

3. Choosing Switzerland: An Attractive Location for Innovation

Dr. Markus Neuhaus, PricewaterhouseCoopers, Zurich
Prof. Georg von Krogh, ETH Zurich



Introduction

In most comparisons of the economic competitiveness and location attractiveness of a country, the issue of ability to nurture and sustain innovation is among the top factors. When choosing a location, firms, as well as individual talent, favor places that provide them access to new technology, knowledge, and business opportunities. In recent years, Switzerland has consistently achieved a remarkable position in terms of economic competitiveness and innovation. For this reason, among others, Switzerland has also been one of the favorite locations for global companies to establish their headquarters, centers of excellence, and research and development facilities. In this essay we aim to show why Switzerland is an attractive location for innovation. We start by looking at the macro-data for innovation, including some of the policies that support innovation at the national level. Next, we consider the benefits for global companies of locating their innovation activities in Switzerland through what we term “knowledge clusters.” One of the advantages of a Swiss location is a strong support of services. It is worthwhile to keep in mind that innovation does not only concern product and process technologies, but also encompasses services. Over the last couple of years we have seen a very fast growth in the Swiss professional services industry, enabled by a strong passion for innovation. We conclude by arguing that innovation in the service sector (and other sectors) thrives on diversity, a distinctively strong characteristic of Swiss society.

Innovation in Switzerland

Some of the basic strengths of the Swiss innovation system include the robust industry, good public infrastructure, macroeconomic balance, as well as the favourable framework conditions in terms of its labour laws, working time, company laws, intellectual property protection and its culture of innovation. Switzerland is also recognized as an international research center. It is, for instance, home to two globally highly-admired centers of research, the European Laboratory for Particle Physics (CERN) and the European laboratory of IBM. IBM founded its research laboratory in Switzerland in 1956. Its staff is an important part of the international scientific community. Two of Switzerland’s Nobel laureates in physics, Heinrich Rohrer (1986) and Alexander Müller (1987), won the prize for work carried out by IBM in Switzerland, in both cases jointly with German colleagues. Work conducted at CERN has resulted in three Nobel prizes, as well as significant advances in technology and engineering. It was here that the World Wide Web was invented by Tim Berners-Lee back in the early 1990s. CERN currently has approximately 2600 full-time employees from all over the world. The fact that CERN is (only) the seventh largest producer of scientific publications in Switzerland can be interpreted as a sign of the strength of the overall Swiss research landscape and educational system.

Switzerland has a dual and diversified tertiary education system. It includes ten cantonal universities, two federal institutes of technology (the ETH sector, comprising ETH Zurich and EPF Lausanne) and the universities of applied sciences (UAS). Both the confederation and the cantons have significant funds for higher education and thus academic research.

While the ETH sector is financed by the federal government, more than 50% (on average 57%) of the funds for cantonal universities and the UAS are provided by the cantons. According to the OECD Reviews of Switzerland’s Innovation Policy, approximately 25% of the total expenses of the cantonal universities and 28% of UAS are covered by federal support.

Currently, the Swiss tertiary education sector is managed by a large number of cantonal, federal and joint bodies, and there is a variety of legal frameworks. In order to increase the system’s efficiency with limited resources and to improve its quality, a framework law (*Federal law for the support and coordination of higher education institutions*) is currently being drafted. The main goals are to simplify the complex mechanisms of cooperation between federal and cantonal authorities and to enhance transparency and efficiency regarding institutional cooperation and allocation of resources.

In the latest “academic ranking of world universities,” published by the Shanghai Jiao Tong University, ETH Zurich is ranked 27th and the University of Zurich is ranked 58th. Among European universities, Zurich ETH ranks 5th. All in all, six Swiss universities are among the world’s top 200 universities and among Europe’s top 80 universities. The latest OECD review of innovation policy states that Switzerland’s research infrastructure is of high quality and that, overall, education in Switzerland is considered satisfactory at all levels, including universities and UAS as well as vocational training, and that a strong application-oriented professional education provides a foundation for the sustainable development of Switzerland’s innovative efforts. In the WEF Global Competitiveness Report 2007, Switzerland is ranked first in quality of its scientific research institutions. Switzerland also has a very strong basic research capacity, which is only partly funded by the public sector. An important indicator of Switzerland’s innovative strength is the fact that Switzerland has, in proportion to population, the highest number of patent applications at the European Patent Office, as well as within the triad European Patent Office, US Patent & Trademark Office and Japanese Patent Office. The country also leads the world with regard to the number of patents per million spent on research. Furthermore, if we consider the number of articles published per one million inhabitants, Switzerland, together with Finland, is currently at the top of a worldwide comparison. Additionally, Switzerland boasts a large number of Nobel Prize winners for a country of its size. Swiss scientists have received 17 Nobel prizes, and if dual nationals and naturalised foreigners are also counted, it has received more than 27. The most recent award to a Swiss national was the 2002 prize in chemistry, awarded to Kurt Wüthrich.

A further strength of the Swiss university system is its international outlook. There are a large number of foreign students and professors at Swiss universities. At ETH, for example, 60% of the professors have been recruited from abroad. In the 2007 IMD World Competitiveness rankings, Switzerland ranks 2nd in attractiveness to foreign high-skilled workers, which places Switzerland in an advantageous position for the “war for talents.”

In IMD’s 2007 survey of world competitiveness, Switzerland ranks first in university-industry research collaboration. An

example of the strong networking link is “ETH Transfer”, the technology transfer agency of ETH Zurich. ETH Transfer supports the ETH community in all matters relating to cooperation with industry, inventions, and patent applications and licensing, as well as setting up an ETH spin-off company. An example of a successful spin-off company of the ETH Zurich is Flisom, the first Swiss company to be elected “Technology Pioneer 2007” by the WEF. One of the reasons for success may be that despite the highly flattering results of the IMD’s survey of world competitiveness in 2007, Swiss industries claim, themselves, that Switzerland is not sufficient in transforming the products of academic research into something marketable. Permanent dissatisfaction with the status quo is an important driver in business – and in research!

According to the OECD review of Switzerland’s innovation policy, Switzerland’s spending on R&D (research and development) as a percentage of GDP is, with a value of 2.9 %, amongst the highest of OECD nations. Public funding of R&D, however, is average by international standards at about 0.65% of GDP. There is a high degree of consensus among the Swiss government, the Swiss economy, and the Swiss population, that Education, Research and Innovation (ERI) holds a high level of strategic importance for the country. Consequently, following a period of stagnation, resources for ERT were significantly increased to the amount of CHF 16.7 billion during the credit period 2004–2007. *For the credit period 2008–2011, the Federal Council requested from parliament credits totalling CHF 20.001 billions, equating to a budget increase by approximately 6% annually.*

In the Global Competitiveness Report 2007, Switzerland is ranked first in company spending on R&D. The Swiss Federal Statistical Office states that 70 % of R&D in Switzerland is undertaken in the private sector. The lion’s share of this expenditure concerns the chemical/pharmaceutical industry and the machine industry. Twenty-six Swiss firms are among the 1,000 companies that invest the most in research and development worldwide. Interestingly, the percentage of business expenditure for R&D taken on by Swiss multinationals abroad vs. total firm R&D expenditure in Switzerland is 120%. There is no other country with available data which shows R&D expenditures abroad to represent more than the R&D expenditures of all domestic firms. This also shows that R&D is becoming increasingly global.

A home for Knowledge Clusters

According to a survey conducted by the Swiss-American Chamber of Commerce and The Boston Consulting Group (2007), global companies accounted for 34% of the Swiss GDP in 2004. Today more than 10,000 foreign and Swiss global companies conduct their business outside of Switzerland. The inflow of Foreign Direct Investment (FDI) rose 15% between 1995 and 2003, making Switzerland one of the largest recipients of FDI in Europe. At the same time, exports from Switzerland rose about 14% in 2006, leading to a trade surplus of 7.9 billion CHF (OSEC, 2007). These figures indicate that Switzerland’s economy thrives on innovative products, processes, and services.

Foreign companies which locate their headquarters and other knowledge-intensive activities such as R&D, in Switzerland will find strong knowledge-based clusters. Such clusters typically consist of other firms, research institutions, and universities. Knowledge-based clusters are important because they help ensure that the firms’ research and development staff keep up with technological development by participating in research networks, hiring new talent, attending conferences, meeting informally, and so forth.

Consider three examples of how these clusters work. First, Switzerland has an outstanding record in life sciences in particular in fields such as medicine, genetics, diagnostics, and pharmaceutical research. There are strong clusters, such as BioValley, BioAlps, and the greater Zurich area, which provide global firms located here with access to partner firms,

university-based research, and talent. These clusters support more than 720 biotechnology firms (!). In addition, large pharmaceutical firms, including Novartis and Roche, sustain and contribute to research networks with smaller biotech firms, as well as Swiss universities, including ETH Zurich, the Universities of Basel and Zurich, and ETH Lausanne. These universities also secure access to top-trained international talent within their respective disciplines.

A second example is found in wealth management and financial services. In addition to UBS and Credit Suisse, a large number of financial services firms have their home in Switzerland. A knowledge-cluster has emerged, connecting small and large firms in bank-for-bank services and open architecture products. The cluster also has a strong supplier network including software firms, such as AdNovum, which specializes in products for the industry and university-based research, including a Zurich-based research center devoted to financial risk modeling and the training of bankers in state-of-the-art methods.

A third rapidly evolving example is energy technology. Swiss universities collaborate with small and large firms to develop alternative and more efficient energy technologies. ETH Zurich has several research programs currently in progress, which explore new technology. It is expected that these programs will lead to innovations that will be beneficial to the industry. Currently, about 40 professors carry out research on technology for clean, reliable, and, affordable energy. Young and highly successful firms, such as BKW, sell eco-electricity and conduct extensive innovation on photovoltaic technologies.

The foundation for the success of these three clusters is, firstly, an exceptional openness between firms, research institutes, and universities towards collaboration for mutual benefit. We believe that over the years these clusters have evolved; the physical co-location of executives, entrepreneurs, and researchers have contributed to high levels of mutual trust and understanding that is unique in the world. This trust is a lubricant in creating effective innovation. More frequent communication between the sectors of education, research, and industry also fosters the development of educational programs adapted to the current and future needs of employers. A second reason for the success is that Swiss domestic customers, both private and institutional, are known for being highly demanding of product and service quality (As a small anecdote, this is mentioned as one reason why IKEA decided to locate in Switzerland as the first country outside of Scandinavia). Confronted with demanding customers, companies will quickly learn to meet needs through innovation. A third reason for the success, and possibly the most important, is that Switzerland is considered one of the most attractive places to settle to foreign talent. Cities such as Zurich and Geneva are highly enchanting and welcoming to foreign talent. Finally, with a very long tradition in mechanical industries, including the watch industry, research on and practices of managing innovation have become central. Many leadership development programs are devoted to this discipline. Universities such as ETH Zurich and ETH Lausanne support research on innovation management that helps advance practice.

On the Horizon: the Role of the Service Sector in Innovation

In Switzerland, the service sector accounts for 73% of the GNP and is currently the main source of economic growth. A striking 80% of newly created jobs are in the service sector. Sustained GDP growth in Switzerland is achieved by strong impulses from the service sector, and as per latest statistics, a trade balance surplus of 29.6 billion CH is accruing in this sector.

In the 1990s, innovation was about technology and control of quality and cost. Today, innovation is about more than new products, and encompasses the ability to transform new

ideas into projects. A basic premise of doing businesses is that firstly, all business is people-business, and secondly, services affect customer satisfaction, even for product-based businesses. Recently, the Oslo Manual broadened the definition of innovation from technological product and process innovation to include **organizational and marketing innovation**. The term “technological”, which is R&D-based, has been dropped.

Many leading companies in non-service sectors focus on the number of products in their product portfolio which have been newly launched (within the last 5 years) and consider a percentage of up to 40% or more as being strategically crucial. The same is continually true in the service sector. Thus, both the service sector and the non-service sectors have something to learn from each other. The service sector is ahead in developing and applying new communication tools, which is a crucial element in a rapidly changing world, speed, and knowledge. Here, the importance of people who are free to move anywhere, and who thrive on connectivity and networks is substantial. Understanding that you need to “give knowledge in order to get” and that you “never know everything by yourself” are rules of thumb in this sector. The non-service sectors are ahead of service firms in structuring the innovation process. Innovation does not usually just happen; it is the result of a very deliberate effort. Yet, what is changing today is the way in which these results are achieved. And this is where the lessons of the services sector come into play. Exchanging, sharing, and collaborating are the keys to success in this industry and foster much less protectionism on behalf of the firm. Multinational corporations, like service firms, may benefit even more from these trends. Since they have global reach, they can capture ideas and engage brains around the world. Diversity is a key driver for innovation—a more diverse workforce placed in various countries allows you to look at things from different perspectives. Likewise, smaller companies can only compete if they embed themselves in an ecosystem and build a network enterprise beyond their own organization. Diversity too, specifically in language and culture, is the main source of Switzerland’s attractiveness as a site for innovation.

About the authors:

Dr. Markus Neuhaus is CEO at PricewaterhouseCoopers in Zurich. He is also Chairman of the Public Affairs Committee of the Swiss-American Chamber of Commerce (SACC).

Prof. Georg von Krogh, Department of Management, Technology and Economics at ETH Zurich, is a member of the Chapter Board Doing Business in Switzerland of the Swiss-American Chamber of Commerce (SACC).