

# CEMI letter 2007

## Foreword

2007 has been the third year of growth and development for CEMI; a year of intensive academic activities, projects and conferences. One hit has certainly been the Monte Verità conference, which gathered internationally recognized top economists to participate on issues related to "The Economics of Technology Policy". But we have had many other events that should also be recognized and we invite readers and CEMI friends to learn about our research performances and our agenda for 2008.

Our main research interests remain unchanged – economics of R&D, innovation and knowledge transfer, national innovation capacities and technology policy in a global world – and we expect substantial progresses and many publications in the areas described below. We aspire that our research will have significant impact on policy making in Switzerland, Europe and elsewhere.

An upcoming event in 2008 that should not be missed is the EPIP conference to be held in Bern, Switzerland. CEMI is privileged to host this third international conference on the economics of intellectual property rights, which would bring experts and researchers in Europe together. Please refer to our website for more information on this conference. We hope to see you there.

Beyond these many academic events, it is worth to point also an astonishing number of weddings and births that have been celebrated in 2007 and early 2008, a social activity that also keeps us very busy!

We wish you a very successful 2008!

With my best regards

Prof. Dominique Foray  
Director of CEMI




## Research operations

### Economics of science and technology commercialisation

#### Towards efficient licensing and research contracts

This research focuses on two aspects of university-industry technology transfer. The first aspect relates to the activity of the University Technology Transfer Offices (UTTOs) and specifically to the impact that different organisational forms of the UTTOs in Europe have on their licensing activity. The second aspect relates to how different policy regimes regulating university intellectual property rights affect the decision of academic researchers to engage in contract research with industry for the development of a "basic" knowledge generated in the university labs.

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#### Social networks and knowledge workers

The literature on knowledge spillovers is usually focused on firms and inventors. Many recent efforts try to identify the channels by which knowledge is diffused. Inventor's mobility among firms and graduated student mobility are hot topics among scholars who focus on the role of individuals in the diffusion process. Information and knowledge may however diffuse day to day through the different social networks the employees are involved in. This project is thus to examine if researchers from public organisations or private enterprises, as well as other graduated people, are more likely to invest into social networks than other workers' category. A second question is to explore the evolution of networking activities over the last thirty years and its determinants.

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### User innovation and informal innovation

#### User innovation by firms

This project aims at investigating the role of users in the innovation process with a particular focus on firms as user innovators. The aim is to explore the characteristics of these user firms and their innovations, and more specifically the role of learning by doing in these process innovations. A questionnaire has been conducted to investigate the economics and management of process innovation in user firms. The results will shed light on, for example, who contributes to process innovation in user firms, how these innovations are monitored and budgeted, and in what way they can be effectively managed by facilitating learning by doing. Similar projects are run in parallel by Georg von Krogh (ETHZ) and Eric von Hippel (MIT). The research is supported by the Swiss National Science Foundation.

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### The impacts of disclosure strategies by software users

Improvements proposed by users are not reduced to the shop floor level in manufacturing industries. Many upgrades are done by people using softwares. Then, the upgrades are (or not) re-appropriated by software companies. Users strategically choose to diffuse (or not) the improvements among other users or can even negotiate with suppliers to integrate their inventions. This research project tries to measure the return for user innovators and to analyze the impact on software providers and other software adopters.

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### The economics of R&D for neglected diseases

The purpose of this qualitative research project is to develop a better understanding of which institutions lead to the efficient production of a specific type of knowledge: new pharmaceutical products against diseases that primarily affect developing countries (neglected diseases). Preliminary results suggest that the following features of drug discovery need to be taken into account when designing incentive mechanisms for neglected diseases R&D: (1) Cross fertilization. Research undertaken in neglected disease research may be useful in another commercial disease research and vice versa (2) drug discovery makes heavy use of quasi-public inputs in the form of screening machines and compounds libraries (3) Corporate social responsibility and employee motivation are important motivating factors for engaging into otherwise non-profitable research.

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### Towards a knowledge-based economy? Examining how South East Asian (S.E.A.) countries are faring

This research investigates whether and how developing countries, and specifically S.E.A. countries, are progressing toward becoming knowledge-based economies. We look at local institutional structures, entrepreneurial activities and IP databases to examine whether there have been changes in the kinds of innovation that these countries produce. Results from this research will offer insight to the need for IPR protection in developing countries.

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### Technology flows towards developing countries

Developing economies usually propose less advantageous environments to access knowledge and technology, hampering the innovative behaviour of firms. This research looks at the main channels for technology flows between developed and developing countries and the nature of the technology transferred. Three main technology acquiring means are empirically studied by using Southern firms' microdata and patent data: (a) intra-MNEs flows, (b) international co-operation for innovation and (c) the learning-by-exporting. There is a special interest in the role played by General Purpose Technologies (GPTs) in these flows.

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### Nanotechnologies in Switzerland

This research project aims to estimate the chances of Switzerland to become a world leading player in the nanotech economy. It addresses the potential of the nanosciences, nanotechnologies and nano-applications as "general purpose technology" in the economic development. We further investigate the Swiss nano "knowledge ecology": their actors, their activities, their economic results, and we compare it with other sectors and countries to look if a nanotech innovation system is surging from that. We also focus on the knowledge and technology transfer fostering institutions and policies, especially with the new trends in Switzerland and their interactions within the competitive realization of innovations like nanotech.

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### Measuring knowledge spillovers

This study aims at practical estimation of the spillover benefits of publicly funded R&D projects emphasised on magnetic confinement thermonuclear fusion technology. Different socio-economic impacts of fusion research, development, demonstration and deployment (RD3) programme are being evaluated with the help of a novel methodological approach combining elements of microeconomic assessment of individual firms' performances and integrated techno-economic modelling of global energy systems.

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### The determinants of medical devices adoptions

During the last thirty years technological progress has been particularly intense in Health. The medical device industry is often overlooked by scholars, which usually focus on the more alluring pharmaceutical companies. Along with the United States, Switzerland is a major adopter and user of capital intensive new medical devices such as CT, PET, SPECT scanners or MRI imaging devices. This research project aims at analyzing over time the factors influencing the adoption of different medical technologies at the hospital level, controlling for the heterogeneity due to the existence of 26 cantons (regions).

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### Word matching strategies for patent datasets

We are heavily investing in research infrastructure by gathering and working on several databases related to technological innovation. The effort made in order to use the European Patent Office Worldwide Patent Statistical Database (also known as EPO Patstat database) with other datasets will be carried on with firms' name instead of inventors' name. Several datasets will be tested. The matching with innovation survey datasets is of particular interest: it will for instance give some insight on the reliability of the self-declared number of patents filed in these qualitative surveys.

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## PhD research projects

- Estimating spillover benefits of global RDD programmes in energy sector: the case of magnetic confinement thermonuclear fusion technologies. (*D. Bednyagin*)
- Firms as user innovators: an exploration of process innovation in user firms. (*M. Bogers*)
- University-industry technology transfer: sources of inefficiency and possible remedies. (*A. Conti*)
- Nanotechnologies: will Switzerland miss the boat? (*D. Fischbach*)
- The economics of R&D for neglected diseases. (*P. Gaulé*)
- Towards a knowledge-based economy? Examining how S.E.A. countries are faring. (*I. Hamdan*)
- International spillovers channels: micro-evidence from developing countries firms. (*J. Raffo - co-supervision with the University of Paris Nord*)

## The Economics of Technology Policy

**June 17th / 22nd - Monte Verità, Ascona**

Supported by the Centro Stefano Franscini, the European NoE DIME and the Swiss Federal Office for Professional Education and Technology, this international conference gathered an impressive group of top academics in the fields of the economics of endogenous growth, the economics of innovation and the econometrics of R&D, innovation and productivity.

Bringing these three communities together to discuss and exchange on the effectiveness and impact of public policies related to science, technology and the innovation was one of the objectives of the conference.

In addition to them, twenty policymakers also participated in the debate. This obliged the academic speakers to identify and measure the concrete implications of the theoretical analyses they were presenting.

In total, close to one hundred people attended the event (one third of young researchers). Incontestably, the conference largely profited from such intellectual density.

<http://etp-monteverita.epfl.ch>



- Prof. Manuel Trajtenberg:  
*"The conference was really fabulous. I came back re-energised and highly optimistic: I think there is a true sort of renaissance in our field and the conference served both as catalyst and as window to it. I deeply thank you for having put so much effort in organising it, but it was definitely worth it."*

- PhD student:  
*"The Eve of a New Model in Economics of Innovation – The Monte Verità is the perfect scenery for daring dreams of fundamental changes. After the Utopia of the naturist dancers 100 years ago and many others, we believe to have witnessed a major event in the history of the economic thought about innovation."*



## Main conference contributions

### February 7th / 8th – D. Foray

"Embracing the knowledge economy: policies and strategies for the EU" - India-EU Ministerial Science Conference - New Dehli, India.

### February 8th – D. Bednyagin

"Socio-economic profitability of Fusion RDDD programme" - Annual Meeting of EFDA "Socio-Economic Research on Fusion" programme - Garching-bei-Munich, Germany.

### May 16th / 19th – M. Bogers

"Users as innovators: A review and future research directions. Can manufacturers profit from user innovation?" - European Academy of Management 2007 Annual Meeting - Paris, France.

### April 13th – S. Lhuillery / J. Raffo

"Innovation, productivity and exports: a comparison across European and Latin-American countries" - Micro evidence on innovation in developing countries (MEIDE) - Maastricht, The Netherlands.

### September 20th / 21st – P. Gaulé / A. Conti

"Academic Licensing: a European Study" - 2nd Annual Conference of the EPIP Association - Lund, Sweden.

### September 20th / 21st – I. M. Hamdan Livramento / D. Foray

"Does IPR policy affect the prevalence of local entrepreneurs? A cross-country empirical finding" - 2nd Annual Conference of the EPIP Association - Lund, Sweden.

### October 2nd / 3rd – S. Lhuillery / J. Raffo

"How to play the 'Names Game': Patent retrieval comparing different heuristics" - Patent Statistics for Policy Decision Making - Venice, Italy.

### October 8th / 9th – D. Foray / S. Lhuillery

"Corporate R&D in EU and US" - Knowledge for Growth: Role and Dynamics of Corporate R&D - Sevilla, Spain.

### October 18th / 20th – S. Lhuillery

"Absorption for innovation or imitation?" - ESF/COST Workshop on "Science and Technology Research in a Knowledge based Economy" - Leuven, Belgium.

### October 18th / 20th – P. Gaulé / A. Conti

"Academic Licensing: a European Study" - ESF/COST Workshop on "Science and Technology Research in a Knowledge based Economy" - Leuven, Belgium.

### October 23rd / 24th – D. Foray

"They made the trip up, but never came back down" - Turning knowledge into practice: Getting more out of public investment in innovation - Berlin, Germany.

### October 25th / 27th – I. M. Hamdan Livramento

"Does IPR protection affect high growth entrepreneurship? A cross-country empirical examination" - Second Annual Max Planck-Indian Institute of Science (IISc) International Conference on "Entrepreneurship, Innovation and Economic Growth" - Bangalore, India.

### November 12th / 16th – D. Foray

"Intellectual property and technological development" - WIPO International Seminar on "The strategic use of intellectual property for economic and social development" - Ljubljana, Slovenia.

### November 15th / 16th – S. Lhuillery

"Innovation, organisational change and servicisation: A micro data level analysis in five European countries" - DIME workshop on "Organisational innovation: The dynamics of organisational capabilities and design" - Nice, France.

### December 7th – D. Foray

"Technology transfers toward LDCs need more incentives: does article 66-2 succeed?" - Geneva Trade and Development Forum - Meeting of the IP Group on "Bridging the technological gap: How can LDCs promote innovation and growth?" - Geneva, Switzerland.

December 13th/14th – D. Foray

“L'économie de la connaissance : une nouvelle économie?” - Institut des Hautes Études pour la Science et la Technologie -Workshop on “L'économie de la connaissance: quelles sont les transformations nécessaires ?” - Paris, France.

## Main publications

### Working papers

- CONTI, A., GAULÉ, P. and D. FORAY, *Academic licensing: A European study*, CDM working paper n° CEMI-workingpaper-2007-01.
- AGHION, P., DAVID, P. A. and D. FORAY, *Linking policy research and practice in 'STIG Systems': Many obstacles, but some ways forward*, CDM working paper n° CEMI-workingpaper-2007-02.
- FORAY, D., HALL, B. H. and J. MAIRESSE, *Pitfalls in estimating the returns to corporate R&D using accounting data*, CDM working paper n° CEMI-workingpaper-2007-03.

### Papers in academic journals

- FORAY, D. and T. COOK, “Building the capacity to experiment in schools: a case study of the Institute of Educational Sciences in the U.S. department of Education”, *Economics of Innovation and New Technology*, 16(5):385-402.
- FORAY, D., MURNANE, R. and R. R. NELSON, “Randomised trials of education and medical practices: strengths and limitations”, *Economics of Innovation and New Technology*, 16(5):303-306.
- MILSTIEN, J. B., GAULÉ, P. and M. KADDAR, “Access to vaccine technologies in developing countries: Brazil and India”, *Vaccine*, 25(44):7610-7619.

### Chapters in books

- FORAY, D., “University-industry knowledge transfer in Switzerland”, in YUSUF, S. and K. NABESHIMA (eds.), *How universities promote economic growth*, The World Bank.
- GAULÉ, P., “Towards Patent Pools in Biotechnology?”, in VEENA (ed.), *Biotech patent law*, ICAFI University Press.
- FORAY, D., “Enriching the indicator base for the economics of knowledge”, in *Science, Technology and innovation indicators in a changing world. Responding to policy needs*, OECD publishing.
- FORAY, D., THORON, S. and J.-B. ZIMMERMANN, “Open software: knowledge openness and cooperation in cyberspace”, in BROUSSEAU, E. and N. CURIEN (eds.), *Internet and digital economics*, Cambridge University Press.
- FORAY, D., “Tacit and codified knowledge”, in HANUSCH, H. and A. PYKA (eds.), *Elgar Companion to Neo-Schumpeterian Economics*, Edward Elgar Publishing Ltd.

### Special issue

- FORAY, D., MURNANE, R. and R. R. NELSON, “Randomised trials of education and medical practices: strengths and limitations”, *Economics of Innovation and New Technology*, 16(5).

## Policy advice

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

P. Gaulé provides policy advice to the World Health Organization.

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

- Vice-Chair of the Expert Group “Knowledge for Growth” - a group of economists established and chaired by the European Commissioner for Research, Janez Potocnik.

- Member of the IP Group of the Geneva Trade and Development Forum.

## Scientific/Management responsibilities

D. Foray has the following scientific and management responsibilities:

- Vice-President of the EPIP association (European Policy for Intellectual Property).
- D. Foray is 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.
- Member of the Steering Committee of the “Société d'Etudes Economiques et Sociales”.
- Associate editor of the peer-reviewed journal “Economics of Innovation and New Technology”.

S. Lhuillery has also been an expert evaluator for the 7th Framework Program of the European Union.

## The team

**Director:**

Prof. Dominique FORAY

**Senior researcher:**

Dr. Stéphane LHUILLERY

**PhD students:**

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**Research operations officer:**

Tea DANELUTTI

**Secretary:**

Marianne CACHIN

<sup>1</sup> Co-supervision w/ the Laboratory of Energy Systems (LASSEN), EPFL.

<sup>2</sup> Visiting PhD student at Georgia Institute of Technology since September 2007.

<sup>3</sup> Co-supervision w/ the CEPN, University of Paris Nord.

## 3rd Annual EPIP Conference

October 3 - 4, 2008

Bern - Switzerland

<http://www.epip.org>

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