

Initiatives which promote co-operation and networking: some examples from Switzerland

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Abstract:

This is a note to the OECD focus group 'innovative firms and networks' for the module 'policy case studies'. After the description of the financial R&D flows in Switzerland, the (networking) activities of the main funding body for applied R&D, the Commission for Technology and Innovation, are presented. The building up of the competence to successfully co-operate is a key element for the long-term reform of the specialised universities (Fachhochschulen). Besides publicly shaped networking there are many examples of spontaneous private / public co-operation.

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1. Introduction

The following note is prepared for the OECD focus group 'innovative firms and networks' for the module 'policy case studies' and gives an initial flavour of examples in Switzerland. For theoretical consideration consult for example Hämäläinen/Schienstock¹.

Looking at the general spirit of networking and co-operation in Switzerland the following theses can be stated:

- a lot of networking is going on, but it is not always obvious.
- There is a feeling that even more co-operation would be beneficial for the exploitation of existing knowledge.
- In line with a liberal spirit there is reluctance to accept a public role in networking. The least debated field is networking with SMEs.

The paper starts with describing the general financial flows regarding R&D to better situate the remainder of the note.

The Commission for Technology and Innovation (CTI) is the main federal funding body for applied R&D. Its activities in most cases focuses on the promotion of collaboration and networking, especially with SMEs and the public research infrastructure.

The reform of the specialised universities (Fachhochschulen) is currently the most important project in the higher education scene. Since applied R&D is a new element for these universities, the design of a favourable environment as well as the competence building for successful co-operation (public/private, especially with SMEs) are key challenges to the reform process.

The examples of Novartis and Roche deliver two cases of spontaneous research co-operation between multinationals and the local public research infrastructure.

2. General description of the Swiss R&D scene

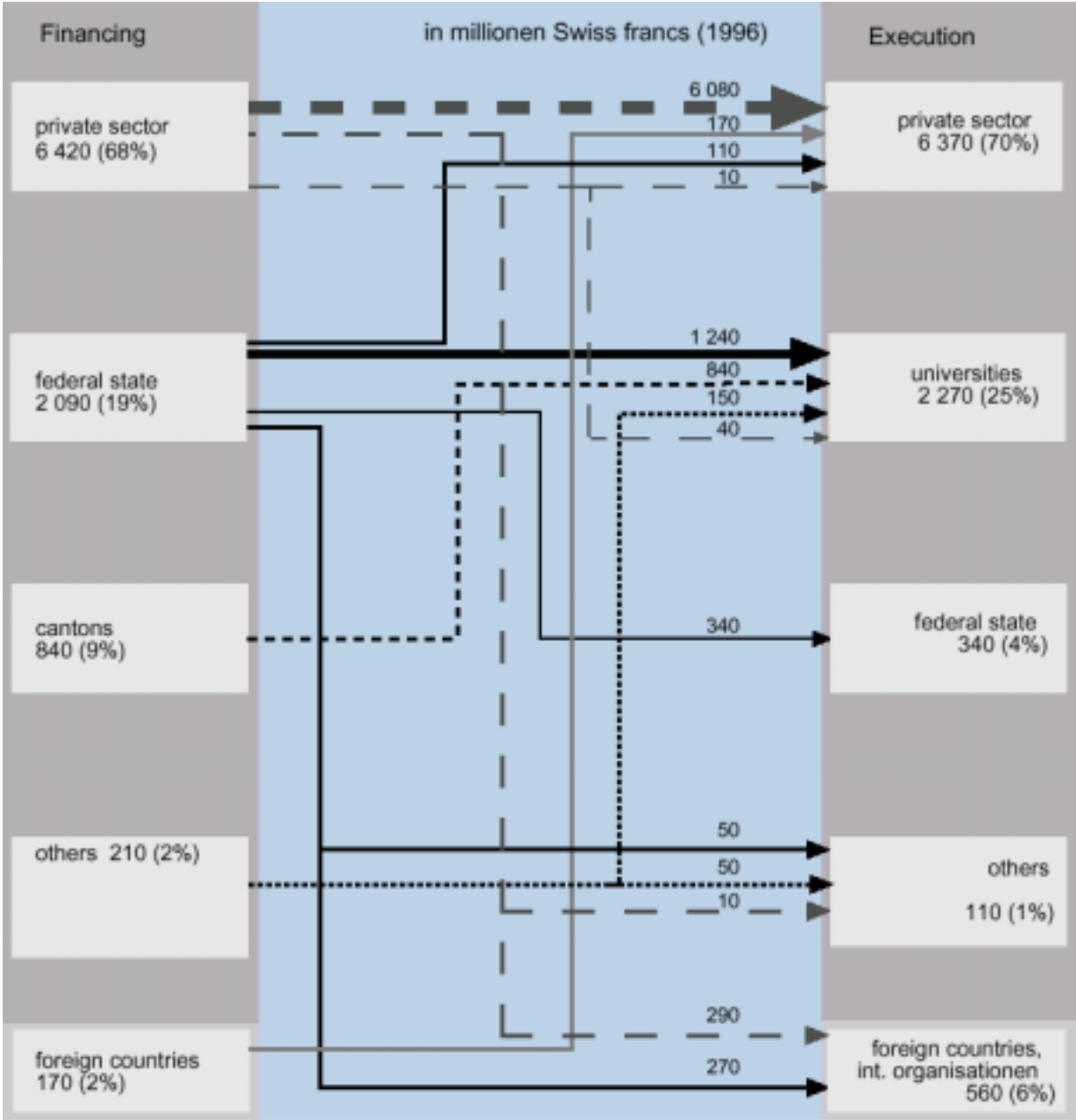
Before starting to describe some selected initiatives it is of benefit to give a short overview of the Swiss education and R&D scene in general.

In 1996 public authorities (federal state, cantons and communities) spent around 21 Billion Swiss francs for education which amounts to 6,7 % of GDP. Of these, more than 3 billion were spent by the federal state with around 2 billion going into R&D (this figure can be found in the graph below)

¹ Hämäläinen, T.J., Schienstock, G. (2000) Innovation Networks and Network Policies. First Draft. Paper for the OECD Focus Group on Innovative firms and networks.

Total R&D carried out in Switzerland amounts to around 10 billion Swiss francs. In addition, Swiss firms spent another 7 billion Swiss francs for R&D abroad. The breakdown of the 10 billion - who is financing and who is executing R&D - is shown in the graph:

Box I. Financing and Implementation of Swiss R&D



The structure can be summarised as follows:

- 70% of R&D spending in Switzerland is carried out by firms and 25% by the higher education sector (Federal Institutes of Technology, cantonal universities).

Networking is strongly influenced by regulatory and financial incentives. The figures above, of course, do not say anything about the extent of networking with the purpose of enhancing innovativeness. But they allow to relate the below mentioned initiatives to the broader Swiss context.

On the federal level there are two main R&D funding institutions:

- the Swiss National Science Foundation (SNF) promotes (basic) scientific research inside and outside universities mostly on a project basis. Its annual budget is around 350 million Swiss francs.
- The Commission for Technology and Innovation (CTI) sponsors applied R&D (mostly) in collaborative projects (industry-science) and has a annual budget of around 80 million francs.

Of the around 2 billion Swiss francs which is spent by the federal state for R&D today around 25% are awarded on a project basis. The following table gives an overview:

Box II. Project based federal R&D funding

(in Mio. Fr.)	1992	1993	1994	1995	1996	1997	1998	1999
SNF Abt. I-III	207.2	217.8	224.0	228.8	232.5	241.2	250.4	254.9
KTI	36.1	35.4	36.5	32.5	32.6	40.4	57.3	61.7
EU-Programme	17.6	25.0	39.0	44.8	65.2	80.4	102.6	88.6
SPP (SNF/ETH-Rat)	18.4	49.8	61.4	63.9	62.8	65.2	64.5	60.2
SNF Abt. IV (NFP)	24.4	26.6	25.2	19.2	21.1	27.6	26.6	23.8
EUREKA	5.5	5.8	5.1	7.0	10.4	11.2	11.3	8.4
COST	1.8	3.3	4.4	6.1	6.2	6.8	6.1	5.4
CIM	4.2	3.1	1.9	1.9	1.1	0.1	0.0	0.0
Microswiss	0.9	3.5	3.7	2.8	3.2	2.4	0.8	0.0
Total	316.0	370.3	401.0	407.0	435.1	475.2	519.5	503.0

3. Promotion of applied R&D through the Commission for Technology and Innovation (CTI)

1.1. General

As described above the Commission for Technology and Innovation is the key instrument of the Swiss federal government's technology policy, i.e. it supports knowledge transfer with joint industry-science projects.

The CTI is part of Switzerland's economic policy and contributes to the goals of keeping and improving Switzerland's leading edge position in the global economy, and of strengthening innovativeness and competitiveness of enterprises in Switzerland. Since more than 50 years the CTI sponsors dynamic enterprises to transfer promising ideas into new products and services. Starting with the presumption that the excellent knowledge of the higher education sector is suboptimally used it funds joint projects of enterprises, R&D and higher educational institutions in Switzerland. It focuses specially on SMEs. The CTI is part of the Swiss Ministry for the Economy. The 25 CTI-members are eminent persons from industry and scientists with industrial background, all working on an honorary basis.

The CTI has basically two support channels:

- Standard projects with no pre-determined thematic focus
- Thematic oriented support

Before going into more detail about the support mechanisms some key figures of the CTI.

1.2. Some key figures

Between 1986 and 1999 more than 600 million Swiss francs were spent on salaries of almost 10'000 project workers of research and education organisations. In the same period the percentage of participating SMEs rose from 64 to almost 90.

In the last three years (1996-99) more than 1000 projects were supported with a total of around 600 million Swiss francs of which around two thirds were covered by private firms. Around 1900 firms participated, the overwhelming majority being SMEs.

At the international trade fair in Hannover 6 out of the 17 Swiss projects selected for the fair (through the initiative 'Technologiestandort Schweiz') were CTI projects.

For the next years the financial plans designate each year 80 million Swiss francs for the activities of the CTI. The breakdown can be seen in the following table:

CTI ACTIVITIES	2000-2003	Per YEAR
CTI standard projects	120	30
CTI specialised colleges (Fachhochschulen): competence building	80	20
Start-up	10	2.5
MedTech	20	5
Softnet	30	7.5
Application oriented education research	10	2.5
Eureka	40	10
Intelligent Manufacturing Systems (IMS)	10	2.5
TOTAL	320	80

1.3. Standard projects

The support of standard projects is the core business of the CTI and thus consumes the major part of the budget.

1.3.1. Properties

A standard CTI-project has the following properties:

- Projects are market-driven and initiated by enterprises and/or jointly with R&D or educational institutions, thus they are not initiated by any government agency.
- Each project consists of at least one enterprise and one non-profit R&D or educational organisation. Networking projects are of particular importance. For these specific rules apply. Project consortia can be formed in many ways out of a great variety of schools and enterprises.
- Government subsidies are paid for the expenses of public R&D or educational organisation participating in the projects.
- Industry covers its own expenses, normally 50 % of the total project costs. This investment makes sure that CTI projects have a clear market focus.

1.3.2. Procedure

An ideal CTI projects is developed and executed along the following way:

- A good idea for innovative products or processes or a step into new technologies, or developing new market opportunities through new products and services are at the outset of a project. It is considered to be an advantage if the project is lead by industrial partners.
- Search of an academic or additional industrial partners.
- Examination of the state-of-the-art. Feasibility studies. Submitting a draft proposal.
- Formulation of the project. Research and financial plan; business plan. Submitting the application.
- Deciding on the project by the CTI. Special attention is paid to swift decision making, projects up to 75'000 Swiss francs are decided within one month.² Project contract to be signed by all partners
- Executing the project.
- Scientific and financial reports after one year are compulsory to obtain the second part of financing. Scientific and financial final reports are evaluated by experts. These 'reports' are mandatory but the CTI does not intend a 'piece of paper', rather than a specific industrial solution, e.g. a functional specimen, prototype or demonstration site. Dissemination of results through different channels.

² The following steps are followed: A. Appointment of CTI members as Expert. B. Evaluation by Expert. The following four criteria are of particular importance: 1) industrial, technological, and scientific relevance of the project, 2) the potential to quickly arrive at marketable results, 3) a precise work plan, i.e. a clear-cut path to reach the project objectives, 4) a contribution in cash by the industrial partners as an indication of their firm commitment to the project. C. Written proposal to CTI. D. Discussion / Decision by CTI.

1.3.3. Financing

From a financial point of view the following applies:

- Project costs are shared 50: 50; this is the basic principle for funding CTI projects. Normally, the Swiss government covers half of the total project costs, namely the salaries of the research institutions. The industrial partners cover their own costs, and on top of this pay a certain amount in cash directly to their research partners. The contribution of the industry partners includes the manpower involved, project related equipment, as well as licences or other equipment given in kind to the research partners.
- In specific cases CTI will also fund:
 - feasibility studies (pre-projects), to elaborate the definition of objectives and the project plan,
 - co-operation with partners abroad, if the required know-how will not be available in Switzerland,
 - networking projects including several SMEs; CTI will cover the co-ordination costs,
 - activities to disseminate the project results.
 - At international level CTI funds Swiss participation in two R&D programs, namely Eureka and IMS (Intelligent Manufacturing Systems).

1.4. Thematically oriented support

1.4.1. Overview

Beside the thematically not oriented core business of the CTI, support also goes to focused themes with future potential. Activities are currently under way in the following themes³:

- Reform of specialised colleges (Fachhochschulen): Establishment of competence centres and applied R&D.
- SOFTNET: Development, commercialisation and application of software made in Switzerland.
- Research on professional training.
- Eureka, IMS.
- MEDTECH: Networking and knowledge transfer in the field of medical technology.
- START-UP: start ups of the higher education sector.

³ Already finished projects are: P&M; WZMO; Effi-Bau; Microswiss; CIM

1.4.2. An example: Softnet

Softnet is an action programme of the Federal Office of Vocational Training and Technology. Its goal is to launch a strong Swiss software scene, which also is active and successful in international markets. With the development, commercialisation and application of software 'made in Switzerland' the Swiss economy should yield higher turnover and revenues. This should strengthen competitiveness and contribute to job creation.

In 1995 a gap analysis showed the strengths and weaknesses of the Swiss software suppliers and users. A feasibility study in 1996/7 laid the basis for the action programme which lasts from 2000 to 2003. The action programme focuses on the one hand on the strengthening of the supply side (thus the competence of the developers) and on the other hand on the strengthening of the demand (competence of the client especially of Original Equipment Manufacturers).

The programme is implemented through different channels:

- Formation and further training
Launch modules for formation and further training in order to enhance the supply of IT-workers.
- Business excellence and entrepreneurship
Creation of a favourable environment for the start up and growth of IT-firms in order to strengthen the performance of the concerned industry.
- Information technology competence network
The national competence network with different thematic focuses brings together software developer, specialised universities and software users in order to jointly develop modern and customised IT products.
- Communications / PR
Enhance the transparency of the Swiss software market in order to promote professional exchange and a sensitisation of the public.
- Applied research and development
Interface between the CTI and firms in order to advise them for filing a project.

An example of the competence network is the project Ecademy. It brings together specialised universities, universities and firms in order to transfer knowledge about E-business and E-government, especially to SMEs. It is sponsored by the CTI and three major companies: Swisscom, yellowworld/ Post and UBS.

4. Reform of the universities of applied sciences (Fachhochschulen)

Currently the higher education system is subject to change. One crucial element is the reform and the integration of the specialised universities (Fachhochschulen) into the network of the other higher education organisations, namely the federal institutes

of technology and the universities. The process was started in 1996 and should end in 2003.

The goal of the specialised universities is to provide the necessary education in order to successfully enter business life. The task of the schools are threefold:

- formation and further training
- applied research and development
- services for external clients

The reform process has several goals:

- Regional concentration of training programmes
- Definition of training and research emphasis
- Division of labour / collaboration between the specialised universities and the other organisation of the higher education sector (federal institutes of technology and the cantonal universities).
- Reduction of excess capacities
- Competence building in applied R&D and knowledge and technology transfer.
- Promotion of the participation of women

The federal state can steer the reform process by its regulatory power and the annual contribution to the specialised universities (which makes up around 200 million Swiss francs). The fact that the regulatory power for the specialised universities is divided between the federal states and the cantons complicates the reform process. Schools concerned with the areas of industry, services and agriculture are regulated by the federal state and those preoccupied with the areas of social welfare, health and arts are under cantonal jurisdiction. Efforts are under way to bring all the specialised universities under the patronage of the federal state.

The reform of the specialised universities is expected to have a substantial impact on the competitiveness of the location Switzerland, namely for the SMEs. This in particular with the additional tasks of applied R&D as well as knowledge and technology transfer. But in most schools there are none or hardly ever sufficient activities in these fields. Therefore measures to build the necessary competencies have been introduced.

As a mentor for this process the CTI has been chosen since it has decades of experience in project support through various initiatives. The strategic goal is to build the competencies at the specialised universities that they can step up as serious and competent partners for SMEs in regard to applied R&D, knowledge and technology transfer and other external services.

As a response the CTI offers a multiplicity of instruments to support this competence building, such as:

- Coaching for the design of a strategy for applied R&D as well as knowledge and technology transfer
- Launching of co-operations between businesses especially SMEs of the region
- Planning and preparation of projects, especially CTI (standard) projects.
- Introduction of project management
- Launching of quality management for applied R&D projects (controlling, reviews)
- Assistance with the launching of national competence centres
- Support of projects (project for starters, feasibility studies, national CTI projects, European projects (Eureka), project for the establishment of national competence centres)
- Support for the launching of knowledge and technology transfer services
- Recommendations for favourable framework conditions and an appropriate incentive system for a successful applied R&D and knowledge transfer strategy.

Experience of the first phase (two years, several hundred projects) teaches the following lessons for the successful competence building for applied research and development at the specialised universities:

- Existence of a full-fledged strategy (which services? With which resources?)
- Contacts to the customers to know their needs
- Applied R&D means the orientation towards the concrete problems
- Free capacities to undertake applied R&D
- Serious project planning (with goals and milestones)

5. Spontaneous private / public co-operation

The ideal case, of course, is when firms and public organisations are convinced of co-operation benefits without any further regulatory or financial incentives and initiate co-operation themselves. Two examples of the recent past:

1.5. Co-operation between Novartis and the universities in Zurich

In 1999 life science multinational Novartis and the Neuroscience Center Zurich signed a long term co-operation agreement which includes financial contributions of Novartis of 4 million Swiss francs per year over ten years.

The Neuroscience Center Zurich is a collaboration between the Swiss Federal Institute of Technology Zurich and the University of Zurich research groups in Neuroscience. Its objective is to promote Neuroscience research in Zurich by

- Increasing scientific interaction between and among basic, applied and clinical research groups.
- Improving the mutual utilisation of infrastructure.
- Offering a Ph.D. program in neuroscience.
- Applying for and distributing financial support.
- Establishing and improving relations to other research centres, patient advocacy groups, universities and industry.
- Enhancing public awareness of neuroscience research.

The centre links around 90 research groups of 36 institutes and clinics. On the other hand, Novartis employs around 220 neuroscientists in Switzerland.

The goal of the co-operation is to better link basic and applied research in order to better explain and treat illnesses of the nervous system.

Under the agreement projects (selected by a mixed body) or whole research groups are sponsored. Furthermore 40% of the funds are transferred to the centre without conditions. The independence of the higher education institutes in selecting their personnel is guaranteed. If a result is patented the intellectual property right remains at the higher education organisation but Novartis gets the option to licence it.

The co-operation also improves the exchange of human capital. Doctoral students can work at Novartis but are mentored at the higher education organisation. Scientists can be exchanged on a temporary basis. Ongoing work can be presented and discussed in joint seminars.

1.6. Roche sponsors research fund at the Federal Institute of Technology

In May 2000 Basle based pharmaceutical concern Roche signed an agreement with the department of biology at the Federal Institute of Technology in Zurich (ETHZ) to sponsor a research fund of 2,5 million Swiss francs distributed over 5 years. It promotes research in molecular and structural biology by permitting the department to recruit top researchers (five assistant professors) and equip them with the necessary infrastructure. The choice of fields and the professors to be recruited is left up to the department.