfer, science-industry relationships (several occurrences, the most frequent) (Box 3.5); networking of scientific and technology transfer potential, including the support to the KTT initiatives; competence centres, specialised technological poles);

Box 3.5. Technology Transfer and clusters in Fribourg

The scientific and technology pole of Fribourg aims at providing a unique platform for technology transfer between research institutions and companies of the canton. It actually combines classical technology push activities through which companies can benefit from research results, with cluster promotion activities which concentrate on relationships between private actors. Companies finance 20% of the joint research projects, and the rest is funded by the pole, with equal shares coming from cantonal and federal (NRP) sources. The core of the pole is a technology transfer unit, which helps with collaborative R&D projects development and with intellectual property management. The pole is structured around four clusters, with a co-ordinator in one of the higher education institutions of the canton: plastics, energy and building, nanotechnology, IT and security systems.

Source: www.pst-fr.ch.

- **Support to innovation in SMEs** (promotion of innovation in enterprises; support for SMEs; networks of SMEs for knowledge transfer; clusters in TIC, life sciences and energy, with incubator and SMEs support; innovation watch system);
- **Support for new firm creation** (support to new firms and start-ups (see Box 3.6 for concrete examples); stimulation of youth entrepreneurship and creativity; incubators linked to high schools);
- **Human resources development** (training and education actions; “school and science” actions);
- **Policy governance** (strategic exercises, participation in RIS projects).

In conclusion, the NRP has placed a focus on innovation in cantonal plans, and this has been effective in pushing this item on cantonal policy agendas. While NRP is “small money”, it can act as an effective leverage for supporting cantonal innovation policies, when there is a sufficient concentration in those projects. The leverage effect can be obtained through the additional funding offered to cantons, but also to a certain extent through a labelling effect. Where successful strategic innovation policy exercises are carried out, innovation seems to stand out more prominently. The 30 projects with an innovation label are spread over 18 cantons. The cantons of Jura and Vaud stand out for their large number of innovation-oriented projects.

3.2.4. The inter-cantonal dimension in innovation promotion

The inter-cantonal dimension in innovation promotion is not well developed. Regarding the territorial level at which regional innovation promotion is conducted currently in Switzerland, the situation is as follows: there is an ongoing major trend for streamlining actions from regions to the

Box 3.6. Support for company creation in Swiss regions

A typical intervention area of Swiss regions and cantons in innovation policy concerns the support to company creation and early development. The following examples are cases where the NRP supports such cantonal initiatives:

Jura: Creapole is an initiative aiming at promoting innovation and diversification of the economic fabric of the Jura canton, one of the less developed Swiss cantons. The focus is on firms and branches with high value-added and high potential for diversification of the traditional economy towards high-tech activities. Creapole works towards the promotion of infrastructures for new companies (incubators), provides coaching and advice to new entrepreneurs, and conducts awareness raising activities for new company creation in higher education establishments. Creapole is a private company, partly funded by the canton of Jura, but the majority of funds come from private investors. Most of the economic promotion activities of the canton have been transferred to Creapole.

Fribourg: FriUp is an association pursuing the aim of increasing innovation capacity in existing and new enterprises. It is jointly governed by the canton, representatives from the higher education and the business sectors. FriUp functions as a first-stop shop for regional companies: it provides advisory services to companies at various stages of development, and links to specialised service providers according to needs. It has a department for start-ups, to which it provides free advice and (after selection) hosting in an incubator.

Neuchâtel: Neode is another technology park offering space and advice for new and established innovative companies, with a specialisation in nanotechnology and microelectronics. It works with a network of specialised partners. It is an initiative of the canton, like the Finergence fund for start-ups: the fund provides loans as seed-money for feasibility studies before company creation.

Typically, these territorial initiatives do not provide direct funding to innovative companies or company creators, but act as intermediaries for those companies to access funding sources (risk capital, specialised investment funds, etc.). Most are run as private companies, but are strongly linked to regional authorities: they implement a public support mission for the canton and benefit from public support (federal, cantonal, sometimes regional) in addition to private investments, and work under the “triple helix” model (gathering governments, businesses, and knowledge institutions).

Source: www.friup.ch; www.creapole.ch; www.neode.ch.

cantons, and a minor trend towards inter-cantonal actions. The legacy from previous regional policy instruments where the target groups were the regions is visible here. Many cantons are struggling towards lifting their strategies from the sub-cantonal regional to the cantonal level, and hence do not feel ready yet to enter into inter-cantonal joint development.

Barriers exist for in inter-cantonal co-operation for innovation promotion. As mentioned in Chapter 2, there are important disincentives for inter-cantonal co-operation, which are at play for regional innovation promotion too. All co-operation steps are concerned with this difficulty, from the less to the most sensitive ones: sharing information on actions, exchanging on methods and building joint tools, developing co-operative projects, implementing joint activities funded on a multi-cantonal basis. It is not rare to hear views such as “a canton cannot pay for an organisation which is in another canton”. One of the communities of practice established by Regiosuisse was supposed to work on the following theme: “Implementation process of the NRP, inter-regional, inter-cantonal and international co-operation”. Regiosuisse reports that the work of this community had to be terminated due to the lack of interest of local actors in the theme.⁴ Significantly, those themes that were dropped from the work of this community concerned the territorial co-operation. The documents from this working party refer to barriers to inter-cantonal co-operation linked to inter-cantonal competition.

Despite an unfavourable setting, there are experiences with inter-cantonal innovation promotion. An in-built contradiction exists within the NRP, which asks for cantonal development plans as well as for inter-cantonal co-operation. As a result, inter-cantonal initiatives need to appear under one cantonal plan only and hence be placed under the responsibility of one canton even if it is a joint initiative. Also, the official procedure for NRP funds allocation creates competition between cantons, since money is preferably allocated to cantons presenting the best plans. The example of western Switzerland (Box 3.7) shows though that inter-cantonal co-operation can work, although not without difficulty, and there are other examples in the field of technology transfer (e.g. inet Basel is funded by three cantons, ITZ by six central Switzerland cantons, etc.). Inter-cantonal co-operation is institutionalised in other sectors such as health and education, showing that such co-operation can become reality when joint interests are identified. Well-conducted strategic exercise around regional innovation policy can help foster the emergence of cross-cantonal innovation strategies. Regional Innovation Strategies (RIS) projects, when run under good conditions, may help pave the way towards inter-cantonal innovation promotion activities (Box 3.8).

3.2.5. Cross-border co-operation in innovation

Switzerland is a country with large potential for international cross-border co-operation. Due to the geographic situation, the small size and high economic outreach of the Switzerland economy, the relevance of cross-border activities in innovation is particularly high (Box 3.9). It is also one important direction promoted by the NRP, which is supporting inter-cantonal and cross-border activities. Despite the fact that the country does not belong to the

Box 3.7. Structures for inter-cantonal co-operation in western Switzerland

Western Switzerland has established the Council of Western Switzerland's Ministers of Economy (CDEP-SO) (*Conférence des chefs de département de l'économie publique de Suisse occidentale*), gathering the cantons of Bern, Fribourg, Geneva, Jura, Neuchâtel, Valais and Vaud. This platform acts as a support for the development of inter-cantonal projects.

One of those projects is a technology platform dedicated to "cleantech", which is established following a prospective study ordered by the CDEP-SO. The idea is to position western Switzerland internationally in the cleantech business, joining forces of business, research and training actors in the seven cantons. The platform follows three others already active in the large region: Bioalps in life science, Micronarc in micro- and nanotechnologies and Alp ICT for information and communication technologies. They are all supported by the NRP.

The Platinn innovation support network a truly inter-cantonal initiative, is recognised as a project in all cantons involved, with a lead in the Vaud cantonal plan. Redistribution mechanisms of the NRP money across the seven cantons are adopted but this creates an unnecessary layer in funds distribution. It also blurs the visibility of these inter-cantonal initiatives in the NRP. The role of the RIS project (see Box 3.8) was instrumental in achieving this cross-cantonal co-operation in western Switzerland.

European Union like its neighbours, its boundaries are permeable to capital, people and knowledge flows. Thanks to their good level of development, the neighbouring French, Italian, German and Austrian regions, and Liechtenstein, all offer rich opportunities for developing partnerships and joint initiatives with Swiss cantons.

The NRP allows regional actors to co-operate with neighbouring regions. As mentioned in Chapter 2, the NRP integrates the participation of Swiss actors to the EU-funded INTERREG programme: CHF 40 million have been reserved for this participation. An examination of the Swiss participation in the EU-funded INTERREG programme shows that the 20 cantons at the Swiss borders are involved in the cross-border part of the programme: the French border through the "Lémanic Bassin" and "Jurassic Arc" programmes; the French and German borders in the "Upper Rhine" programme; the Italian border in the "Swiss-Italy" programme; and the German and Austrian border in the "Alpen Rhine-Constance Lake-Upper Rhine" programme. The cross-border activities of Swiss companies and research institutes are remarkable and well-known, in particular around the Basel area in the north and along the Swiss-French border on the west. The less-well known case of Eastern

Box 3.8. RIS projects in western and Central Switzerland

The RIS projects, sponsored by the European Union, have the goal to support regions to design innovation policies in a robust way. They are structured around four activities: i) an assessment of the strengths, weaknesses, threats and opportunities of the regional innovation system; ii) a consensus building phase involving a wide diversity of actors defining key directions for innovation promotion; iii) a strategy building phase in which the key directions are expressed in the form of actions lines and iv) the setting up of a governance, monitoring and evaluation system for the policy.

Switzerland has been involved in two projects, covering two functional regions, western and Central Switzerland. In both cases, the projects have been instrumental in developing a clearer view on SME's needs for innovation, based on robust analysis rather than just opinions from "those who know". Beyond that however, it can be said that the western Switzerland RIS brought some good results, while the Central Switzerland RIS failed to reach its objective.

In western Switzerland, the need for a coalition of French-speaking cantons helped to obtain the underlying political consensus and joint commitment of the seven cantons for the strategy. Analyses were conducted and the basic idea of innovation as a business-driven phenomenon, different from R&D, went through the policy circles and generated initiatives, and a lasting inter-cantonal co-operation visible in the NRP.

In contrast, the RIS Central Switzerland started without a political consensus and was driven by a high school. In those conditions, despite the value in the substance in the analyses, and the recognition of the sub-critical size of the cantons (Obwalden has 30 000 inhabitants) results achieved remained at the level of "broad visions" since they did not benefit from political legitimacy. This RIS may have contributed to some cultural changes, but its impact on cantonal (and certainly inter-cantonal) policies remains marginal.

Switzerland is taken below to discuss the options and challenges for the NRP to capitalise on the cross-border potential for innovation.

3.2.6. Cross-border potential in innovation in Eastern Switzerland

Eastern Switzerland might benefit from enhanced cross-border co-operation. Eastern Switzerland does not include leading urban metropolitan regions like the northern or western parts of the country. As such, it could be seen as belonging to "the periphery" of Switzerland. According to data presented in Chapter 1, despite its high-tech orientation, this part of the country experiences less growth than the leading "motor" regions. The challenges faced by this *Grande Région* raise the question of the potential for

Box 3.9. The case for a cross-border approach to innovation promotion

Much attention is being paid across OECD regions to the question of adapting regional innovation policies to the particular features of the targeted innovation system and companies. The challenge for regions is to identify their unique advantages and capitalise on them with the view to develop “smart specialisation”. To do so, many regional innovation strategies have followed a “supply matching demand” approach, creating a bias towards autarkic approaches, confined within regional boundaries. However, even in the largest OECD regions, it is very unlikely that innovation drivers, barriers and opportunities, are all to be found within regional boundaries. The globalisation of economic activity, the need to tap into and connect to wider knowledge networks, the internationalisation imperative of companies, are all recognised in regional strategy documents. But regional policies mostly deploy their tools in the restricted space of the administrative region.

Thus, amongst the many issues policy makers face when developing effective policy portfolios, the question of the relevant geographic space to deploy policies is a critical, but neglected one.

The problem is particularly acute in the innovation policy domain. This is because of three phenomena:

- i) **Cross-border knowledge spillovers:** many innovation policy instruments are likely to generate spillover effects across regional boundaries. For example, the potential outreach of a technology transfer centre is likely to go much beyond the borders of the administrative region in which it is established. It is hardly possible, and actually, not advisable, to restrict the diffusion of knowledge supported by public money within borders defined from an administrative perspective. Cross-border spillovers thus create problems of appropriation when the investment is made by one regional authority only.
- ii) **Economies of scale and indivisibilities:** the size of many regions prevents them to invest in a full innovation infrastructure matching all the needs of regional stakeholders. Innovation support services need a critical mass of activities to reach a good level of professionalisation, specialised venture funds can only work efficiently when there is a sufficient base of projects to spread risks, technoparks and similar real estate initiatives with an international outlook need to be branded at the level of larger territories to get good visibility, etc.
- iii) **International and global outreach of many innovation activities:** companies are extending their value chains and markets, and their recruitment areas, towards larger territorial spaces. From a business perspective, there is no *a priori* reason why areas of smart specialisation should necessarily correspond to administrative regions. The promotion of inter-company linkages and joint innovative ventures in the form of clusters or competitiveness poles would need to take into account this openness.

cross-border innovation as a stimulus for growth. The peripheral location in a Swiss context could mean for example that companies face relatively more difficulties in attracting qualified workers: ensuring a more fluid cross-border market might alleviate this constraint. Current developments point towards both potential and actors' commitment, but also to limits and barriers, for enhancing innovation in this cross-border region.

Cross-border co-operation exists, but is hampered by the lack of robust partnership between the various cantons in Eastern Switzerland. To start with, it should be noted that there is no commonly agreed definition of a functional region such as cross-border Eastern Switzerland. On the Swiss side, the Eastern Switzerland *Grande Région*, as referred to in Chapter 1, does not have an institutional basis. Various place-based initiatives target that area on a variable geometry basis. One main initiative, funded under the INTERREG programme, covers the "Alpen Rhine-Constance Lake-Upper Rhine" area. This large cross-border area, also referred to as the "Bodensee" (Lake of Constance) area, includes three Swiss cantons (St. Gallen, Appenzell Aussenrhoden and Schaffhausen), part of the German region of Baden-Württemberg, the Austrian Land of Vorarlberg and Liechtenstein. Another area targeted by some initiatives is the "Alpen Rhine Valley". That smaller cross-border region includes the cantons of St. Gallen and Graubünden, part of the Vorarlberg region in Austria and Liechtenstein, but not the German neighbouring area. Thus not only foreign regions considered as part of the cross-border area differ, but on the Swiss side too, different cantons are considered. This variable geometry can be an advantage for tailoring initiatives based on the potential and joint strategies of the areas, but also creates difficulties to gather a different set of actors in charge of economic development in these zones.

Innovation is part of these cross-border co-operation frameworks. One example of an innovation-oriented initiative supported by NRP in Eastern Switzerland is the cross-border cluster project around nanotechnologies: Nanocluster Bodensee. This INTERREG project is co-ordinated from Switzerland (canton St. Gallen). The focus of the cluster is on the utilisation of research results rather than the conduct of research. Nanotechnology is a pervasive technology with potential applications in a large diversity of fields: life sciences (medical techniques), tools and sensors, materials and surfaces (coating, printing, textile and woodworking industry), optics and electronics, nutrition. The cluster includes companies and research institutes from the large Bodensee cross-border region. The platform acts as a meeting place for generating innovative projects using nanotechnology. As mentioned above, not much is known about the effectiveness of cantonal cluster policies, due to lack of evaluations. Evaluating a cross-border cluster initiative such as the Nanocluster Bodensee presents technical challenges, but deserves much attention due to its potential broader outreach.

The Universities of Applied Science in Eastern Switzerland offer potential for services to the economy, and are networked in the cross-border region. The Universities of Applied Science in Eastern Switzerland are, on the one hand, the Hochschule Luzern, with specialisation in Architecture and Technique, Business Management and Informatics, social work, design and art, and music; and, on the other hand, the UAS Eastern Switzerland. The latter gathers the University of St. Gallen, specialised in business management, social work and health management; the Hochschule Rapperswil, specialised in Building and Technique, and Planning, the Chur Hochschule for Science and Technique and the Technical Hochschule of Buchs (jointly funded by the cantons of St. Gallen, Graubünden and Liechtenstein). The UAS Eastern Switzerland belongs to the Internationale *Bodensee-Hochschule* (IBH), a network of Higher Education Establishments from Eastern Switzerland, Germany, Austria, and Liechtenstein, in the Bodensee region. The specialisations covered by these UAS are likely to find matches in the economic fabric of the functional region, but at the same time may provide technology and knowledge to other parts of the country, or act as bridges towards the other Swiss UAS. An independent evaluation of the quality and relevance of services to companies, as well as of the intensity and effectiveness of the networking between the UAS (which points towards the role of KTTs) would be welcome, 15 years after the establishment of the UAS. The trans-border character of the Eastern Switzerland UAS should receive specific attention, with a view of possible lessons to be applied to other UAS.

Establishing cross-border innovation promotion centre is an example of project that faces the difficulty of reaching consensus between all regional authorities. The Swiss Institute for Entrepreneurship located in the Graubünden canton, has developed a feasibility study for a concept of regional innovation centre, with the support of the canton. The study has taken the “Alpen Rhine Valley” as the target territory for the establishment of such a centre. This is a SME-oriented region, including 1 000 so-called “high impact” firms, is specialised in industry, with dominant sectors being metal and machine construction, textiles and food. Based on an analysis of regional SMEs’ needs, the study team developed a concept of cross-border regional innovation centre. The goals of such a centre would be to enhance innovation potential of regional SMEs, by providing information, partner search, project management support, and facilitating access to funding sources. The funding structure would rely only in a minor part on public sources (for administrative costs) and the rest would come from service sales to companies. This idea was supported by regional chambers of commerce and industry associations. The Liechtenstein stakeholders are in favour of cross-border and cross-cantonal co-operation in SME support for obvious critical mass reasons. The Liechtenstein Institute for Entrepreneurship provides SMEs support services that could be integrated in the services of a regional centre for innovation.

This feasibility study for a cross-border regional innovation centre has not been translated into a concrete initiative, due to lack of agreement and common vision between the various relevant public authorities.

Similar hurdles prevail for the establishment of competence centres on a cross-border basis. The Austrian region of Vorarlberg is a small industrial region, including innovative firms responsible for a high regional patenting rate (the region ranks eight in EU patenting rates), and several industry-oriented research centres in selected thematic areas. The University of Applied Science offers tertiary education, but due to its peripheral position in Austria, the region relies on and benefits from the proximity of German and Swiss Higher Education Establishments. The regional innovation policy is oriented towards knowledge diffusion rather than knowledge creation, and the facilitation of networks and industry-science collaboration partnerships (notably through participation in Austrian public-private competence centres). Swiss partners co-operate with Austrian competence centres (without being funded by Austrian sources). An Agency (WISTO) is responsible for co-ordination of regional instruments to support innovation and for the delivery of services such as stimulation of participation in R&D programmes, IPR consultancy services, partner search for knowledge and technology transfer programmes, etc. The current situation is that Liechtenstein and Austrian actors co-operate bilaterally with individual Swiss cantons but are faced with difficulties when trying to establish partnerships at cross-cantonal level. The creation of joint cross-border infrastructures such as competence centres has not been successful until now, because of the high complexity for managing funds from different origins.

The fragmented dimension of cantonal innovation promotion activities plays a role in the difficulties to establish cross-border innovation promotion initiatives. Regional innovation policies of Swiss cantons, as detailed above, are of a much more limited scale, and rely on different instruments than Austrian regional innovation policy. Cantons intervene mostly indirectly, through land planning decisions, the use of tax incentives and general economic promotion activities. There are no direct subsidies for private R&D at national or regional level in Switzerland. There are no explicit innovation policies at the regional level and the above instruments contribute to a broader economic promotion goal rather than to innovation promotion more specifically.

In conclusion, there are good reasons why cross-border co-operation in innovation in Eastern Switzerland should be enhanced, but there is a variety of barriers to overcome. A culture of cross-border openness and the existence of multiple informal linkages between neighbouring regions are mentioned frequently as starting points and facilitating factors for cross-border joint initiatives. Economic relations along the supply-chains or in related activities do exist and provide ground for cross-border economic ties. However, the lack

of critical mass for most of the constituting regions of the larger cross-border area (e.g. in third-level education) would call for joint cross-border initiatives.

Barriers reported for cross-border co-operation in innovation in Eastern Switzerland include differences in administrative and regulatory frameworks, which are experienced as less stringent in Switzerland and Liechtenstein than in Austria and Germany. There are also differences in modes of public intervention for the promotion of R&D and innovation: more pro-active interventions in Austria, including direct funding to companies; more liberal in Switzerland and Liechtenstein (focus on framework conditions and public research funding). In addition, cross-border co-operation is hampered by competition between cantons on the Swiss side (for attracting companies notably), lack of incentives and of inclination towards inter-cantonal co-operation in innovation. This conclusion suggests that the overall recommendations for a better articulation between federal and regional innovation in Switzerland, do apply in particular to the Eastern Switzerland *Grande Région*. These recommendations are spelled out in the next section.

3.3. Main challenges for regional innovation policy in Switzerland

Reinforcing innovation promotion at regional level in Switzerland is relevant for the country's overall economic performance. The NRP introduces innovation promotion as an important component of regional policy, an evolution from the previous focus on infrastructure provision. This orientation is highly relevant to ensure widespread growth on the whole Swiss territory, through an expansion of innovative activities beyond the sectors and companies that are currently involved in innovation. The polycentric territorial development model adopted by Switzerland functions well, and provides good framework conditions for a policy aiming at wider innovation diffusion, in contrast with the situation in very centralised countries, where all resources are concentrated in the capital region and not much is left for the regions outside of this centre. And the rich potential for cross-border co-operation beyond the country's borders adds to the possibilities for regions to become actors in innovation promotion.

However policy instruments to reach this broad goal would need to be more clearly articulated between the various government levels, and their effectiveness enhanced in a number of ways. In order to increase the labour productivity and support sustained innovation performance in the future, innovation policy should be enhanced along four lines:

- clarify the roles of national and sub-national governments in innovation promotion;
- build strategic management capacity for innovation;

- lift regional innovation policies to the inter-cantonal level and foster the cross-border dimension;
- extend coverage of NRP to all regions.

3.3.1. Clarify the articulation and ensure complementarity between innovation promotion at federal and regional levels

There is confusion on the roles of the Confederation and the sub-national authorities for regional innovation promotion in Switzerland. Federal level policy for innovation and cantonal (or cross-cantonal) initiatives for innovation promotion evolve in parallel, creating overlaps and gaps, missed opportunities and tensions between the various actors involved in innovation promotion. A lack of visibility of sub-regional initiatives and a lack of knowledge of these initiatives by the federal actors lead towards the risk of under-exploitation of the potential of the NRP to improve regional innovation in Switzerland.

At federal level, the policy approach is to let market forces play and intervene only to provide framework conditions, or where obvious market failures take place (investing in science and education as public goods and in promoting knowledge and technology diffusion). Hence, there is a strong Swiss science and research policy, addressing the public sector, but no innovation policy addressing possible systemic failures and barriers for non-technological innovation. The targets of Swiss federal policies are the high-tech sector and science-based industries and companies, with a consequent accent on technology transfer activities. The key actors are, for science policy, SNF, and for applied research and technology transfer policy, CTI. This is in line with a linear concept policy where innovation directly flows from research and technology development. The other parts of the productive fabric, consisting of smaller, less technology-intensive companies, and those that innovate without R&D, are not targeted by Swiss federal policies (except indirectly through the provision of excellent framework conditions for businesses).

Recent federal initiatives include the development of the KTT Knowledge and technology transfer consortia, which claim to have a territorial dimension and focus on “new customers”. However, this is being developed without a driving force from companies, with little involvement of sub-national authorities, and with an almost exclusive focus on technology transfer while the target companies have much broader needs than technology for their innovation strategies. The efforts to twist a linear, technology-driven policy instrument towards a demand-led instrument are bound to fail: the KTT networks face difficulties to act as true networks and they are ill-conceived to act as demand-led mechanisms. Many cases of lack of mutual knowledge, conflicts and distrust between KTT and regional promotion bodies have been reported. It is unlikely that KTT will progressively absorb regional/cantonal level

initiatives for the promotion of innovation. This situation is a well-known flaw in regional innovation promotion activities in Europe, which have claimed to adopt a systemic, demand-led approach to innovation policy, while being stuck in policy tools and organisations taken from a linear policy tool box. Thus, within the innovation triangle of knowledge creation-diffusion-absorption, the Swiss federal policy addresses the first two elements: knowledge creation and diffusion. This points towards a potential role for sub-national authorities in addressing knowledge absorption bottlenecks. Cantons have already started to use the NRP to fund activities oriented towards the demand by KTT, and it needs to be checked whether this might prove an effective way to stimulate absorption capacities by companies. A good way to ensure that demand-oriented support instruments are effective in meeting companies' (mostly SMEs') needs, is to require private co-funding for these networks.

At cantonal level, there are both interest and institutional competences, to develop innovation in the more sheltered, less technology-intensive companies, which are natural target groups for sub-regional authorities. This involves a much broader approach to innovation, where technology development or adoption represents only one part of the innovation needs. The absorption capacity of these companies is much lower than the CTI clients, and as such not the target of the federal instruments. Proximity of the support is important to access those companies with low absorptive capacity. As depicted in this chapter, many efforts are being deployed at regional and cantonal levels towards this target group and objective. However, cantons lack critical mass and capacities to develop such policies. Numerous cases of co-operation between cantons have been reported, but in the field of innovation, fierce competition between cantons for attracting investments represents a barrier for developing innovation programmes covering broader functional regions.

The way forward for sub-national authorities would involve the establishment of a bottom, demand-led, approach to innovation promotion, developed at inter-cantonal level, and with a cross-border perspective. The target group would be the companies with lower absorptive capacities, while those with higher capacities would remain the (indirect) target of federal policies implemented by CTI. Existing research and technology providers need to be mobilised as it is the case in the KTT, but more importantly, complementary expertise addressing managerial and organisational deficits in firms should be made accessible too. The role of existing "coaches" under KTT needs to be scrutinised to understand the range of functions they are able to perform effectively beyond their natural role of brokers for the S&T resources in their own mother organisations. Clustering initiatives might be used (with caution), provided that they respond to a number of success criteria derived from the wide pool of experience in European and other regions. This is not a panacea, nor an easy type of policy to implement. And, as mentioned above, involving the private

sector in the funding of these initiatives, is the best way to secure their relevance with companies' needs and their true demand-orientation.

Along these lines, a clearer division of labour for a multi-level innovation policy needs to be defined, in which the federal level maintains its country-wide policy focused on knowledge creation and technology transfer for technology-driven innovation, while the sub-national level takes up an active role in knowledge absorption and diffusion, in a broader innovation perspective. In this framework (Table 3.1), the federal level would concentrate its role on the core activities of CTI, which have proven effective: supporting technology transfer and joint public-private R&D projects, on the basis of excellence and relevance, across the whole country, relying on strong technology transfer networks when they exist. The KTT would in this view acquire a national dimension and their specialisation be reinforced. The role of the federal level would remain concentrated on knowledge creation and diffusion. Functional regions would be in charge of innovation promotion in the wider sense and address knowledge absorption needs: this would be done by establishing networks of innovation promotion agencies and advisors,

Table 3.1. **A multi-level framework for Innovation Policy in Switzerland**

Level	Objectives and Targets	Instruments
Confederation	<p>Knowledge creation and diffusion</p> <p>Support excellent research at public research organisations. The focus should remain on frontier research.</p> <p>Stimulate technology transfer and public-private R&D co-operation.</p> <p>Target firms: technology leaders active in global markets.</p>	<p>SNF funding programmes, funding for federal Polytechnical Schools, co-funding of Universities of Applied Science and cantonal universities.</p> <p>CTI: funding for collaborative research, KTT transformed into national scale instruments.</p> <p>CTI: high-tech start-ups support.</p>
Functional regions (inter-cantonal level)	<p>Knowledge absorption</p> <p>Stimulate innovation in wider sense, incorporating also non-technological issues.</p> <p>Target firms: technology followers and "learning-by-doing", "learning-by-interacting" firms.</p>	<p>Universities of Applied Science (co-funding, performance assessment) and cantonal universities.</p> <p>Regional innovation agencies (central node of a network): professional and quality controlled, co-funded by NRP, cantons, and private sector.</p>
Cantons (and regions)	<p>Knowledge absorption</p> <p>Connect local firms to knowledge networks. Help alleviate managerial bottlenecks for innovation.</p> <p>Target firms: technology followers and "learning-by-doing", "learning-by-interacting" firms.</p>	<p>Cantonal (or sub-cantonal) antennas for regional innovation agencies offering proximity support to companies: advisory services, cluster animation, etc.</p>

covering the local and cantonal dimensions, co-ordinated and quality-controlled at the level of the functional region. This mission includes linking with KTT when technology needs are at stake. The target groups for the federal level should be the innovative, technology-advanced companies, while the target groups for the regions should be the companies innovating in a learning-by-doing and learning-by-interacting mode.

3.3.2. Building strategic management capacity for innovation policy

Capacity gaps are at play to conduct innovation policies with a regional dimension. Comments were made in the Chapter 2 on the need to address capacity gaps at the level of the cantons to develop strategic and robust plans under the NRP. At federal level too, barriers exist to take full advantage of the new means offered by the NRP. These difficulties apply in particular to the innovation dimension in these plans.

There is a gap between the mission of the NRP and the tools put at the disposal of the federal level to monitor its implementation. The federal level is not well informed about the innovation promotion efforts of the cantons, and is very cautious about taking any steps towards playing a catalytical role towards such activities. The institutional structure of the country does not allow this. Notably, the *ex ante* assessment of the cantonal plans cannot be properly carried out in the absence of such information. The NRP however presents an opportunity for SECO to indirectly get information on these activities. As mentioned already in Chapter 2, the NRP assessment procedures are weakened by: limitations in internal capacities at SECO (based on expertise of a few people only); existence of “degrees of liberty” in the use of official assessment criteria; absence of external expertise. This means that the system is not immune of pressure from interest groups, which creates a need for more transparency of funding allocated. The NRP assessment and monitoring system should also be improved with a view of more professionalism, independence and transparency. Using external experts for the assessment of cantonal plans would introduce both more transparency and more expertise in the analysis of these plans. Monitoring should move beyond the pure administrative follow-up and prepare for sound, robust and external evaluations. Lessons from the implementation of EU Structural Funds to support innovation could be used to this purpose (Box 3.10).

There is a need for more strategic view on regional innovation promotion activities. The system would benefit from a clarification on where the best local competences in innovation promotion lie, and from more visibility of available services in given territories and throughout the country. This would help address the limits of small-scale, disconnected initiatives, and support the selection process for NRP funding. Involving companies in assessing (through enquiries) and funding regional innovation promotion schemes is a necessity (see below).

Box 3.10. Strategic bottlenecks for innovation promotion under EU Structural Funds

A strategic evaluation has been carried out on the strategies put in place for the use of EU Structural Funds for the knowledge economy, for the period 2000-06. The evaluation has put in evidence the following main bottlenecks for an effective outcome of RTDI measures under these programmes, which bear similarities with the Swiss situation:

- an administrative, rather than strategic management of RTDI measures;
- a lack of expertise at national and regional levels in managing RTDI measures adopted under the Operational Programmes;
- a continuing dominance of supply-side measures, and technology-oriented measures, with poor relevance to specific regional innovation systems;
- a limited interest for many “softer” “demand-side” measures aimed directly at enterprises.

Accordingly, the challenges for the future use of Structural Funds for building knowledge economies have been identified as follows. First of all, policies would need to be based more strongly on sound and robust analyses of the regional innovation systems, and incorporate actions and instruments that fit the needs of these systems. This will give rise to much more differentiated policies than is the case hitherto. A shift towards demand-oriented policies is also warranted, but this is even more demanding in terms of strategic capacities for policy design and follow-up. A better acknowledgement of all forms of innovation, beyond purely technological innovation, needs to inspire policies. Most importantly, since the role of Structural Funds is to contribute to competitiveness and catching-up of regions, preference should be given to those actions and initiatives which are most likely to generate economic value. Prioritising “downstream” research developed for the needs of markets is needed in such types of programmes.

Source: Technopolis, UNU-MERIT, Lacave, Ismeri, Logotech (2006).

Evaluation practices should be reinforced and linked to funding. Evaluation of funded regional innovation projects would need to take place in order to raise their impacts and ensure that the stated objectives are met at project and programme levels. An evaluation of the first 16 pilot projects of the NRP has been carried out in 2007 (INFRAS, 2007). It indicated two problems: the utility of the projects were rarely made visible to target group (companies) and they were not used frequently by the beneficiaries. Because of the timing of the evaluation, it was not yet possible to assess the private sector’s readiness to fund the initiatives after the end of the public grant. Similar to the Regioplus evaluation, this evaluation could not determine whether the supported projects

contributed to structural change and competitiveness in the regions, due to the attribution problem (and the short history of the projects). Sound and independent evaluations are needed for the cantonal plans as a whole, and for specific areas including innovation, in particular. Diversity in approaches and competition should be maintained, but public funding should be more attached to performance. This concerns both federal (NRP) and cantonal funding for innovation. Mechanisms of performance reserve could be established when evaluation mechanisms are adopted and effective.

Companies' views should be integrated in the strategic approaches to innovation promotion. It should be noted that, in the middle of the efforts to establish a multi-level innovation policy where regions, cantons, functional regions and the federal state would play a complementary role, views of the companies, who are the key actors for innovation, are almost absent. Those actors which are closest to the field have a good knowledge of the daily concerns of companies, but do not have a complete vision of the challenges they face. And they might be biased in their proposals by self-interest and the need to secure funding sources for their own activities. The actors that are more far away from end beneficiaries do only have pre-conceived ideas on companies' needs but those are not based on reliable source of information, nor on feedback from companies. One of the critical success factors of the RIS Western Switzerland was that a large number of companies were systematically interviewed to understand their innovation sources, needs and potential. This objective source of information was then used as a reference to tailor the innovation support network: needs which were considered as both strategic and unmet by existing suppliers, were given priority.

The deployment of properly run strategic exercises at supra-cantonal (functional region) level could help to tackle some of these governance problems. Learning from foreign practices in Europe where regions are faced with similar challenges, is also a possible way forward (Box 3.11). Regional innovation promotion activities should be framed in a sound strategy and be professionalised, taking inspiration from good practice at home and elsewhere (Nauwelaers and Wintjes, 2008). National and international benchmarking, exchanges of methods, establishment of robust monitoring and evaluation systems should be introduced without delay. Robust SWOT analysis of the regional innovation systems should be developed, with the help of independent experts. Setting targets, not only in the forms of input and output indicators, but also in terms of outcomes and, as far as possible, approximation of impact indicators, should become a standard practice (but indicators should not be standardised centrally!). Improving quality and effectiveness of innovation promotion actions paves the road towards cross-cantonal (functional regions) innovation policies: cantons will agree to pool resources when they get convinced that this provides good quality results.

Opportunities for learning and exchange across cantons and functional regions should be exploited further. This relates to many aspects of regional policy development, notably the diagnosis and support tools used for identifying SMEs needs for innovation. Several methods and models exist: IMPROVE project by ITZ in Central Switzerland, Platinn business model used by innovation coaches, www.innocheck.ch, benchmarking with Boston Massachussets done by i-net Basel, evaluation tool used by Creapole in collaboration with Neuchâtel university, etc.

3.3.3. Lift regional innovation policies to the inter-cantonal level and foster the cross-border dimension

In the medium term, the functional region (inter-cantonal region) should become the locus for defining and implementing a regional innovation policy in Switzerland. The launch of RIS-like exercises could help moving towards this target (including four elements: political commitment, evidence base, demand-led orientation and stakeholders involvement). One radical option would be to limit NRP funding in innovation to cross-cantonal initiatives: this is politically very sensitive but cannot be excluded after a transition period. A second-best option could be to increase the share of cross-cantonal funding in NRP (currently set at one-third) and take this criterion seriously to allocate federal money.

The cross-border dimension of regional innovation policies should be given more prominence in regional actions, taking examples from successful cases and introducing indicators of results and outcomes to demonstrate the value-added of the initiatives. To promote a cross-border dimension in innovation policy, innovation cheques might be further developed, allowing companies to redeem their cheques outside of the administrative borders, in line with a demand-led approach where companies remain free to decide where the best source of expertise lie. This small-scale instrument might provide a good pilot step in trying to alleviate the many barriers reported for cross-border innovation promotion. Making the KTT network evolve towards more open, cross-border structures is also an option to pursue in the medium term.

3.3.4. Extend the territorial definition for regional innovation policy under the NRP

The NRP should cover the entire Swiss territory and not exclude those places which are the motor of regional innovation. As argued in Chapter 2, the territorial definition of the NRP, excluding agglomerations, is at odds with functional realities in Switzerland. It reinforces the view in some cantons that NRP equals fostering tourism and rural areas, rather than developing new economic opportunities. Cases were reported where a single policy had to be artificially formatted and cut in pieces to respond to the different funding

Box 3.11. Lessons from RIS and RITTS projects in Europe

The RIS (Regional Innovation Strategies) and RITTS (Regional Innovation and Technology Transfer Strategies) programmes were initiated by the European Commission in the mid-1990s to support the conception of strategic regional innovation policies. These programmes were frontrunners, at a time where innovation was barely considered as a legitimate policy area, and where the widest confusion concerning the borders of the concept itself was still prevailing in regional policy circles.

Even though the programmes were still developed in a rather linear fashion (with the idea that technology support services would need to match demands, both defined on a regional scale), they have been instrumental in introducing innovation as a new policy field, the idea of innovation as an interactive process, and in promoting more reflexive and inclusive policy-making processes. As a result, remarkable changes in perspective have been introduced in the regional policy portfolios. The somewhat revolutionary features of new instruments introduced in the wake of the RIS and RITTS are:

- Their conceptual background rests on the idea of interactive innovation.
- They focus on networks of actors and are system-oriented rather than individual actors-oriented. Here the numerous cases of introduction of clusters in the RIS-RITTS regions, illustrate this interactive approach to policy making.
- They involve enhanced co-ordination and synergy between policy instruments, rather than single-goal and isolated tools.
- Their target and shape is informed by an understanding of SMEs' needs, bottom-up defined, rather than centrally determined by managing agencies only. An example here is the introduction of a voucher scheme in Uusimaa (Finland), which stems from the acknowledgement of the need for an evolution towards more demand-led policy instruments.
- They include a behavioural additionality dimension: their aim is not only to provide sufficient financial resources, but also to influence behaviours and strategies towards more innovative ones. The Spiegel (i.e. Mirror) project in Limburg (The Netherlands), a support for innovation coaching in SMEs, illustrates a new orientation addressing the need for improving strategic thinking in SMEs, which was discovered as an important, non-technological bottleneck in the regional innovation system during the RITTS.
- They involve a dimension of learning in policy making: they rely on robust assessments of innovation needs and potential lessons are drawn from their implementation, and fed back into policy practice.

These various characteristics are indicating an evolution towards a “modern” innovation policy model, picturing a much broader and open view on innovation system that the prevailing R&D and technology policies at play in the regions before the RITTS and RIS exercises took place.

Source: Nauwelaers, C. (2009), “Challenges for the Design of Regional Innovation Policies: Lessons from Europe”, in P. Cooke and J. Osmond, *Regional Economies in a Globalising Economy: Enhancing Intellectual Capital and Innovation*, Institute of Welsh Affairs, Cardiff.

sources: part of the actions in rural areas is to be funded by NRP, while the part touching on excluded areas would be funded by cantonal sources or CTI. The work of inno-BE for innovation promotion for example is funded by the canton of Bern, and there is additional money from SECO for those very small areas of the canton which are eligible for NRP. However support work is unified and it is cumbersome to distinguish between clients from eligible or non-eligible areas. Reporting on the two parts differ according to funding sources. This administrative complication could be easily avoided with an extension of eligibility for NRP to the whole territory. The experience with European Structural Funds points towards such a direction: the micro-zoning used in the past for regions in industrial decline (Objective 2 regions) has been abandoned to cover the whole European territory.

Notes

1. Free translation from the Message relatif au programme pluriannuel de la Confédération 2008 à 2015 concernant la mise en œuvre de la nouvelle politique régionale (NRP) et son financement, 28 February 2007, 07.025.
2. The assessment of crowding out effects rests on declarations of project promoters only, which is likely to lead to an underestimation of the phenomenon.
3. From Regiosuisse website, www.regiosuisse.ch.
4. From Regiosuisse website, www.regiosuisse.ch.

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From:
OECD Territorial Reviews: Switzerland 2011

Access the complete publication at:
<https://doi.org/10.1787/9789264092723-en>

Please cite this chapter as:

OECD (2011), "Regional Innovation Policies in Switzerland", in *OECD Territorial Reviews: Switzerland 2011*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264092723-6-en>

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