

Economics of science at EPFL

Research program ExTra

"Exploring Knowledge Transfer from EPFL"

CEMI proposes a study that systematically probes into the specificities of the knowledge transfer at EPFL. The project will develop a sound empirical base for the design of measures promoting the economic impact of its research on the regional, national and international level. By distinguishing the fundamental factors that drive knowledge transfer from those specific to the Swiss context, this might ultimately allow comparisons to the situation and practice at other internationally renowned research organisations in Switzerland (ETHZ), the EU (Max-Planck-Society; ULP) and the United States (MIT, Caltech).

Complementary to this benchmarking exercise, the study will explore in considerable detail the case of EPFL against the specificities of the Swiss innovation system, making reference to the sectoral structure of Swiss industry and national innovation policies. A slightly more ambitious and far-reaching research objective is to explore how formal transfer mechanisms such as patents relate to the informal structures in the innovation system, i.e., to the networks and links that are created through mobility (Fornahl, Zellner and Audretsch 2005).

The first step of the envisaged research is to set up a database that documents the various transfer mechanisms at EPFL, and contains information on the number of professors at individual laboratories and departments, their publications and registered patents. A database existing at MIT provides broad guidance in this respect, and the EPFL database should be set up similarly, to ensure comparability with the MIT case, including the period covered. This work will proceed in close collaboration with those parts in the administrative structure at EPFL that have in the past collected such data. In addition, it will be examined whether and to what extent reliable data on EPFL alumnae can be obtained (from "A3"), especially for those who became employed by industry. Finally, data on start-up activities, including information on the nature of their links to EPFL will be sought in interaction with the VPIV (CAST/SRI).

Secondly, for the construction of the qualitative impact measures, the EPFL database needs to be linked to global science citation and patenting databases, in order to map citation patterns of patents to previous patents and / or the scientific literature. In other words, EPFL patents will be "put in context" - following work along these lines for MIT (cf. Agrawal and Henderson 2002).

References:

- Agrawal, A. and R. Henderson (2002) Putting patents into context: Exploring knowledge transfer from MIT. *Management Science* Vol. 48, 44-60
- Fornahl, D., C. Zellner and D.B. Audretsch (2005) *The role of labour mobility and informal networks for knowledge transfer*. Dordrecht: Springer

Case study World Bank

Study proposal for the network Universities as Drivers of Local and National Economies - C.Zellner

World Bank project

"Exploring the impact of science on the local economy:

The case of the *Sciences et Techniques de l'Ingénieur* faculty at EPFL, Switzerland"

Recent assertions of an intensification of the role played by universities in economic development have been accompanied by a vivid debate on whether -- and how -- universities should actively participate in the commercialization of the new knowledge and technologies they generate. An assessment of university administrators' policy options requires a profound empirical understanding of the organization of knowledge transfer at the faculty, laboratory and individual level. The present study, which is part of a larger research project currently conducted at the Ecole Polytechnique Fédérale de Lausanne (EPFL) in Switzerland, hence investigates the case of the **EPFL's faculty of science and engineering (STI)**, and focuses mainly on **technology commercialization by start-up companies**.

The foundation of new companies has been found to be a major driver of local economic development (OECD 2003), and a rather effective channel for transferring and commercialising new scientific knowledge. This is particularly true in high-technology industries where innovation is typically closely linked to current scientific advance. While taking faculty start ups as the unit of observation, the study accounts for the fact that there may be very different types of start ups (Druilhe and Garnsey 2004), and that they typically involve the activation of other mechanisms of knowledge transfer. Obvious examples are the protection of the company's intellectual property through patents, and mechanisms ensuring the continual involvement of university staff with the new company. The interplay of these transfer channels at STI, and the commercialization strategies they represent, will be analysed based on both, **quantitative and qualitative data collected through in-depth interviews at the faculty**. The resulting account of the commercialization of scientific knowledge at STI is hoped to contribute to the empirical and conceptual clarification of universities' role in achieving economic development objectives.

References:

- Druilhe, C. and E.Garnsey (2004) Do Academic Spin-Outs Differ and Does it Matter? *Journal of Technology Transfer* Vol. 29, 269-285
- OECD (2003) Entrepreneurship and Local Economic Development - Programme and Policy Recommendations OECD, Paris

Database

Database in progress

In its initial phase, a research program such as ExTra requires a considerable investment in terms of data and information collection on the campus.

Currently, CEMI is building a **comprehensive database starting from 1995 on EPFL research activities**, both at the individual and laboratory level.

This initiative has the full support of the '*Vice-Presidency for Innovation and Valorisation*' (VPIV). Several bodies of the EPFL administration are already collaborating with our team in order to facilitate the access to various information:

- The '*Industrial Relations Office*' (SRI) is helping us with data on invention disclosures, patents and inventors;

- The '*Délégué à la Recherche*' (DAR) is sharing its database on publications.

Besides, in order to be able to control for the size of the labs, we are also working closely with the HR department who will provide individual data on EPFL staff.

We would like to stress that this is an **ongoing process**. As a matter of fact, after gathering all data from 1995 to 2005, the database will have to be updated on a regular basis.