

CEMI letter 2008

Foreword

CEMI's research agenda has evolved over the past four years, but our main focus has always been on the field of applied economics of innovation. We have been researching and collecting evidences to better understand various dimensions and aspects of knowledge economy, notably in regards to R&D and innovation activities, both for the developed and developing countries.

We are pleased to present some of our team's recent work on:

- Technology transfer evidences in Europe
- Universities and the access to medicines
- The impact of open access journal on knowledge dissemination
- The economic importance of user innovation and innovation without R&D in Switzerland
- The TRIPS agreement compliance in developing countries and how it affects local entrepreneurship and innovation
- The use of intellectual property rights by Swiss SMEs
- R&D networks
- Tools and methodologies developed for the measurement of technology
- The demand for medical technology in Switzerland
- Nanotechnology in Switzerland.

As a research team, CEMI strongly believes that effective measures for the promotion of competitiveness and long-term economic growth through innovation should be based on understanding of how innovation is generated, distributed and exploited by several actors in the economy. We hope that our research can shed some light on the various aspects of the economics of innovation.

We wish you a happy and productive 2009 and hope to continue our academic and policy exchanges with most of you.



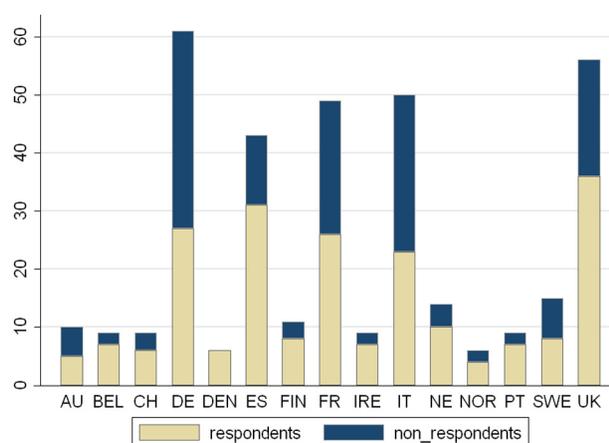
Prof. Dominique FORAY
Director of CEMI



Research results

Survey of technology transfer offices

In the Summer of 2008, CEMI conducted a survey of Technology Transfer Offices (TTOs) from universities located in Western European countries, whose researchers published more than 200 scientific articles in the period 2004-2006. With a response rate of 59.4%, the sample is broadly representative of the target population (355 universities) in terms of size and geography.



Source: The CEMI survey of Technology Transfer Offices in Europe (2008)

The main findings are the following:

- European TTOs are relatively young: in our sample 60% were created in the last ten years.
- There are large differences in staffing levels across European countries. For instance, the average Austrian TTO has eight times as many employees as the average Swiss TTO per 1'000 scientific publications.
- Switzerland scores very well in terms of number of licenses made, startups created and research contracts concluded.

This research is supported by the Swiss National Science Foundation (grant N°100012-120216).

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>> <http://cemi.epfl.ch/tto>

Universities and access to medicines: What is the optimal 'humanitarian license'?

The World Health Organization and other groups have suggested that universities could and should play a role in facilitating access to pharmaceuticals through their licensing contracts. This research seeks to bring an economic contribution to the debate on which type of humanitarian licensing policies are most appropriate.

It shows that licensing contracts with a price target and a due diligence clause (whereby the licensee would lose its exclusivity in the South if it does not supply the South) have advantages over non-exclusive licensing for developing country use.

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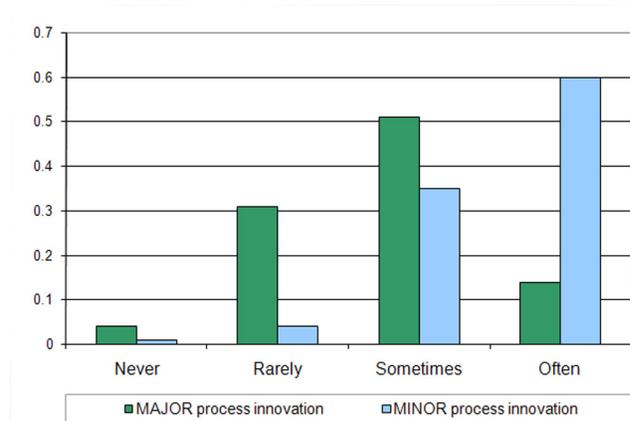
Getting cited: does open access help?

In this completed research project we reexamine the widely held belief that free availability of scientific articles increases the number of citations they receive. Since open access is relatively more attractive to authors of higher quality papers, regressing citations on open access and other controls yields upward-biased estimates. Using an instrumental variable approach, we find no significant effect of open access. Instead, self-selection of higher quality articles into open access explains at least part of the observed open access citation advantage.

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Survey on process innovation

It is well known that user firms can be important sources of innovation but little is known about the magnitude of this phenomenon and about the exact conditions that underlie user innovation by firms. Therefore, we developed a questionnaire that explores process innovation in user firms and we sent it to a sample of Swiss manufacturing firms. Based on 413 responses (response rate: 21%), the data show that process innovation is a very important phenomenon as 65% of the firms develop major process innovation and 95% develop minor process innovation. Using a more conservative measure, these figures become 14% and 60%, respectively.



The results also show that process innovation is to a large extent informal given that its accountancy relies extensively on other budgets than R&D - such as a general budget - or even no budget at all. Moreover, formal intellectual property rights - such as patents - are relatively unimportant for protecting process innovation and market transactions are seldomly used to benefit from process innovation. Furthermore, an exploration of the role of on-line employees - particularly production floor workers - show that learning-by-doing is an important source of both major and minor process innovation. The study also shows that - in order to promote learning-by-doing and process innovation - firms implement complementary systems of organizational capabilities and managerial practices related to production floor autonomy, support for innovation, individual and monetary rewards, collective rewards, social capital, and external experience.

This research is supported by the Swiss National Science Foundation (grant N° 105512-106932).

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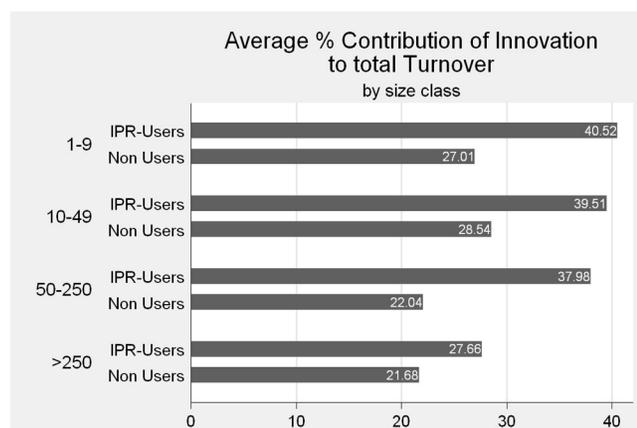
TRIPS index

The objective of this research is to construct an intellectual property rights (IPR) index based on the World Trade Organization's Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement for 53 developing countries. Analysis of the data collected shows three implementation trends. Firstly, almost all developing country members availed themselves to the transition period afforded by the Agreement, and in some cases have exceeded the time limit imposed by the transition period. Secondly, implementation efforts of developing countries vary, and not necessarily because of their income levels. And lastly, countries in regional trade agreements that specify IPR obligations tend to comply with the TRIPS agreement earlier than the rest. The results collected in this study show that TRIPS does imply a convergence of global IPR protection across countries, and that the implementation of this Agreement is an external factor, not influenced by the countries' level of economic development.

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Swiss SMEs and their use of intellectual property rights

This report is an attempt to improve the use that Swiss Small and Medium Sized Enterprises (SMEs) do of IPRs. Elaborated with the idea that these firms may have special needs when they are trying to protect their innovations, it concentrates on finding the reasons why (or why not) an SME might choose to apply for an IPR.



Source: *Economic Focus Study on SMEs and Intellectual Property in Switzerland*, final report (forthcoming, 2009)

Four main results can be withdrawn from the study. First, Swiss SMEs are very heterogeneous; size and sector highly determine their propensity to use IPRs. Second, their needs for information vary depending mainly on whether they have ever used an IPR or not. Third, the report observes an increasing specialization of SMEs which are filing patents: over time less firms apply for patents but each of them files a higher number of documents. And finally, the study finds a dynamic role of Swiss SMEs applying for IPRs abroad, which implies an implicit need of information related to international IPRs.

This research project is funded by the Swiss Federal Institute of Intellectual Property and has been jointly developed with the University of St. Gallen.

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Incomplete information in R&D networks

Although R&D networks influence the innovation performance of their members, firms may not be fully aware of the scope of their network. In particular, due to cost reasons, they may not be fully informed of their "indirect ties", i.e., of the ties between their partners and other firms. The research done in collaboration with the University of Strasbourg (BETA) investigated this issue. We used survey data inquiring about whether firms are aware of the ties that their main R&D partners may (or may not) have between themselves. The results show that responding firms are more informed about their partners' other collaboration projects when the partnership is more directly linked to intangible R&D capital, when the partner is a public research organisation or when the partnership is needed to access a new market. Firms with abundant resources in-house or within a group are less likely to know their indirect ties. Finally, network awareness is lower in high technology industries, possibly because the costs of being fully informed about R&D networks and of exploiting this knowledge are too high given the high number of R&D partnerships in these sectors. On the whole, network awareness thus appears as the result of a trade-off between expected rewards and costs.

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The development of tools and methodologies for technology measurement

The precise measurement of technology is crucial for carrying unbiased studies and developing proper policy recommendations. For this purpose, we are heavily investing in research infrastructure by gathering and working on several databases related to technological innovation, such as the European Patent Office Worldwide Patent Statistical Database (also known as EPO Patstat database). The tools we have developed allow us to merge different data sources and to construct unique datasets with up-to-date innovation indicators of different scope. Some of the fields where we are presently applying these methods are Technological strategies and portfolio of firms, Technology flows (with particular attention to transfers to developing countries), Medical technologies, Education technologies and General purpose technologies (e.g. nanotech).

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The demand for medical technology

Relying on initial contributions to the understanding of the adoption of new technologies in hospitals and to the revolution in diagnosis techniques, our research is focused on the determinants of the Swiss demand for PET and CT scanners. In this industry, the demand is indeed original: physicians are willing to provide new services but, departing from other sectors, the demand also depends on the fact that these users are also doing research using these equipments. The demand for medical devices is also strongly influenced by the final customers or patients, putting pressure directly (during visits) or indirectly (e.g. via lobbies or representatives) on physicians and health care providers. Besides, the demand for medical technology is strongly channeled through the regulators and especially the financing bodies or insurance companies involved in the health care system. Finally, the existence of a local medical device industry is likely to facilitate the adoption of technologies either through the availability of qualified technicians to use machines or through the supply of complementary goods.

This is the first step of a research program on the impact of medical technologies on health care costs. The research is developed in collaboration with the University of Lausanne (IEMS) and funded by the Swiss National Science Foundation (grant N°100014-122610).

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Nanotechnology in Switzerland

This project aims at identifying research and technological networks in Switzerland, as well as their dynamics. Nanotechnology is an interesting case for this study as growth and polarization of research activities in clusters will increase the number of interactions between researchers and will lead to innovation dynamics. Our research shows two distinct phenomena in Switzerland: (1) a polarization of activities around Zurich, Schaffhausen and Basel between 1978 and 1993; (2) a stronger geographical distribution of innovation capacities between 1994 and 2006, with the emergence of both the 'Léman' cluster and the Neuchâtel cluster.

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PhD research projects

- Socio-economic evaluation of fusion energy research, development, demonstration and deployment programme (*D. BEDNYAGIN*)
- The sources of process innovation in user firms: an exploration of the antecedents and impact of non-R&D innovation and learning-by-doing (*M. BOGERS*)
- University-industry technology transfer: sources of inefficiency and possible remedies (*A. CONTI*)
- Nanotechnologies: will Switzerland miss the boat? (*D. FISCHBACH*)
- Three essays on access to knowledge (*P. GAULÉ*)
- Towards a knowledge-based economy? Examining how S.E.A. countries are faring (*I.M. HAMDAN-LIVRAMENTO*)
- International spillover channels: micro-evidence from developing countries (*J. RAFFO - co-supervision with the University of Paris Nord*)

3rd Annual Conference of the EPIP association

October 3rd / 4th - Gurten Park, Bern - Switzerland

Invited speakers: A. ARORA, J.E. BESSEN, A. BRIMELOW, F. GURRY, R.M. HILTY, C. MCGINLEY, R. GROSSENBACHER, D. GUELLEC, M. SCHANKERMAN

The Annual Conference of the EPIP association is a platform of exchange for academics and intellectual property policy-makers. In 2008 the event was organised by CEMI with the support of the European Patent Office. It gathered close to one hundred participants. Among them were not only academics from over the world (Europe, US, Asia, Australia) but also representatives of the World Intellectual Property Organization (WIPO), the European Patent Office (EPO), the Swiss Institute of Intellectual Property (IPI) and other European national agencies.



J.E. BESSEN



A. ARORA

On the first day a panel of experts composed of Ms. Alison BRIMELOW (President of EPO), Mr. Francis GURRY (Director of WIPO) and Mr. Roland GROSSENBACHER (Director of IPI) exchanged their views on the governance of the patent system and its evaluation. The following sessions dealt with topics related to intellectual property rights: development, academic patenting, national patent systems, as well as the patent process in general.

The next Annual Conference will be held in Bologna on September 24-25, 2009.

>> <http://www.epip.eu/conferences/epip03>

Main publications

Articles

- RAFFO, J., LHUILLERY, S. and L. MIOTTI, "Northern and southern innovativity: a comparison across European and Latin American countries", *The European Journal of Development Research*, 20(2):219-239.
- LHUILLERY, S. and E. PFISTER, "R&D cooperation and failures in innovation projects: Empirical evidence from French CIS data", *Research Policy*, 38(1):45-57 (January 2009, accepted in 2008 for publication)
- FORAY, D. and B. VAN ARK, "Overview on Knowledge for Growth: European issues and policy challenges", *Knowledge for Growth. European Issues and Policy Challenges*, 6-15.

Working papers

- GAULÉ, P. and N. MAYSTRE, "Getting cited: does open access help?", CDM working paper series n° CEMI-workingpaper-2008-07.
- GAULÉ, P. and A. CONTI, "Universities and access to medicines: What is the optimal 'humanitarian license'?", CDM working paper series n° CEMI-workingpaper-2008-05.

Chapters in books

- CALLAERT, J., VAN LOOY, B., FORAY, D. and K. DEBACKERE, "Combining the production and the valorization of academic research: a qualitative investigation of enacted mechanisms", in MAZZA, C., QUATTRONE, P. and A. RICCABONI (eds.), *European universities in transition. Issues, models and cases*, Cheltenham: Edward Elgar.
- FORAY, D., "Economie de la connaissance", in VAN ZANTEN, A. (ed.), *Dictionnaire de l'éducation*, Paris: Presses Universitaires France.

Policy briefs

- FORAY, D. and B. VAN ARK, "Smart specialization in a truly integrated research area is the key to attracting more R&D to Europe", *Knowledge for Growth. European Issues and Policy Challenges*, 26-28.

Policy advice

D. Foray provides policy advice to European and international organizations:

- Vice-Chair of the Expert Group "Knowledge for Growth", a group of economists established and chaired by the European Commissioner for Research J. Potocnik (http://ec.europa.eu/invest-in-research/monitoring/knowledge_en.htm).
- Member of the IP Group of the Geneva Trade and Development Forum.
- Member of the World Economic Forum's Global Agenda Councils.

S. Lhuillery regularly participates in the OECD working groups dealing with issues related to Science, Technology and Innovation.

Scientific/Management responsibilities

D. Foray has the following scientific and management responsibilities:

- 2009-President of the EPIP association (European Policy for Intellectual Property);
- Member of the National Council of Research of the Swiss National Science Foundation (Division IV - targeted research);
- Member of the Advisory Board of the KOF Swiss Economic Institute at ETH Zurich;
- Associate editor of the peer-reviewed journal "Economics of Innovation and New Technology".

S. Lhuillery is an expert evaluator for the European Commission. They both act as referees for several peer-reviewed journals.

The team

Director:	Dominique FORAY
Senior researcher:	Stéphane LHUILLERY
Post-doc:	M. Abraham GARCIA-TORRES
PhD students:	Denis BEDNYAGIN ¹ Marcel BOGERS Annamaria CONTI ² David FISCHBACH Patrick GAULÉ Intan M. HAMDAN-LIVRAMENTO Julio RAFFO ³ Katarina LARSEN ⁴
Visiting researcher:	Tea DANELUTTI
Research operations officer:	Marianne CACHIN
Secretary:	

- ¹ Co-supervision w/ the Laboratory of Energy Systems (LASEN), EPFL.
- ² Visiting PhD student at Georgia Tech, September 2007 - June 2008.
- ³ Co-supervision w/ the CEPN, University of Paris Nord.
- ⁴ Post-doc at KTH - Royal Institute of Technology, Sweden.

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Forthcoming book

The New Economics of Technology Policy
D. FORAY (ed.), Cheltenham: Edward Elgar, 2009

Forthcoming events

Knowledge for Growth
Final conference of the K4G Expert Group
June 23, 2009 - Brussels, Belgium

The Economics of Knowledge Policy
International conference
May 30 / June 4, 2010 - Monte Verità, Switzerland