Abstract
This discussion paper demonstrates how innovation weaknesses and barriers of SMEs can be overcome by integration in a regional, open innovation system. Thanks to a multitude of actors and resources involved in mutual exchange within this innovation network, innovation processes can be promoted more effectively. Companies can be engaged according to their needs and innovation activities in the innovation system. As a result of the design and operation of the regional innovation centre (RICE), the SMEs are enabled to exchange information with other actors, to engage in further training in particular areas or to outsource the R&D management and project handling. Support and coaching when applying for grants is also a major feature of the RICE.

Keywords: open innovation, SME, regional innovation system, R&D cooperation
1. Background

European firms increasingly see themselves confronted in their development and especially in their innovative capacity with new challenges. Sustained liberalisation, deregulation and globalisation tendencies are intensifying the competition between the industrial nations and that between the emerging countries too (such as China or India). Growing internationalisation of business and globalisation of trade are changing competitive advantages. In particular services, work-intensive production processes and even research activities are being outsourced (Hauser 2006; Dunning 2000, Kutscher & Schmid 2005). The new information and communication technologies are reinforcing this development, since the importance of proximity to the market is dwindling for the selection of the company location (Pastor Cardinet, 2006, p. 19; Arvanitis et al., 2007, p. 119ff.).

The competitiveness of firms no longer only depends on costs and geographical location advantages, but above all on the ability to provide new higher quality goods and services according to market needs. The rising importance of knowledge-intensive services and the implementation of new technologies, especially information and communication technologies, have led to the formation of a knowledge-based economy (Maier et al., 2004). Consequently, many firms have been forced into permanent learning and continuous innovation. Consequently, firms must be able to adopt and improve product innovations not only in the development of their goods and services, but also to integrate them in their procedures and organisation. These capabilities are regarded as important contemporary determinants of company competitiveness.

A study on innovation activities of Swiss business commissioned by SECO concludes that the share of innovating companies in the industrial sector has steadily decreased since 1990. Although the share of R&D-active and patenting companies stabilised several years ago, this has occurred at a very low level compared to the peak. In the service sector, the R&D and patent activities have been stable for a considerable period as in the industrial sector, while the share of innovating companies has recently plunged (Arvanitis et al., 2007). The same study establishes that Swiss small- and medium-sized enterprises (SMEs) take first place in international comparisons (EU, Japan and the USA) with regard to innovation activities according to size classes; the major Swiss corporations, however, are only in eighth place (Arvanitis et al., 2007, p. 163ff.). One must also bear in mind that in Switzerland state expenditure for basic research is around four times greater than that spent on applied research and development; in other countries it is the other way around (bfs, 2004; Hallauer, 2005, p. 31). Although in many programmes the SMEs are defined as target group, it is all the more surprising that the medium-sized and large companies, but not the small ones, profit with above average frequency (approximately 80% of expenditure) from public grants (Arvanitis et al. 2007, p. 197).

Over the course of the last few decades knowledge regarding innovations has made great advances. In place of a linear perspective, in which innovations arise in the research laboratory and are transferred to the companies, a systemic approach is coming increasingly to the fore. Innovation is based on the nature and quality of the interaction between all regional actors, the producers, consumers and governor of knowledge. Apart from the business side, this includes the local authorities, technology transfer institutions, investors or banks and training and research institutes.

The regional level appears particularly suitable for the exchange of such activities, since a common space characterises the culture, values and relationships and facilitates the exchange and handling of joint projects. The skills, infrastructure and capital needed for innovations are often available in the regions. Forms of cooperation between these actors will be described below as innovation system.

To develop a regional innovation system and build up a solid research location, not only must qualified employees with tertiary education be available, but the companies must also have access to high quality services in the vicinity. This is because innovative capacity and the creation of innovations depend very much on the quality of the cooperation between a large number of different actors with complementary abilities (Chesbrough, 2007b; Pastor Cardinet, 2006).
Particularly in more recent publications on the nature of innovation, reference is made to the advantages of cooperative forms of innovation management. These theories are grouped under the concepts “open innovation” or “open business” (Chesbrough, 2007a, p. 24; Chesbrough, 2007b; Arvanitis et al., 2007). Related to this, a model for innovation management is also presented in this article, which supports SMEs within an open innovation system in planning, implementing and managing innovation projects. The model represents practical tested method, which shows how a regional innovation centre (RICE) can contribute as enabler to the pull-process in the knowledge and technology transfer system. On the other hand, various institutions (KTT consortia) were established across Switzerland, which have been institutionalised as push-agents in so-called technology transfer offices (TTO). Similarly the authors Caputo et al. expound a solution with an “innovation center” which operates as promoter between SMEs, research partners and potential customers (Caputo et al., 2002).

2. Research Questions

Against the background of various approaches for innovation management for improved knowledge transfer and promotion of the innovative capacity of companies, the following questions are answered in this article:

1. What are the main reasons for the innovative weakness of SMEs?
2. What is the structure of innovation management in SMEs?
3. Who are the individual actors inside an innovation system and what tasks, responsibilities and expertise do they have within the system?
4. What products and services should be provided in an open innovation system so that the actors involved encounter the best possible conditions? How can the innovation barriers indicated be mastered and the innovative capacity boosted by the support services provided?
5. What should the structure of a regional innovation centre (RICE) be and what innovation services should it provide?

The article is subdivided into six sections. In the first two sections the starting situation and the problem are explained, the research questions deduced and placed in the context of previous work. The third section addresses in particular innovation management within SMEs. The fourth section examines the innovation system and its actors. The fifth section describes the regional innovation centre (RICE) as an approach for increasing the innovation activities of SMEs. In the final section the results are summarised and future research projects described in a preview.

3. Innovation Management in SMEs

SMEs, as carriers of business activities, are extremely important (Hotz-Hart et al., 2001, p. 320; Lenk & Zelewski, 2000) and they are responsible for the lion’s share of the outstanding Swiss position regarding innovation activity (Arvanitis et al., 2007, p. 163ff.; Pastor Cardinet, 2006, p.12). Nevertheless, the share of innovating companies has constantly declined since 1990, while at the same time above all the medium-sized and large, but not small, companies have benefited disproportionately often (approximately 80% of expenditure) from public grants (Arvanitis et al. 2007). This is already an indication that SMEs especially are faced with specific innovation barriers.

In what follows, after presenting various kinds of innovations, the reasons why firms have certain weaknesses regarding their innovative capacity will be discussed. These innovation barriers will be classified within the context of innovation management and the overall business framework, among other things.

3.1 What is innovation?

The ability to innovate is one of the most complex relevant management tasks (Brockhoff, 1999; Hauschildt, 2004, mtr, 2000). Rising economic pressure as a result of shortened product life cycles and delivery times as well as a simultaneous increase in the quality and functionality demanded in the face of permanently falling market prices points to the necessity of innovative ability and capacities in companies (Eversheim & Krah, 1998, p. 31).

However, innovation does not just mean the development of innovative new products. Rather, the understanding of innovation must be expanded in the sense of the implementation of novel
**technical** (products and processes), *organisational* (structures, cultures, processes, systems), *economic* (industrial and market structures, rules) or *social* (politics, lifestyles, social technology) problem solutions (Hauschildt, 2004; Moss Kanter, 2006, p. 79). Bessant and Tidd define this comprehensive point of view with the four Ps of innovation (Bessant & Tidd, 2007, p. 13 f.), which are also used in Switzerland (cf. Sawhney, 2006, p. 75ff.):

**Product innovation** changes in the things (products/services) which an organization offers

**Process innovation** changes in the ways in which things are created and delivered

**Position innovation** changes in the context in which the things are introduced

**Paradigm innovation** changes in the underlying mental models which frame what the organization does

New markets can be developed with product innovations and as a result rising sales and employment growth realised. Normally new products bring higher returns. By introducing new procedures, productivity increases can be facilitated and the quality of products improved. However, higher productivity can also lead to job losses in the company departments affected.

Schumpeter pointed out the destructive power of innovations (Schumpeter, 1927). Normally, sectoral, social and regional changes are associated with the creation of new innovations. New industries arise while old industries, existing products and production procedures lose importance and existing organisational patterns become outmoded (Maier et al., 2004).

### 3.2 Why are SMEs in particular disadvantaged?

According to the Swiss business census, small and medium-sized enterprises (SMEs) measured according to their frequency (99.7% of all companies) and their significance for the labour market (66.8% of all employees work at an SME), are the main pillar of the Swiss economy as well as simultaneously being a guarantee for current and future growth (bfs 2001).

However, if one compares their R&D expenditure with that of large companies, a sobering picture emerges. SMEs make up just 16% of total annual R&D expenditure (bfs 2000).

The following table shows why SMEs could demonstrate less innovation activity than major companies (cf. Figure 1). Arvanitis et al. compared the results of the companies surveyed divided according to SMEs with fewer than 50 full-time equivalent employees with medium-sized and large companies with over 500 (2007, p. 67ff). It emerged that SMEs evaluate innovation barriers differently compared to major companies.

<table>
<thead>
<tr>
<th>Reason</th>
<th>SMEs (fewer than 50 FTE)</th>
<th>Medium-sized</th>
<th>Large companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>lack of skilled employees</td>
<td>25%</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>high taxes</td>
<td>20%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>lacking credit capital</td>
<td>15%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>lacking equity</td>
<td>10%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>long-lasting amortisation</td>
<td>25%</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>high costs</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
</tr>
</tbody>
</table>

**Figure 1: reasons for innovation weaknesses according to company size**

---

1 In Europe the picture is almost identical. For example, the SMEs are key factors for stronger growth, more and better jobs – both of the two main aims of the Lisbon partnership for growth and employment. They represent 99% of all companies in Europe, generate over two-thirds of the European gross domestic product and employ about 75 million employees in the private sector (European Commission, 2007; Caputo et al., 2002; Günther & Peglow, 2007, p. 340).
Both the high costs of innovation as well as the long amortisation periods are equally relevant for both size classes. However, evidently a clear difference exists between the small and the large especially with regard to financing. Although SMEs identified the lack of financing as one of the most important innovation barriers, the study likewise shows that when it comes to public grants it is above all medium-sized and major companies that find consideration (approximately 80%), (Arvanitis et al., 2007, p. 82). If one also considers the development since 1990, one can establish that the obstacles declined during the comparative period (Arvanitis et al., 2007, p. 77). It is all the more astonishing that the sales share of innovative products rose despite falling innovation expenditure. Presumably this indicates an increase in the sales productivity of investments in innovation products. Furthermore, the authors establish that SMEs by comparison cooperate less (Arvanitis et al., 2007, p. 88).

In addition to these quantitatively collected innovation barriers, there are other obstacles, documented in various internal and external studies:

**First**, in many cases the management of SMEs simply lack the time for innovations. Entrepreneurs are absorbed in their day-to-day business to such an extent that they can only deal with R&D as a side activity. After all, they do combine all general management functions such as planning, controlling, organisation and management in one person (Wolff et al., 1994, p. 8; Minder, 2001, p. 80).

**Secondly**, innovations require special resources such as suitable personnel and infrastructure. For example, this involves expert scientists, highly specialised equipment or laboratory facilities that an SME simply does not have access to. Furthermore, financial resources must be freely available which, depending on the risk level of the innovation, may have to be invested without any chance of recovering them (Wagner et al., 2006, p. 12; Minder, 2001, p. 80; Caputo et al., 2002).

**Thirdly**, SMEs often lack the contacts required with research partners within the innovation network, since there is hardly an overview of the particular thematic specialisations of qualified research partners such as university institutes, test centres and research facilities (Wagner et al., 2006, p. 15; Wolff et al., 1994; Caputo et al., 2002). The know-how required in the company is often missing as well. Even formulating applications to acquire funds from various promotion agencies is not something an SME can do on its own.

**Fourthly**, it can be presumed that SMEs always implement innovations when they are realisable from their own point of view and entail a financially limited and calculable innovation risk. However, if the innovation risk is too high, i.e. if the entrepreneur is not sure whether the idea can be implemented and whether the market will accept an innovative solution to a problem, he will not go ahead with the innovation (Chesbrough, 2007b; Acs & Audretsch, 1992; Minder, 2001, p. 80ff.; Caputo et al., 2002, p. 274).

In summary, it can be noted that from a qualitative point of view it is particularly factors like lack of time, the shortage of suitable personnel, infrastructure and financial resources, the absence of contacts to suitable partners in the innovation network and an excessive innovation risk which are the major reasons for the innovation weaknesses of SMEs.

### 3.3 Innovation Management in SMEs

In classic business economics innovation management is understood on the one hand as arranging the structure of innovation processes (Hauschildt, 2004, p. 30), and on the other hand as a conscious structuring of the innovation system (Uhlmann, 1978, p. 82). In what follows, a simpler and for practical purposes, more pragmatic approach is pointed out. Here the following three steps, which have to be coordinated, are understood under innovation management (Bessant & Tidd, 2007, p. 20):

1. **generate new ideas**
2. **select the good ones**
3. **implement them**

---

2 The Swiss Institute for Entrepreneurship has already handled over 100 R+D projects with SMEs from Switzerland and its immediate neighbours. The barriers listed were mentioned by a majority of the economic partners and collected in a database.
Even if all four kinds of innovations listed (product, process, position, paradigm) are significant for internal company innovation processes, product innovation nevertheless plays the most important role regarding the innovative ability and capacities of SMEs. For the development of this kind of innovation the SME is dependent most on a diverse knowledge- and research intensive innovation network.

Due to the significance of product innovation, a validated approach frequently used during the development process of new products is applied: the Stage-Gate model developed by Robert G. Cooper (Cooper, 2001). To empirically develop and establish the Stage-Gate® model, Cooper and his staff carried out several detailed studies to ascertain the reasons why certain new products are successful and others by contrast fail. The authors identify 13 key activities in the product development process. With regard to the failed projects they assessed the quality of the execution of key activities in order to identify causes for the failure (Cooper, 2001, p. 27; Cooper & Kleinschmidt, 1987; Cooper & Kleinschmidt; 1993). Based on these findings, Cooper define 15 critical factors in the product development process as requirements for a generic innovation process. Based on the perspective that product development process management is risk management, successful product development process is a risk reduction process. This risk reduction process subdivides the long path from the idea to the product launch into manageable stages. Furthermore, the risk reduction process aims in cases of high levels of insecurity to keep what is at stake low and to raise the stakes when the level of insecurity drops.

![Figure 2: Stage-Gate® Model (Cooper, 2001)](image)

The Stage-Gate® model subdivides the innovation process into five development stages, from the idea through to product market launch. Test gates for decision-making intervals have been installed in between the development stages. These test gates force the user of the model to assess the progress of the product development process continually, to compare the results achieved with the goals originally set, and to make clearly reasoned decisions as to whether the process should continue or not.

Not least as a result of the innovation barriers it is emphasised that the innovation process is characterised by interdependencies and non-linearities (cf. Maier et al., 2004). Companies do not innovate in isolation, but in cooperation with, and also while being dependent on, other organisations. These organisations can be companies (suppliers, customers, competitors) and equally non-business actors such as research and educational institutions, government bodies, technology centres or other semi-public support institutions. In the next section these actors are identified, their role in the system described and initial consequences drawn for the open innovation system.

### 4. Need for a Regional Open Innovation System

What in general is understood under a system? It is seen as "a system of innovation as being constituted by a number of elements and by the relationship between these elements [...] a system of innovation is constituted by elements and relationships which interact in the production, diffusion and use of new and economically useful knowledge" (Lundvall 1992). Innovation systems in this regard can be defined in many different ways – they can be nationally-, regionally-, sectorally- or technologically-oriented. Although innovation systems were initially investigated on a national level, it already became clear in the mid-1990s that innovation processes are determined less on a national level, but rather regional factors in particular exercise a significant influence on innovation activities.

This can be justified by the fact that innovation processes and company innovation services are unequally distributed spatially and depend on innovation-relevant relationships (Fritsch & Slavtchew, 2007; Feldman & Desrochers, 2003). These knowledge spillovers are often spatially linked to research institutions (Feldman, 1994; Acs et al., 1991). Apart from the companies, the
innovation-relevant actors include the local authorities, educational and research institutions, technology transfer institutions, investors or banks and many more innovation-relevant actors, which are involved in the creation, transfer and implementation of innovations.

Consequently, a regional innovation system includes a multitude of actors and resources in effective interchange whose aim is to promote the innovation processes in the region. Such an innovation system ought to make available infrastructures and existing knowledge visible and facilitate access to material and immaterial services (access to capital, advice, etc). These relationships are very complex and characterised by feedback mechanisms. Consequently, innovations are the product of innovation systems, which consist of different elements (innovation-relevant actors) and the relationships between them.

An innovation system of this kind can be subdivided into several subsystems (Autio 1998; Maier et al., 2004). The subsystem Generation and diffusion of knowledge with the tasks of production, communication and distribution of knowledge includes research and development facilities and educational institutions as well as organisations for technology and qualification communication. The subsystem Application and exploitation of knowledge includes companies, their customers, suppliers, competitors and cooperation partners (Autio, 1998). The area Facilitation and governance of knowledge can be added as a third subsystem. This area includes the policy which influences the innovation process at various levels.

![Figure 3: The Actors of the Innovation System](image)

In practice it has emerged that companies in general pursue three strategies regarding their knowledge and technology transfer (KTT) activities with other actors and in particular with universities. The third has the strongest positive effect on the creation of innovations (Woerter, 2007, p. 21):

1. Companies make contact primarily with national universities and demonstrate relatively few transfer activities. They cultivate only a loose relationship and make use of training offers.
2. Companies evaluate softer contact forms as important for their transfer activities. Among other things, they employ graduates who still maintain contact with their university, staff get involved in lectures and seminars or use is made of university consulting services.
3. Companies maintain very intensive transfer forms. They see universities as reliable partners, operate joint R&D projects, maintain long-term cooperation agreements and make use of universities’ technical infrastructure.

Accordingly, what counts is picking up the companies in terms of their different needs and individual innovation activities, sensibilising them and integrating them in regional innovation systems. For this purpose a RICE is to be operated which provides needs-oriented services for regional SMEs.

5. The Regional Innovation Centre (RICE)

To begin with, the structure and design of a regional innovation centre is examined, before the outsourcing of the R&D management is discussed as the central innovation service of the RICE, which can contribute to boosting of the innovation activities of SMEs.

5.1 Design of a RICE

Based on an expert workshop with 12 regional managers of the Alpine regions in Switzerland, the requirements and tasks (Tab. 1) of a RICE were worked out and presented as below. The requirements were formulated so that a RICE can ideally support the pull-process demanded in the open innovation system and the effect actually reaches the SME.

- **Independence**: The RICE must be independent of authorities, industries and research institutions. Within the innovation system it operates as a neutral actor, which also has access to knowledge outside of the region and maintains contacts there too (gatekeeper and knowledge pipeline).

- **Agents of SMEs**: The RICE functions as agent of the SMEs and not as the sales department of research institutions. It is on the side of the SMEs, understands their problems and looks for matching solutions for them.

- **Entrepreneurial Thinking and Action**: The RICE is run by personalities with business management training and a lot of experience in project management and an affinity for high technology. They think entrepreneurially, have relevant practical experience and ideally industry experience.

- **Management of Partnerships**: The RICE is in a position to initiate and accompany partnerships between companies and research institutions. This also includes the support of SMEs in identifying and looking for suitable partners as well as the formulation of applications for grants (KTI, SNF, FP7, foundations, etc).

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Find and select innovative SMEs, acquire and carry out innovative projects with R&amp;D co-operation, provide services and information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abilities/Skills</td>
<td>Project management, communicative, motivation to perform, experience with R&amp;D projects</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Office, car, ICT, meeting room</td>
</tr>
<tr>
<td>Financing</td>
<td>Mix between administration costs covered by public funding and SMEs settle the services</td>
</tr>
<tr>
<td>Third parties</td>
<td>Continuum between competition and partnership</td>
</tr>
<tr>
<td>External Network</td>
<td>Systematic, periodic and structured, e.g. umbrella organization, internet platform or face-to-face contacts</td>
</tr>
</tbody>
</table>

*Table 1: Design of a Regional Innovation Centre*
5.2 R&D Cooperation Activities

The Swiss Institute for Entrepreneurship SIFE has developed a bottom-up conceptual framework for R&D partnerships between SMEs and qualified research partners and launched more than 100 cooperation projects based on this model. The model is based on the theoretical framework of the Stage-Gate model® as well as on existing market needs brought to the institute from SMEs in various industries. During these R&D projects the institute takes on parts of or the entire innovation management. The knowledge gleaned and the innovation services remain within the company. Depending on requirements, knowledge, infrastructure, labour services or services from all kinds of institutes within the innovation network such as other universities of applied sciences, universities, laboratories, Swiss Federal Institutes of Technology and materials science and technology institutes can be brought in to assist the process.

![Figure 4: R&D Cooperation Model (Jenni & Ziltener, 2008)](image)

R&D packages are bundled for each of the steps in the innovation process. These work packages are processed cooperatively by qualified research partners such as universities, research facilities, laboratories or testing centres and expedite innovations in stages. The regional innovation centre (RICE) assumes the operative management of the projects. During this time the entrepreneurs can concentrate on their day-to-day business. They are sporadically involved in the innovation process, for example when decisions have to be made or results presented.

The qualified research partners usually possess a well-developed network, which the SMEs can utilise. In addition, R+D partnerships always employ several people, as a result of which they can have recourse to differing levels of knowledge and experience, which are out of reach for an SME on its own. A single point of contact in projects involving several partners arises through the cooperation with a RICE, which assumes the R&D management on behalf of the SME. This means that SMEs have a one-stop shop in terms of a virtual R&D department which plans, manages, and controls the innovation from the idea stage right through to the launch. Another important advantage of qualified university partners is that on the one hand they have access to grants as well as experience in formulating applications for state-funded support services (EU programmes, CTI projects, etc). This circumstance above all counteracts the innovation barriers of the absence of financial resources within the company or from third parties. The creativity
and impartiality of students can be used by involving the students in the individual innovation stages. This often produces ideas which are not immediately obvious to an SME.

In Switzerland the process of outsourcing R&D management has aroused great interest among small and medium-sized enterprises. Some of the previous projects have shown that many SMEs regard the business case stage as unnecessary, because the entrepreneur himself launches and finances the project. Exceptions to this, however, are projects financed via venture capital or banks. However, the readiness to spend money on market and competitor analyses is apparently rather limited. In many of the supervised projects there was a noticeable urge to prototyping, which often came into play when obtaining the first feedbacks. This is an opportunity to involve engineering students, who can aim to develop a prototype as part of their practical activities.

5.3 Application Example - Drive Belts

The following practical example is intended to illustrate what tasks a RICE should assume as part of the R&D partnership with SMEs and how the R&D cooperation model is used.

Partner Company

The partner companies of this project can only be described very briefly for confidentiality reasons. The main partner company is a Swiss SME with around 20 employees. It is a global market leader with a niche product in the textiles industry. Two other partner companies are also Swiss SMEs with 40 and 3 employees, respectively. The fourth partner company is a French SME with around 120 employees.

Description of the Problem

Drive belts are used in conveying technology and excavation machinery. Drive bands currently used are made of plastics that are strengthened with nylon. The negative properties of this material include creep behaviour when under stress and a relatively low tensile strength. The creep behaviour means that the belts have to be shortened from time to time as the clamping mechanism cannot accept the belt’s change in length when under stress. The low tensile strength means that the drive belt often rips and generally leads to a low lifetime. Both of these factors cause high maintenance and operating costs. The innovation project aims to replace the nylon carcass in the drive belts with new types of textile fibres that are much stronger, and thereby double the lifetime of the belt with a maximum price increase of 30%.

Project Implementation

The RICE headed the pre-project. One critical activity in a pre-project of such complexity involved the search for suitable partners. University partners with the corresponding competencies had to be sought, evaluated and recruited for the project by the time the CTI application was successful. Two other business partners able to cover the critical activities along the value chain during production of the drive belts were also missing. The search had to be coordinated and negotiations had to be carried out. A market study and patent research studies had to be carried out, and a project plan drafted in order to submit an application to CTI. The long-winded negotiations regarding the utilisation agreement also had to be organised, moderated and managed. These negotiations dragged on largely due to an institute of technology, which has an internal legal department with a lot of time on its hands, a standardised contract process and extensive guidelines and formalities. The pre-project went on for more than a year and incorporated around 1,000 hours of work. Around 30 people were directly involved in the pre-project. At the same time as managing the pre-project, the RICE organised and supported a dissertation being worked on with a group of business management students. This dissertation led to the drawing up of a business plan for a company to be set up as a result of the project. Contacts to promote business in the Swiss canton of Graubünden were procured, and negotiations to facilitate the set-up of a company were supported. The project is to last for around three years with a volume of some CHF 800,000. Four University partners and four business partners are involved in the project.
Adaptation of the R&D Cooperation Model

Figure 5 shows how the work packets are embedded in the R&D Cooperation Model. The work packets with a red background are being carried out as part of this project. The idea derived from two of the SMEs. The RICE is responsible for coordinating the entire project and for carrying out the pre-project. The pre-project consists of several business work packets and the development of a business plan (HTW). Three qualified research partners are involved in the development and test packets (NTB, HSR, Empa). The SMEs are involved in the development and test packets as well as in utilisation of the product.

Figure 5: The Drive Belts Project in the R&D Cooperation Model

6. Conclusion and Outlook

The approach for achieving more growth and innovative capacity in SMEs through regional innovation systems accordingly contains two elements. First, development and integration in the regional innovation system and making use of all of the central activities of the innovation network. It was demonstrated how the innovation system can support the innovative company. Secondly, the R&D cooperation model shows how innovative companies can outsource their innovation management in order to develop marketable products themselves with the help of the innovation system’s ideas.

For future research we aim to develop and apply target oriented new tools and methods. Thus, the aim is to collect and position relevant knowledge sources in the regional research and development landscape, develop methods to define and share regional identities and common visions, foster risk management and an extended stakeholder-assessment.

Practical implementation of the theoretical approaches is also needed and includes the development of a measurement system for performance and innovation activity evaluation, the establishment of a regional steering board as an umbrella organization of all RICE as well as the adoption of best practice from change management to regional level.
References


Auto, E., 1998; Evaluation of RTD in Regional Systems of Innovation, European Planning Studies, 6, S. 131-140.

Backhaus, K., Plinke, W., 1977; Die Fallstudie im Kooperationsumfeld von Hochschule und Praxis. Betriebswirtschaftslehre (DBW), 37 (4), S. 615 - 618.

Bessant, J., Tidd, J., 2007; Innovation and Entrepreneurship. West Sussex: John Wiley & Sons Ltd.


Caputo, A.C., Cucchiella, F., Fratocchi, L., Pelagagge, P.M., Scacchia, F., 2002; A methodological framework for innovation transfer to SMEs. Industrial Management & Data Systems, 102/5, S. 271 – 283.


Düggeli, P., 2007; Schweizer Forschung läuft auf Hochtouren. Cash Daily, 5.06.2007.


Europäische Kommission, 2007; Leitfaden zur KMU-Politik der EU. Online im Internet: http://ec.europa.eu/enterprise/entrepreneurship/docs/facts_de.pdf [Stand: 25.01.2007].


Hallauer, Ph., 2005; Die Zukunft erfinden. Clarity (KPMG), Herbst 2005.


Hauser, Ch., 2006; Außenwirtschaftsförderung für kleine und mittlere Unternehmen in der Bundesrepublik Deutschland - Eine empirische Analyse auf der Basis der ökonomischen Theorie des Föderalismus; Schriften zur Mittelstandsforshung Nr. 113 NF; Wiesbaden.


Lundvall, B., 1992; National Systems of Innovation and Interactive Learning, London.


Meier, Ch., 2007; Konzeptpapier WTT KTI. Bern: Kommission für Technologie und Innovation.

Minder, S., 2001; Wissensmanagement in KMU. Beitrag zur Ideengenerierung im Innovationsprozess. St.Gallen: KMU HSG.


Schumpeter, J., 1934; Theorie der wirtschaftlichen Entwicklung. Berlin: Drucker & Humblot

Uhlmann, L., 1978; Der Innovationsprozess in westeuropäischen Industrieländern. Berlin, München:
