Universities and Business: Partnering for the Knowledge Society

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CHAPTER 11

The EPFL approach to Innovation

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Innovation has become a major subject of discussion in developed countries. From the European Union's Lisbon Strategy (2000) to the contribution of Beffa (2005) in France, the number of studies on how to improve innovation has not only been high, but the quality of the authors is also noticeable. Switzerland is no exception to the situation, and the political and economic decision-makers have been very sensitive to the Swiss challenges and opportunities, e.g. Avenir Suisse (2002). As in any developed country, academic institutions are and will be even more important contributors to innovation in the future. A description of the innovation landscape in Switzerland and of the Ecole Polytechnique Fédérale de Lausanne's (EPFL) unique strategy is developed herein.

Silicon Valley is the example of what developed countries would like to achieve: a hugely successful technology cluster, where corporations, which were once little start-ups, renowned academic institutions, and individuals who have become role models for an entire country. Investors, lawyers as well as established companies also contribute to the wealth of a region not larger in km^2 than Switzerland. Need we mention Intel, Cisco Systems, Genentech, Apple Computers, and Oracle? Stanford University and UC Berkeley? Steve Jobs, Larry Ellison? Names such as Kleiner Perkins, Sequoia, or Wilson Sonsini may be lesser known, but were as instrumental in the development and success of the Bay Area. As innovation is complex and requires a variety of

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people and experiences, technology clusters are the right models. Though Silicon Valley will probably remain unique, original approaches should be developed to favour innovation.

ABOUT INNOVATION

"Anything that will not sell, I do not want to invent." Thomas Edison

There is sometimes confusion about the definition of innovation. It is different from invention. Innovation is the successful commercialization of inventions; it is the development and application of new ideas to create value. Coming from an innovator, it is obviously his main motivation. "However, there is another side to innovation at a university — Cambridge University, England, in 1855 — if you had asked what its biology department would look like in 1880, you would have missed the Darwinian revolution. So we don't know exactly which of the things we're working on at Stanford today are going to be the ones that have terribly important relationships to human welfare, indeed, to human survival a hundred years from now." Donald Kennedy, former president of Stanford University, from Whiteley (2002).

Innovation is not and will never be the main mission of universities, even of institutes of technology. To reassure those who are sceptical, let us look at numbers: Stanford with all its successful ventures in innovation is generating about $40 million in royalties per year, a small 2% of its annual budget. The figure of 2% is probably a good average number for most American universities. However, in a rather striking study, Stephan (2005) has shown how Ph.D. students trained in the very good universities of the U.S. Mid-Western states often relocate to the East and West Coast. It seems that some discussions do occur about the efficiency of state funding in high education as a good local investment. The Swiss universities are all state funded. Their budget should be guaranteed and increased, not just for the beauty of science, but also for the benefit of their students and as a good investment for Switzerland and its future.

SWITZERLAND AND INNOVATION

Switzerland has discovered with awe that it is not good at innovation, e.g., Avenir Suisse (2002), Volery (2004). The country may be wealthy with a sound economy and global infrastructure, as numerous reports show, however the trend is negative and many countries are catching up. In the same reports, it has been widely agreed that "future growth will be through the ability to innovate". A detailed analysis of Switzerland reveals that productivity has fallen drastically, new product development is moving out and new venture creation is too small. However, Switzerland is and will be more and more a

knowledge-based society; if it wants to grow, it will have to show that the money spent in innovation is a good investment from which society also benefits.

The reasons for such apparent challenges are difficult to assess and the determining criteria are not yet clear. However, the studies mentioned seem to converge on the same points. It does not seem that political will and decisions, the lack of money or infrastructure are critical. In a small survey on Switzerland, Avenir Suisse (2002) itemized more specifically the following barriers:

Table 1: Barriers to innovation in Switzerland

Category	Category Type	Weight
Risk Aversion	Cultural Issue	10.28
Public Complacency	Cultural Issue	10.28
Innovation Is Not Highly Valued	Cultural Issue	9.66
Existing Education Does Not Provide Tools for Innovation	Educational Issue	8.41
Access to Appropriate Financing	Political Issue	7.48
Closed Networks	Cultural Issue	6.54
Legal Barriers	Political Issue	6.54
Limited Manpower	Educational Issue	5.92
Lack of Vision and Policy Growth	Political Issue	5.61
Innovation and Education	Educational Issue	4.98
No Role Models	Educational Issue	4.36
Lack of Entrepreneurial Mindset	Educational Issue	4.36
Existing Infrastructure and Mind Resources Under-Utilized	Political Issue	3.43
Critical Mass	Size Issue	2.49
Human Potential Exits	Success Factor	2.49
Limited Internal Market Size	Size Issue	2.49
Ivory Tower	Educational Issue	1.87
Positive Business Climate	Success Factor	1.25
Too Many Restrictions on Innovation	Political Issue	0.93
Provincialism	Cultural Issue	0.62
Total		**100.00**

Interestingly enough, if we summarize by category type, we obtain:

Table 2: Barriers to innovation in Switzerland by categories

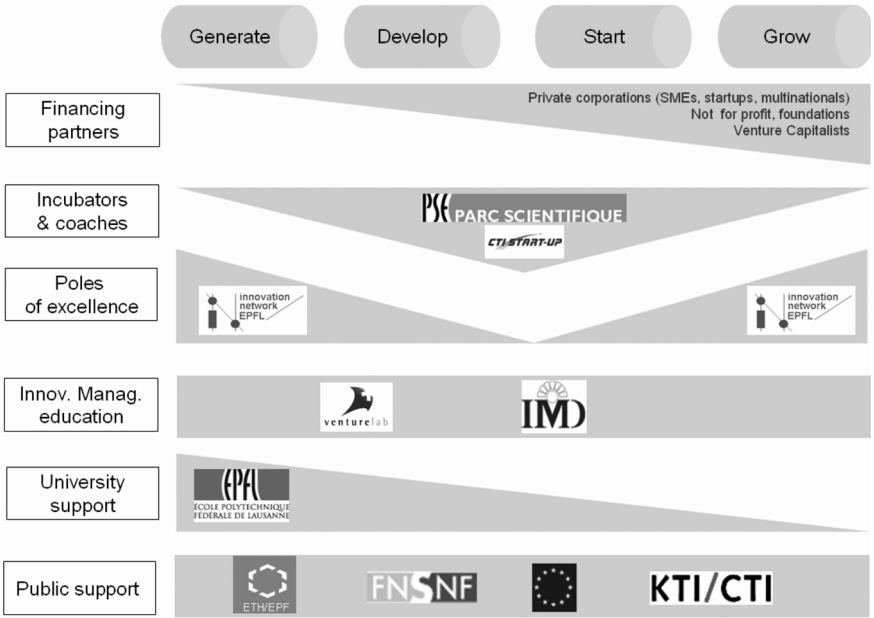
Category Type	Total
Cultural Issues	37.38
Educational Issues	29.91
Political Issues	23.99
Size Issues	4.98
Success Factors	3.74
Total	**100.00**

This table illustrates clearly that cultural and educational issues constitute the main barriers to innovation. This paradox will not be easy to resolve. In his very interesting keynote speech to the Thought Leadership Forum, Kurtzman (2002) states: "Innovation and competitiveness are not national issues. They are corporate issues. Companies compete. Countries don't compete. Yes, a country has to provide the infrastructure, the educational superstructure and health care. But, that is not where competitiveness lies. Competitiveness and economic benefit lie in companies, in the economic engines of that economy. From my standpoint, the most important thing to think about is not the country, but it is how you create economic value within companies. That alone will give the country benefit…. Therefore, I look at innovation and define innovation from a very narrow perspective. From the perspective that the purpose of innovation is to create value — measurable value." The paradox lies in the fact that academic institutions will be asked to be strong contributors to innovation but the measure of success or failure will probably be outside the universities, i.e. within corporations.

SWISS UNIVERSITIES AND INNOVATION

The innovation infrastructure of Switzerland is sound. To focus just on academic innovation, let us try to briefly describe how innovation can be ideally supported. Surlemont (1999) explains the necessary infrastructure for academic spin-offs. His very exhaustive analysis is interesting for many reasons, but one of his best achievements is a description of the infrastructure needed to support ambitious innovation. He classifies such support in six different areas: government, universities, entrepreneurship and innovation education, poles of excellence, incubators and coaches, and industry and financial partners. Figure 1 also illustrates their respective weight from idea generation to development and success.

Figure 1: EPFL innovation actors



The description made below corresponds to the EFPL situation; it has the advantage of giving concrete examples, which can be easily generalized to Switzerland as a whole. Let us begin with external support, i.e. government, industry and financial. The government support begins with the fact that EPFL is a federal school within the ETH/EPF domain. For more than 150 years, Switzerland has been playing a critical role in science policy combining high quality standards in education and research. The ETH/EPF domain today is a very strong support which guarantees a world-class level that enables EPFL in particular to attract the best professors and students. Innovation begins with such prerequisites. Two other agencies, the Swiss National Science Foundation (FNS) and the Swiss Innovation Promotion Agency (KTI/CTI) support research and innovation on a project-based format similar to the American model. Finally, the European Union becomes a major actor in the funding of research. There is one major difference to be noticed: Switzerland does not fund the private sector with public money in the same way as the SBIC program (http://www.sba.gov/INV) in the USA or Ozeo in France, the merger of ANVAR and BDPME (the bank for the development of small and medium size enterprises — SMEs).

At the other end of the spectrum, the private sector is also a major player in innovation: established companies contribute more and more to innovation with direct collaborations with universities and indirect ones in partner-

ships with the KTI/CTI. Another feature of Switzerland is its dense network of SMEs. Historically, the country has always been very strong with such companies in the mechanical, electromechanical, chemical and health industries.

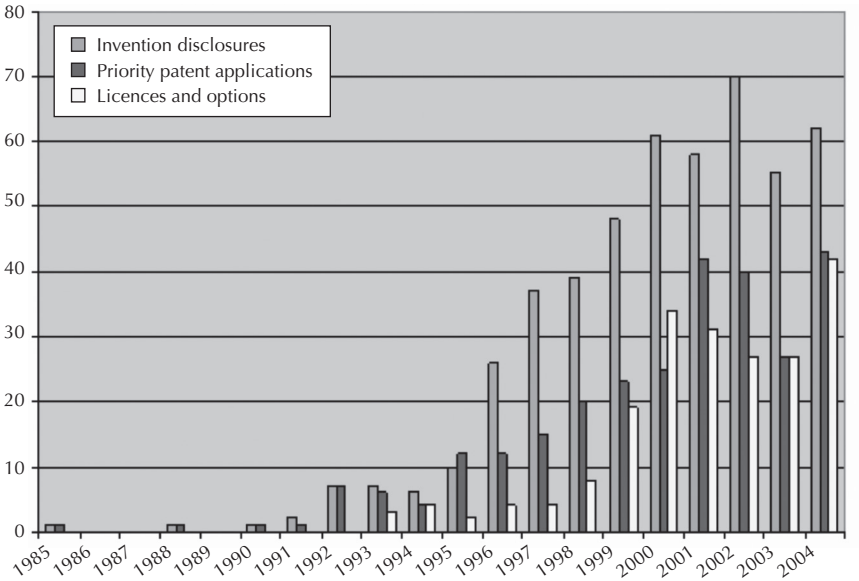
More recently with the development of a new generation of start-ups, a decent number of venture capitalists, accounting and law firms have developed around companies spun-off from academic institutions. Professional associations, foundations and also awards supporting entrepreneurships followed. A foundation, dedicated to innovation, is providing personal loans with very good conditions to entrepreneurs linked to local academic institutions. Finally, as anywhere else, and sometimes with more success thanks to the flexibility of the Swiss federal system, legal and fiscal advantages contribute to making Switzerland an attractive area.

Swiss universities did not stay inactive during these sustained efforts. As American universities following the Bayh-Dole Act (1980) which gave universities the responsibility to manage the intellectual property (IP) generated by their staff, most European universities have developed technology transfer offices. EPFL's Technology Transfer Office (TTO) has been in the forefront as it has been managing IP for more than 15 years. EPFL is also allowed to take equity and royalties in technology licensing deals with private companies. Figure 2 gives some indication of EPFL's data of technology transfer. On the incubator and coaching side, a science park, the PSE, was built starting in 1993. Today, this independent legal structure welcomes more than 100 start-ups on the campus. The PSE also provides coaching supported by KTI/CTI and an incubator for entrepreneurs and early stage companies. The region has also been lucky to see the recent creation of other incubators and numerous coaching programmes.

Education in entrepreneurship and management of technology may have been less developed in the past. The College of Management of Technology at EPFL, a new college founded in 2005, is dedicated to train engineers in the economic and business aspects of innovation and technology. It exemplifies the recent important decisions taken in the area of teaching entrepreneurship and management. With these initiatives, EPFL will be able to attract students with a strong innovative and entrepreneurial mindset that will be further stimulated during their education. It would be terrible not to encourage scientifically brilliant students to develop also their potential in innovation.

To quote Kurtzman (2002) again: "Creativity often happens at the edge of chaos….It has been my contention that the edge of chaos is important, and yields results. Innovation is not a clean process. Innovation has a lot of failure built into it, and innovation is about tolerating those failures. The best venture capital firms in the world have about a 20% success rate — admittedly much worse in the current environment. Innovation means tolerating the fact that failure is a part of the game. Innovation means celebrating failures as the

Figure 2: EPFL technology transfer activity



first step in the process…. Innovation is an unnatural act for many organizations and is often not part of the culture. Many of Russia's best-trained minds were stagnant for decades until they came to the U.S. or to Israel where innovation was something that was valued. Innovation is not just a matter of intelligence."

THE INNOVATION GAP STILL PREVAILS – PART I

Despite all these efforts, the difficulty to innovate — that is the difficulty to successfully market products coming from the inventive activities of technologists — has been recognized. This "Innovation Gap" remains as ever a real challenge. This is not to say that all the past initiatives have failed. It would certainly be quite easy to show that without such support, Europe and Switzerland may have been in a more difficult situation. All efforts in this field can only give long-term results, with their positive outcome only to be seen as positive in the future.

Numerous studies explain the difficulty to innovate: fear of risk-taking, reduced funding, disconnection between academia and industry, lack of university focus on commercialization. These are generally accepted as the main obstacles to innovation. Remedies include actions on culture and education, a more flexible funding scheme, closer links between universities and industry, and a system of rewards inside the universities to facilitate innovation.

The linear approach considering that education, research, development and industrialization follow each other in a natural manner, is arguable. A more integrated framework is certainly necessary.

There are many books about the challenges of innovating, for example, Lester (2004) or Haour (2004). Innovation has never and will never be simple or mechanized, neither will entrepreneurship. Looking again to the other side of the Atlantic, MIT has made a similar analysis: in 2002 it created the Deshpande Center, with the idea of bridging the Innovation Gap by better connecting all innovation actors and diminishing risk taking.

Individual willingness to achieve something, with or without the fear of taking risks, is critical to innovation and entrepreneurship. In the will to achieve, there may or may not be any technology content: innovation is not always about brilliant scientific breakthroughs. It has often been noted that (unfortunately) scientific quality and entrepreneurial mindset are seldom found combined in one individual's brain. Is there a myth in combining Bill Gates and Paul Allen, Steve Jobs and Steve Wozniak, Bill Hewlett and David Packard? Certainly to some extent, but it is the illustration that teams may be stronger than isolated individuals.

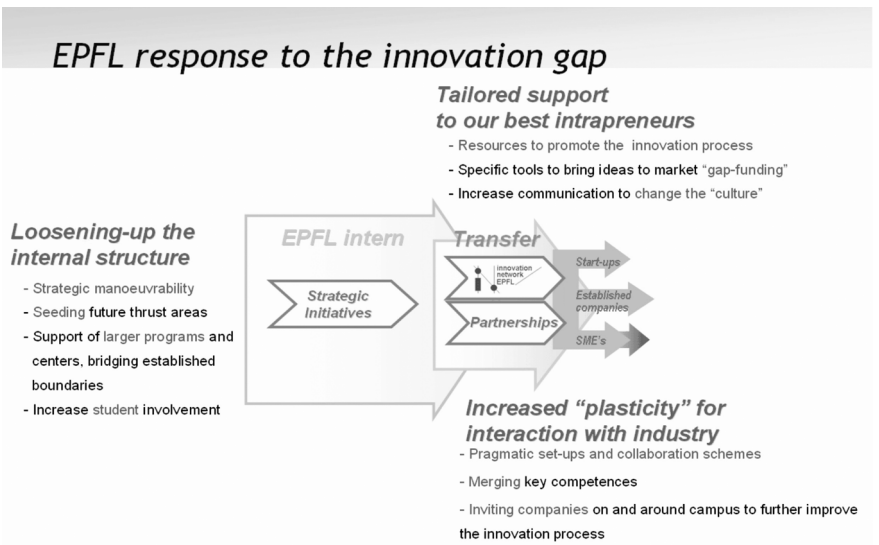
EPFL'S NEW INITIATIVES IN INNOVATION – PART I

This analysis is certainly too short, but we are convinced that more can be done to improve innovation. To assist individuals to better connect in a complex network of actors and to convince established companies that better links can be created with universities, EPFL decided in 2004 to create a new Vice-Presidency for Innovation and Valorization (VPIV). The VPIV encompasses EPFL's TTO and industry liaison programme and in mid-2005, it also created its Innovation Network — a Network, and not a Centre, to emphasize that innovation will not be improved by being centralized. As has been shown by all experts, innovation is about creating open spaces where creativity is first encouraged and then streamlined.

EPFL's strategy to improve innovation will focus on addressing key issues: better communication channels, an effort to change the culture and internal support to encourage innovative projects. Innovation has its roots in research and therefore this effort begins by encouraging trans-disciplinary activities between the different laboratories, to enable the exploration of new fields. Such so called "Strategic Initiatives" should help eliminate the traditional barriers between research domains. Trans-disciplinary centres have been and are being set up linking disciplines such as biology and computer science, chip design at the hardware and software level, material science and bioengineering among others.

Two unique examples of Strategic Initiatives are the collaborations with Alinghi (2001) and Solar Impulse (2003). In the case of Alinghi, the Swiss challenger and winner of the America's Cup, R & D collaborations have been in place since 2001, with particular focus on fluid mechanics, materials and visualization. The more recent Solar Impulse project for a round-the-world solar airplane flight will draw upon intellectual and scientific resources from more than ten diverse research domains. These will focus on the following technological challenges: ultralight materials, novel energy storage and retrieval systems, and new types of human-machine interfaces. The original motivation here is not only to address trans-disciplinary collaborations, but also to create unique and highly successful role models for students and researchers through the visible nature of these two challenging projects.

Figure 3: EPFL innovation strategy



Poles of excellence, as defined by Surlemont (1999), unite universities, research centres, companies and professional associations to facilitate contacts, to animate and promote skills linked to the pole, so as to create a sufficient critical mass. They also create a top-down clustering access (and not to only one laboratory) with a better use of resources. FNS has created at the federal level such areas of expertise (NCCRs), notably around EPFL, on molecular oncology, mobile communications and quantum photonics and in more than 10 other fields in Switzerland. This programme, initially dedicated to high quality research, is now experiencing a second phase in which it focuses more on technology transfer and Partnerships with the private sector. EPFL

will give strong support to follow the early results of the NCCRs, in particular by inviting companies to join the university's efforts. Discussions to create new efficient models for industry-academia Partnerships have been launched. Corporations have been too cautious in funding research which lacked a strong focus on the applications. Mixing strongly university labs and corporate R & D has not always been optimal. The creation of more neutral joint-ventures near university campuses will be one way to promote the open innovation which is seen nowadays as the only way to efficiently innovate. As big corporations have reduced their basic R & D activity, they will rely more and more on university research to innovate. Hybrid structures will be a model to build confidence between universities and corporations. They can innovate together without preventing high quality research in the university labs and without forgetting corporations' main priority: innovation.

SMEs represent a huge proportion of the Swiss economic network: SMEs, those with up to 250 employees, represent 99.7% of the country's 300,000 companies and account for well over two thirds of employment. SMEs are sometimes known as those squeezed in the middle with fewer resources to innovate: on one side, start-ups in their early phase are totally dedicated to the development of new products coming from breakthrough inventions; on the other side, bigger companies, including multinationals, have the resources and flexibility to plan the long term even though their R & D capacity has been under more pressure than it was 15 to 20 years ago. SMEs, on the contrary, due to more limited resources, focus more and more exclusively on their existing customers and have strong dedication to provide the best possible products. This gives little time to look at the future product development. Their research capability is also limited. Bigger companies have specialists who can communicate with innovators outside, such as those in university labs. A unique and potentially very rewarding effort that will benefit the Swiss economy is the launch of a new initiative facilitating SMEs-university communication. This especially supports translating functional technology needs into scientific issues suitable to university research level.

THE INNOVATION GAP STILL PREVAILS – PART II

As it has been shown earlier, the infrastructure for supporting innovation is solid, well in place and it does not lack any tool. Despite this, in the last ten years, not many companies have grown and few inventions made at EPFL have been licensed with an interesting financial return for the school. Why so? It is certainly just a question of time as it must be remembered that successful U.S. universities in technology transfer have often counted on a very small number of "home runs". The Cohen Boyer patent in the 1970s and Google recently are the two big success stories of Stanford. Most other technologies

generated less than $10 million whereas these two extreme cases have generated more than $200 million each.

Let's try a simple exercise. Whether the reader is interested in high tech (semiconductor, communications,…) or life sciences (biotechnology, medtech,…), he certainly knows the most famous and successful companies which were start-ups maybe as early as in the 1970s. The same exercise can be done to build a list of American companies and a list of European companies. We would be ready to bet that, for any reader, building a U.S. list is quite easy and a European list much more difficult. We would even be surprised if he could mention 10 European companies. Let's provide the list we built. The numbers are subject to errors as we did the exercise very quickly. Table 3 shows a comparison for hi-tech companies; Table 4 considers the life-science sector.

Table 3: Successful hi-tech start-ups in the USA and Europe

USA				Europe			
Company	**Creation**	**IPO**	**Market cap ($B)**	**Company**	**Creation**	**IPO**	**Market cap ($B)**
Microsoft	1975	1986	266	SAP	1972	1988	52
Intel	1968	1971	163	Dassault Syst.	1981	1994	5.4
Cisco	1984	1990	120	Bus. Objects	1990	1993	2.5
Dell	1984	1988	95	Arm	1990	1998	2.2
Google	1998	2004	80	Kudelski* +	1951	1986	1.7
Oracle	1977	1986	68	Logitech +	1981	1990	1.4
Yahoo	1994	1996	47	Gemplus	1988	2000	1.3
eBay	1995	1998	45	ASML	1984	1994	0.8
Apple	1976	1984	30	Soitec	1992	1999	0.8
Amazon	1994	1997	13	* company is not a pure start-up, + roots at EPFL			

Source: Yahoo Finance web site, Sept. 05

Discussions may occur about the validity of such an approach, but undeniable conclusions can be drawn. First, the difference in the number of companies cannot be argued. Finding U.S. names was easy, and tens of names could be added with big market capitalizations. Finding European names was not as easy, and the market capitalizations are lower. It might also be that time from creation to IPO is shorter in the U.S. than in Europe, but this would require a very serious study.

Table 4: Successful life-science start-ups in the USA and Europe

USA				Europe			
Company	**Creation**	**IPO**	**Market cap ($B)**	**Company**	**Creation**	**IPO**	**Market cap ($B)**
Amgen	1980	1983	99	Serono*	1906	1987	14.5
Genentech	1976	1980	94	Shire	1986	1996	6.4
Gilead	1987	1992	19	Elan	1969	1992	3.6
Genzyme	1981	1986	18	Actelion	1997	2000	2.5
Biogen	1978	1983	14	Qiagen	1986	1996	1.9
Chiron	1981	1983	8	Crucell	1993	2000	0.9
Medimmune	1987	1991	7	Genmab	1999	2000	0.6
Invitrogen	1987	1999	4				
App. Biosystems	1981	1983	4				
Affymetrix	1991	1996	3	* company is not a pure start-up			

Source: Yahoo Finance web site, Sept.05

Let us come back to EPFL. In the last 15 years, and thanks in part to the nearby PSE, more than 100 start-ups have been established near EPFL. In recent years, 10 companies on average were created per year. Let us also add that both Logitech and Kudelski can trace their roots to EPFL. Universities such as Stanford or MIT create about 15 to 20 start-ups per year, so EPFL is certainly among the most dynamic European universities.

However, Surlemont (1999) classifies start-ups in two categories: individual projects and enterprise projects with the characteristics described in Table 5. Could it be that the reason why companies do not grow big in our area but also elsewhere in Europe is linked to a higher ratio of lifestyle companies vs. "hi-potential" ones. One element is clear, not many start-ups after 5 years of existence have more than 10 employees in Europe. An interesting study by Zhang (2003) shows in fact how Silicon Valley differentiates itself from other regions in the U.S. such as the Boston area in the nature of its start-ups. One key fact is that the number of start-ups with more than five employees at some point in their history is proportionally much higher in the Bay Area than anywhere else. This weakness in growth is certainly a character of European and Swiss start-ups.

Innovation is about value creation and we are in a competitive world. Lifestyle start-ups should exist. They do in fact make a large majority of the start-ups in any area (Zhang, 2003). They also can be considered as the seeds for hi-

Table 5: Type of start-ups

	Individual project (lifestyle)	Enterprise project (hi-potential)
Founders	One (two) individual(s)	A team
Initial investments	Low	High
Financial needs	Low	High
Equity structure	Closed	Open
Growth potential	Low	High
Export potential	Low	High
Main goal	Short term profits	Growth
Dependency on founders	High	Low
Activity	Consulting	Product development and sale
How should university support project?	Moderately	Strongly

Source: Surlemont (1999).

potential start-ups; sometimes they will also become the hi-potential start-ups once they have found their growth niche. But competition is about speed. Your competitors will take your customers if you are not strong, fast and versatile enough. Will you take theirs if you are too small? Innovation is also about speed and efficiency. There is a need to be ambitious and aggressive when one believes in the value of one's venture.

Finally, it is often said that start-ups should be able to convince friends, investors and local customers first. If they cannot do so, they will never be able to sell. But in technology innovation, your markets may not even exist in your backyard; and even the experts, who will convince potential investors that your project has value, do not always live in Europe.

EPFL'S NEW INITIATIVES IN INNOVATION – PART II

The final tool in EPFL's new strategy to support innovation will try to address the challenges analysed in the previous section. EPFL needs to support its best entrepreneurs, the young people who will become tomorrow's entrepreneurs with the ambition to create hi-potential companies. EPFL also needs to help established companies with their intrapreneurs. These are two different types of support that EPFL will address with a new tool, its INNOGRANTS.

INNOGRANTS have been created independently of what MIT launched in 2002 as the Deshpande Center. The similarities in the model are sufficiently striking to convince us of the validity of the approach. EPFL put in place in mid-2005 the INNOGRANTS as a financial as well as an advising tool to help EPFL people with innovative projects. The fear of risk-taking as well as the difficulty of convincing possible partners (investors, industry) in the early stage of an innovation are reasons why some incubation may be profitable inside the school before any external partner is solicited. Page (2002) stated in a video document that he worked for many years at Stanford before launching Google. The two founders became real experts, understood all aspects of search by talking to search companies and worked cheaply on this, as the real cost was only their time — not hundreds of people's time. He also adds that it is absolutely compulsory to work with the right people. It appears that the initial backers of Google were outstanding people. The INNOGRANTS managers do not have the arrogance to believe they will initiate the next Google, but their ambition should be to create great companies with great people.

INNOGRANTS also have the ambition of inviting the local industry, the rich network of SMEs as well as bigger companies to dialogue more with EPFL. Innovation is about sharing ideas to help innovation arise; it is also about creating the right climate and environment which facilitates innovation. Christensen (1997), in his famous approach about innovation dilemmas, explains how great companies fail to identify the disruptive technologies, which will destroy their existing businesses. As a solution, one of his proposals is to let intrapreneurs develop promising technologies outside their existing environment, possibly in a newly created spin-off. EPFL will offer companies with such projects to consider INNOGRANTS as a way to match their collaboration proposals. EPFL also proposes bigger companies to jointly create poles of excellence in areas where EPFL and its partners see very promising development.

Everywhere in Europe, the innovation ecosystem is very fragile. Innovation cannot be done inside EPFL as in an ivory tower. Advisors, friends, experts, business angels with good will and some resources will be needed. They are not easy to find locally, and this is another challenge U.S. technology clusters do not face. The MIT mentoring service involves more than 100 business angels and experts who offer their experience for free. Founders from Logitech, Serono or Kudelski (some of the rare success stories near Lausanne) cannot always be asked to help our entrepreneurs. It might be that experts and early investors have to be found outside Switzerland and even sometimes outside Europe. EPFL's recent successful spin-offs (in terms of their ability to fundraise with venture capitalists) such as BeamExpress or Innovative Silicon had to find some of their managers and investors in the U.S. It is both an oppor-

tunity and a challenge. The good news is the companies did not have to move to the U.S., an argument which was often heard a few years ago when investors and high-calibre individuals were asked to join ambitious European start-ups.

A SIMPLE CONCLUSION

EPFL has the ambition to bridge the innovation gap with its own tools and culture. A key ingredient is a greater flexibility in its relations with its partners as well as with its staff. Better communication channels, better networking with all innovation actors are actively promoted. The culture of trying and risk-taking is encouraged so that our entrepreneurial and risk-taking people can enlarge their vision and ambition. Role models illustrating this philosophy will prove the validity of these beliefs.

A good infrastructure has been set up in the last decade. However it must not be forgotten that innovation is people-centred. A nice physical infrastructure, without the right people to use it will fail. It is therefore a very fragile ecosystem given the rare species formed by entrepreneurs and intrapreneurs. As has been emphasized, our main barriers to successful innovation lie in culture and education. It is easy to change laws and build infrastructure, but it takes time to change people.

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