

INNO-Policy TrendChart –  
Innovation Policy Progress Report

Switzerland

**2009**

## PREFACE

Innovation is a priority of all Member States and of the European Commission. Throughout Europe, hundreds of policy measures and support schemes aimed at innovation have been implemented or are under preparation. The diversity of these measures and schemes reflects the diversity of the framework conditions, cultural preferences and political priorities in the Member States.

**PRO INNO Europe®** is an initiative of the Directorate-General for Enterprise and Industry (DG ENTR) which aims to become the focal point for innovation policy analysis, learning and development in Europe, with a view to learning from the best and contributing to the development of new and better innovation policies in Europe. Run by the Innovation Policy Directorate of DG ENTR, it pursues the collection, regular updating and analysis of information on innovation policies at national and European level.

**INNO-Policy TrendChart** serves the 'open method of coordination' approach laid down by the Lisbon Council in March 2000. It supports policymakers and innovation support measure managers in Europe by providing summarised and concise information and statistics on innovation policies, performances and trends. It is also a European forum for benchmarking and the exchange of good practices in the area of innovation policy.

### INNO-Policy TrendChart products

INNO-Policy TrendChart, previously the TrendChart on Innovation, has been running since January 2000. It currently tracks innovation policy developments in all 27 EU Member States, plus Brazil, Canada, China, Croatia, Japan, Iceland, India, Israel, Norway, Switzerland, Turkey and the US. The INNO-Policy TrendChart website<sup>1</sup> provides access to the following services and publications, as they become available:

- a database of innovation policy measures in the 39 countries;
- a news service and related innovation policy information database;
- annual policy monitoring reports for all countries covered;
- the European Innovation Progress Report, an annual synthesis report bringing together key points in the INNO-Policy TrendChart.

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<sup>1</sup> See <http://www.proinno-europe.eu/index.cfm?fuseaction=page.display&topicID=52&parentID=52> online.

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## Executive Summary: Public support for innovation – a snapshot

### 1. Main trends in the National Innovation System

Due to the financial crisis and the global economic downturn, Switzerland is currently in recession. The State Secretariat for Economic Affairs (SECO) forecasts real GDP growth to be -2.7% in 2009 and -0.4% in 2010 (2). Other forecasting institutions, like the KOF Swiss Economic Institute join this view and forecast real GDP growth to be -2.4% in 2009 and -0.3% in 2010 (3). The unemployment rate is projected to rise to 3.8% in 2009 and 5.2% in 2010. The International Monetary Fund (IMF) forecast is even worse. Real GDP growth is predicted to be -3.0% in 2009 and -0.3% in 2010 (4). Similarly, the estimated unemployment rates are 3.9% and 4.6% for 2009 and 2010 respectively. Thus, one can expect a negative influence on the innovation activities of Swiss firms from the demand side. However, both the credit volume data published by the Swiss National Bank (5) and the Private Credit indicator in the European Innovation Scoreboard (EIS) show that the Swiss credit markets are surprisingly robust against the ongoing financial crisis. A potential explanation of the robust performance of the aggregate credit volume growth is the conservatism of Swiss firms with respect to financing and leveraging. This is indicated by the high degree of self-financing with respect to investment of Swiss firms (6). This is expected to reduce the impact of the financial crisis on innovation performance substantially.

The EIS 2008 places Switzerland in the group of innovation leaders. In fact, Switzerland has the highest score among European countries. Most indicators are above the EU average, and some of them are about three times higher than the EU average, such as European Patenting Office (EPO) patents and European Community trademarks. Furthermore, Switzerland is the only country among the innovation leaders that has an innovation score with a growth rate above EU average. It is labelled as a growth leader in the EIS 2008. Nevertheless, the weak development of some EIS indicators, notably the indicator for Finance and support as well as that for Human resources, which have been growing below the EU average, may cause some worries.

### 2. Main developments in public support for innovation

Over the course of the last year, there have been two notable changes: First, as economic prospects have worsened due to the financial crisis, the Swiss government has launched a stabilisation package. Part of it is a pilot scheme called 'Innovation cheque' that intends to encourage small to medium-sized enterprises (SMEs) to engage in technology transfer. The intention is to prevent a reduction in the research and development (R&D) budget of firms which could negatively affect future innovation potential. Second, in respect to innovation policy governance, the Swiss parliament has passed an amendment that will grant the Innovation Promotion Agency (KTI/CTI) more autonomy. Currently it is integrated into the Federal Office for Professional Education and Technology (OPET), while the amendment will make it an administrative agency that is not subject to directives from other government agencies. This means that the agency will be able to make autonomous decisions about project financing, education programmes and its start-up label.

### 3. Appraisal of national innovation policy

The existing Swiss policy mix is mainly characterised by the absence of direct policy interventions or direct funding allocated to private businesses and its focus on technology transfer. The implementation of research policy is largely concentrated within the Swiss National Science Foundation (SNSF). Innovation policy is delegated to the Innovation Promotion Agency (KTI/CTI). Due to this concentration of responsibilities and the dominating role of the bottom-up approach, there is very little friction and conflict between the implementing agencies. The two agencies are working well

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<sup>2</sup> State Secretariat for Economic Affairs (2009).

<sup>3</sup> KOF (2009).

<sup>4</sup> IMF (2009).

<sup>5</sup> See [http://snb.info/de/i/about/stat/statpub/statmon/stats/statmon/statmon\\_D3\\_1a](http://snb.info/de/i/about/stat/statpub/statmon/stats/statmon/statmon_D3_1a) online.

<sup>6</sup> KOF (2008).

together, as is shown by the Do Research (DORE) funding programme, a common initiative which supports research projects in social sciences. Nevertheless, the communication and information flow between the SNSF and the KTI/CTI should be further improved as noted in an evaluation of the KTI/CTI in 2002 <sup>(7)</sup> in order to increase funding synergies between basic research funding and more applied research funding. Since then, a number of measures have been taken to improve the situation, e.g. mutual membership and the establishment of annual bilateral consultations.

While only little conflict between the implementing agencies exists, some potential for disharmony is given on the level of ministries. The Federal Office for Professional Education and Technology (OPET) is responsible for professional education and innovation policy while the State Secretariat for Education and Research (SER) is in charge of general education and research policy. The potential for conflict was revealed when the OPET created a division for international relations, making it necessary to coordinate the division of labour with the international section of the SER. But since both research and innovation policy implementation are delegated to independent agencies which generally use a bottom-up approach, the potential for conflict between the ministries is quite limited.

The implementation of policy measures is by and large efficient. The KTI/CTI uses a peer-review process to evaluate applying projects. In an evaluation of the KTI/CTI in 2002, the authors find that the application process is very user friendly. One aspect is that the average duration of the peer-review process is about six weeks, including potentially required revision of the application. The report further praises the possibility to submit projects at any point in time, as this reduces the time to market. It also commends that the KTI/CTI provide the service to evaluate the chances of projects based on rough project outlines, thereby reducing the involved approval risk. Furthermore a refusal to consider the case may be followed up by a revised version of the project description <sup>(8)</sup>. Finally, the report recommends retaining a militia based system, meaning that there are no professional politicians among the experts, while most remain employed in the private sector. This ensures the proximity to the praxis.

The current organisation of the Swiss innovation strategy is quite good. Nevertheless, there are two recommendations on how improve the situation even further. Firstly, there is evidence that the financial crisis is not finished yet. Frick et al. (2009) therefore propose that the government take further steps to alleviate additional pressure from the economy. The problem is that there is a limited amount of reasonable opportunities to push demand directly. The construction sector is not affected strongly, meaning that pre-drawing investment projects is solving the problem only to a limited extent. According to Frick et al. (2009), an alternative strategy is to increase available income of households. This is particularly relevant as employment is expected to decrease. The State Secretariat for Economic Affairs (SECO) forecasts unemployment rate to increase to 3.8% in 2009 and 5.5% in 2010 <sup>(9)</sup>. Therefore it is suggested that the government avoid any measures that would reduce the available household income such as increases of direct and indirect taxes, reduction of unemployment support and/or duration of unemployment support. Positively seen, measures are recommended that can help to maintain the current income level such as the prolongation of the duration of giving labour cost subsidies to firms in order to maintain employment, at least in the short run. Finally, Frick et al. (2009) note that government spending should not be contracted in order to avoid an anti-cyclical influence of public spending.

Secondly, in line with OECD experts, it is recommended that the framework conditions for innovation should be improved further. This includes the prioritising of public R&D spending in the budget of the government and an intensification of the technology transfer facilitation. Growth of human capital should also be pushed by strengthening the higher education (OECD 2006).

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<sup>7</sup> [Federal Office for Professional Education and Technology](#) (2002).

<sup>8</sup> [Federal Office for Professional Education and Technology](#) (2002).

<sup>9</sup> State Secretariat for Economic Affairs (2009).

## 1. Main trends and challenges in the National Innovation System

### 1.1 Recent economic trends and market developments

**Exhibit 1: Comparable indicators of economic performance**

Indicator	National performance		EU-27 average	
	2004	2007	2004	2007
GDP per capita in PPS (EU-27=100)	136.0	137.1	104.2*	103.7*
Real GDP growth rate (% change previous year)	2.5	3.3	2.5	2.9
Labour productivity per person employed (EU-27=100)	105.0	106.6	104.2*	103.7*
Total employment growth (quarterly % change) (1)	0.3	2.6	0.7	1.8
Inflation rate (average annual) (2)	0.8	0.7	2.0	2.3
Unit labour costs (growth rate)	-2.4	1.9	-1.4	-0.8
Public balance (net borrowing/lending) in % of GDP (3) (4)	-1.2	2.1	-2.9	-0.8
General government debt as a % of GDP (3) (4)	54.6	43.7	62.2	58.7
Unemployment rate (as % of active population) (5)	4.4	3.7	9.0	7.1
Foreign direct investment intensity	3.7	11.6	0.9	3.4
Business investment as a percentage of GDP	18.4	19.3 (2006)	17.2	18.7

Sources: Eurostat - Structural Indicators, see <http://epp.eurostat.ec.europa.eu> online.

1 for Switzerland: own calculations based on <http://www.bfs.admin.ch/bfs/portal/de/index/themen/03/02/blank/data/01.html> online.

2 for Switzerland: see <http://www.bfs.admin.ch/bfs/portal/de/index/themen/05/02/blank/key/jahresdurchschnitte.html> online.

3 for Switzerland: including social insurance

4 for Switzerland: see <http://www.bfs.admin.ch/bfs/portal/de/index/themen/18/01/key/01.html> online.

5 for Switzerland: see <http://www.bfs.admin.ch/bfs/portal/de/index/themen/03/03/blank/data/01.html> online.

Key: (\*) EU25 average, (^) or latest available year (for example: 2005); (.) not available.

In 2002 the real GDP of Switzerland grew at a rate of only 0.4% compared to 1.2% in the EU-27. After a year of negative growth in 2003, the Swiss economy recovered quickly and between 2004 and 2007 it grew at or above the speed in the EU-27. The relative labour productivity remained constant between 2002 and 2007. Real GDP growth slumped to 1.6% in 2008 as the financial crisis took hold of the world economy. The data look even dimmer if the negative growth rates in the third and fourth quarter of 2008 are taken into account, implying that Switzerland is in fact in a recession. The economic outlook does not look brighter at all. The State Secretariat for Economic Affairs (SECO) forecasts real GDP growth to be -2.2% in 2009 and merely 0.1% in 2010<sup>(10)</sup>. The unemployment rate is projected to rise to 3.8% in 2009 and 5.2% in 2010. The International Monetary Fund (IMF) forecast is even worse. Real GDP growth is predicted to be -3.0% in 2009 and -0.3% in 2010<sup>(11)</sup>. Similarly, the estimated unemployment rates are 3.9% and 4.6% for 2009 and 2010 respectively. A comparison to the EU average shows an even gloomier picture: the growth rate of real GDP in 2009 was 0.9%, below the one for Switzerland. The IMF predicts real GDP growth rates of -4.2% in 2009 and -0.3% in 2010.

Inflation has been stable in Switzerland as well as in the EU-27 between 2002 and 2007. Due to increases in the oil price, it peaked in 2008 at 2.4% in Switzerland and 3.3% in the EU. Due to the global economic downturn, inflation will not be a major problem in the next few years, neither in Switzerland nor the EU. In fact, the IMF predicts deflationary tendencies in 2009 and 2010, implying

<sup>10</sup> State Secretariat for Economic Affairs (2009).

<sup>11</sup> International Monetary Fund (2009).

that the main concern of the Swiss National Bank is facing deflation at the moment. For the EU this risk is less prevalent as indicated by the positive inflation rates predicted by the IMF.

The public balance was slightly negative between 2002 and 2004. In the economic upswing between 2005 and 2007, the Swiss public sector reported surpluses of 0.1%, 1.7% and 2.1%. As a result the public debt decreased from 54.6% in 2004 to 43.7% in 2007 (<sup>12</sup>). The annual deficit in the EU-27 is substantially higher, and although a positive development has taken place, the public balance has not turned positive between 2002 and 2007.

The Swiss economy is a 'small open economy' with a large GDP share of exports and imports and substantial international investment flows. While exports of goods still make the largest part of exports, the share of service exports (mainly financial services and tourism) has continuously grown in the last years. Based on an indicator representing the relative development of unit labour costs in Switzerland, the price competitiveness of the Swiss economy has deteriorated between 2002 and 2006. While this measure has decreased continuously over the whole period for the EU-27, Switzerland has experienced growth of real unit labour costs between 2005 and 2007 (KOF estimates, spring 2009). As a consequence, exports increased less than in the EU-27. This development was further accentuated by the negative impact of the strength of the Swiss franc.

From a longer-term perspective, the development of trade in knowledge-intensive goods and services is of prime interest, in particular from the point of view of innovation policy. The share of high-tech exports in total exports increased from 16.14% in 1995 to 20.35% in 2006, which is above the EU-27 average of 16.67%. In a country ranking, Switzerland takes 2006, the fourth position behind Ireland (28.88), UK (26.48%) and the USA (26.13%), without considering Cyprus, Luxembourg and Malta (<sup>13</sup>).

In the year 2003, the first year Switzerland was included in the European Innovation Scoreboard (EIS), it had been placed 3<sup>rd</sup> among participating countries. As the most recent EIS report shows, Switzerland has been able to improve its position since 2002 and is ranked first today. Analysing the dynamics reveals that Switzerland is the only country within the group of innovation leaders with higher growth rate than the EU average.

In sum, the overall economic performance of the Swiss economy has been good between 2005 and 2007, but the economic outlook is dim. The long-term growth perspectives of the Swiss economy are well, given the strong specialisation towards knowledge-intensive goods/services and the high volume of foreign investments, the still good performance with respect to most growth drivers (R&D, human capital, ICT, etc.) and the high flexibility of the labour market. However, much remains to be done in areas such as deregulation of product markets, social security reform, etc.

### 1.1.1 The credit crisis and its effect on innovation activity

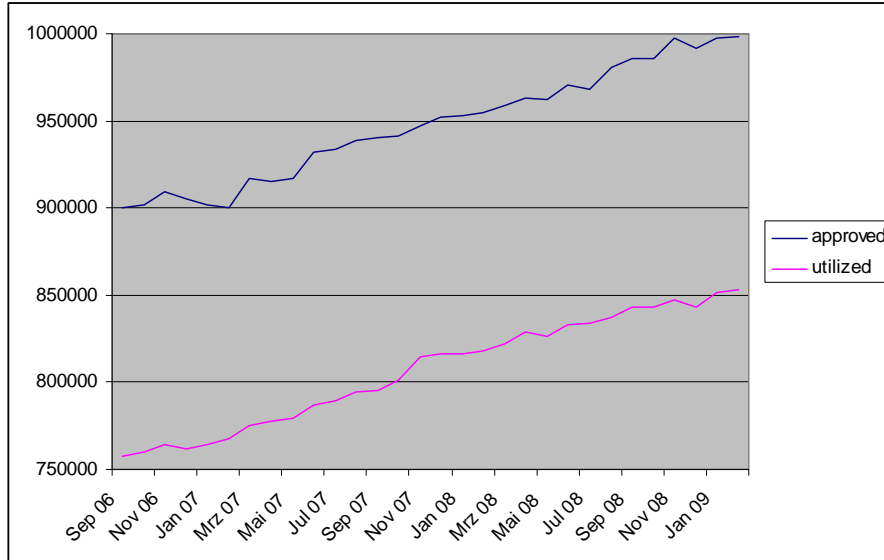
The Swiss National Bank (SNB) publishes data on approved and utilised credit lines to private parties. As the following figure shows, this data does not provide evidence of a credit crunch in Switzerland. On the contrary, it appears that credit growth has been fairly stable over the last 15 months. The SNB further provides credit volume statistics by firm size (14). This data reveals that the credit growth is faster the larger the company. For firms below 50 employees, it is about zero while it is clearly positive for larger firms. Nonetheless, developments over the last 15 months do not provide evidence for a credit crunch.

<sup>12</sup> See <http://www.bfs.admin.ch/bfs/portal/de/index/themen/18/01/key/01.html> online.

<sup>13</sup> See <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/> online.

<sup>14</sup> See [http://snb.info/de/i/about/stat/statpub/bstamon/stats/bstamon/bstamon\\_KS\\_BetriebsG](http://snb.info/de/i/about/stat/statpub/bstamon/stats/bstamon/bstamon_KS_BetriebsG) for more information.

**Figure 1: Approved and utilized credit lines to private parties in Switzerland between September 2006 and February 2009**



Data source: own calculations based on [http://snb.info/de/i/about/stat/statpub/statmon/stats/statmon/statmon\\_D3\\_1a](http://snb.info/de/i/about/stat/statpub/statmon/stats/statmon/statmon_D3_1a) online.

Similarly, the Private Credit indicator in the EIS shows a growth of 3.2% between 2007 and 2008 supporting the above findings that the Swiss credit markets are surprisingly robust against the ongoing financial crisis.

The State Secretariat for Economic Affairs (SECO) has published a study concerning the performance of the credit market in respect to finances of SMEs in June 2009 <sup>(15)</sup>. The survey shows that only 32% of firms smaller than 250 employees have a loan or credit line at a bank. Those firms were asked whether this is due to 'no need', 'past rejection' or 'rejection in the last six months'. Since merely 1% reported rejection within the last six months, a credit crunch is not visible in this data. However, 23% of those firms that have a loan or credit line at a bank report increased financial demand. Of these, 45% report that the availability of financial resources has deteriorated, and 11% see the lack of financing as a restriction to growth. In sum the credit market appears to function relatively well.

A potential explanation of the robust performance of the aggregate credit volume growth is the conservatism of Swiss firms in respect to financing and leveraging. This is indicated by the high degree of self-financing in respect to investment of Swiss firms <sup>(16)</sup>. The quotient of investment and saving has been larger than 100% in recent years. This implies that firms use their financial resources very conservatively and do not stretch their financial base too far. This might help them to acquire debt in the midst of the financial crisis. It further implies that investments, including innovation investments, are dependent on external sources only to a limited extent. Only if the profit situation of firms deteriorates, investment rates will react.

De Lucia and Fauser (2009) find that the equity market has essentially dried out, although the debt market is still active. The availability of debt is restricted to applicants with a good rating. Furthermore, they note that it is mainly long-term financing that has dried up.

Similarly, the Credit Suisse presented an analysis with the development of credit conditions over the last year <sup>(17)</sup>. Unsurprisingly, it finds that the creditworthiness of Swiss firms has deteriorated due to the slump in the global demand, and that this decrease in credit worthiness coupled with an increase

<sup>15</sup> M.I.S. Trend (2009).

<sup>16</sup> KOF (2008).

<sup>17</sup> Credit Suisse (2009).

in risk-aversion has caused the price of credit to rise. Central banks around the world have helped to cushion this credit price increase by aggressive cuts in the nominal interest rate. The Credit Suisse expects credit worthiness to be under pressure over the next 12 months as well.

The sectoral structure contains both susceptible and robust elements. The large share of the banking sector makes Switzerland a major victim of the upheavals in financial markets. Furthermore, Switzerland has a substantial export-oriented manufacturing industry that is specialised considerably in the production of equipment. These investments tend to be very volatile in the business cycle and are strongly affected by a recession in the countries subscribing to them. In contrast the Swiss pharmaceutical industry seems to be robust and is currently not affected by a drop in the credit volume.

In sum, the available data indicates that the Swiss economy is not affected by a credit crunch. One explanation is the conservatism of Swiss firms. Alternatively, it is conceivable that the available data do not capture the credit contraction yet. However, even if the threat of a credit crunch does not materialise, the economic performance of Switzerland is strongly affected by the fall in global demand. Since Switzerland is a small open economy that has a large export share, the sales and profits of Swiss firms will be hit hard by the financial crisis.

As economic prospects have worsened, the Swiss government has launched a measure package that includes additional expenditures of EUR 470 million. About 7% of these expenditures, or EUR 32 million is being channelled into research and innovation expenditures. Innovation policy promotion budget is increased by EUR 14 million. The intention is to prevent a reduction in the research and development (R&D) budgets of firms which could negatively affect future innovation potential. To prevent this from happening, the government has taken three measures. First, it has increased the budget of the KTI/CTI, the main funding agency for applied research, by EUR 13 million. Considering that the planned budget for 2009 was EUR 57 million, a significant increase of nearly 23%. Second, a pilot scheme with innovation cheques that intends to encourage small to medium-sized enterprises (SMEs) to engage in technology transfer has been launched. The firms can use these cheques to pay for services from universities or public research institutions. For this measure, the government is spending EUR 0.65 million. Third, the government is launching a EUR 0.3 million information campaign targeted at the academic and private sectors on the subject of funding opportunities offered by the KTI/CTI.

## 1.2 Recent trends in the national innovation performance

The EIS 2008 places Switzerland in the group of innovation leaders. In fact, Switzerland has the highest score among European countries. It is the only country among the innovation leaders that has an innovation score that grows above the EU average, labelled as growth leaders in the EIS 2008. Most indicators are above the EU average, some of them are about three times above the EU average (e.g. EPO patents, Community trademarks). Six indicators (Youth education, Non-R&D innovation expenditures, Firm renewal, Knowledge-intensive services export, New-to-market sales and New-to-firm sales) are at or below the EU average.

Of these, Non-R&D innovation expenditures, Firm renewal and Knowledge intensive services exports are not that problematic, as the Swiss indicator has grown above the EU average between 2007 and 2008.

The other four indicators with below-average performance must be benchmarked not against the EU average but against the ten European countries with a comparable level of technological development (Austria, Belgium, Denmark, France, Finland, Germany, the Netherlands, Norway, Sweden and the UK).

According to the EIS 2008 Switzerland ranks at 4<sup>th</sup> place for sales of New-to-firm products but only at 7<sup>th</sup> place for sales of New-to-market products respectively. The good performance for New-to-firm products corresponds with the picture of a rather conservative innovation strategy relying primarily on existing strengths. This difference in innovation performance across various indicators can be explained in that the Swiss economy specialises in the production of high-tech and high-quality

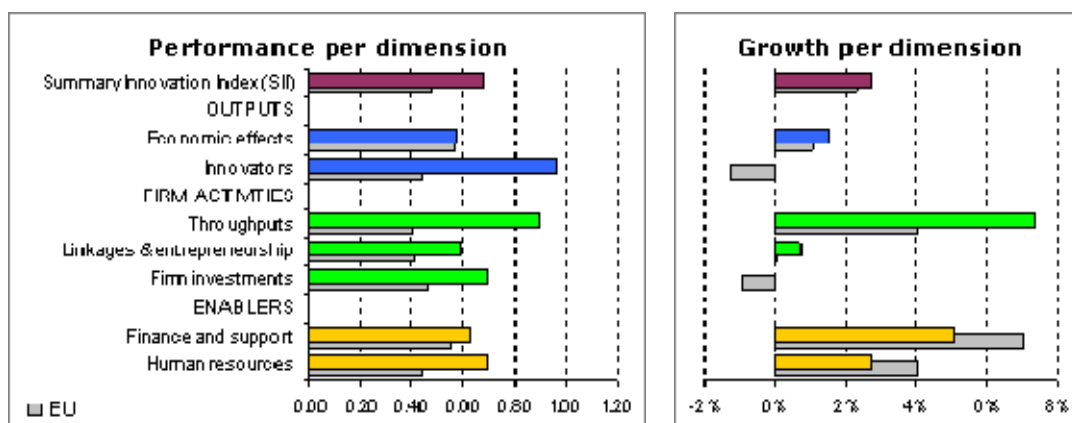
products, mostly to serve niche markets, as well as (financial) services. Therefore, the Swiss innovation strategy relies primarily on the combined use of highly skilled workers, and the use – rather than the production – of new technologies (e.g. ICT) and flexible workplace organisation.

It is not the production of 'radical' innovations that characterises the Swiss innovation system, but the ability to rapidly and efficiently absorb and further develop new knowledge to create significant incremental innovations. In addition, policy stresses basic research as can be seen from the country's excellent standing in this respect, particularly in terms of publications. As documented in the OECD Science, Technology and Industry Scoreboard 2007, Switzerland is the world leader in respect to the number of scientific articles per million population, as well as the relative prominence of cited scientific literature (<sup>18</sup>).

The below-average performance in respect to youth education is one of the main challenges for innovation policy. For a detailed discussion of this topic, see Section 1.3.

The EIS 2007 and the EIS 2008 draw a similar picture in respect to the position of Switzerland as a growth leader. Concerning the dynamic component, a comparison of the two reports shows quite a stark contrast, however. While the EIS 2007 gives the impression that Switzerland is lagging behind other innovation leaders, the EIS 2008 suggests that it is among the group of growth leaders. Nevertheless, a number of points need to be improved by politicians, notably the education of the youth and the exploitation of Switzerland's advantages.

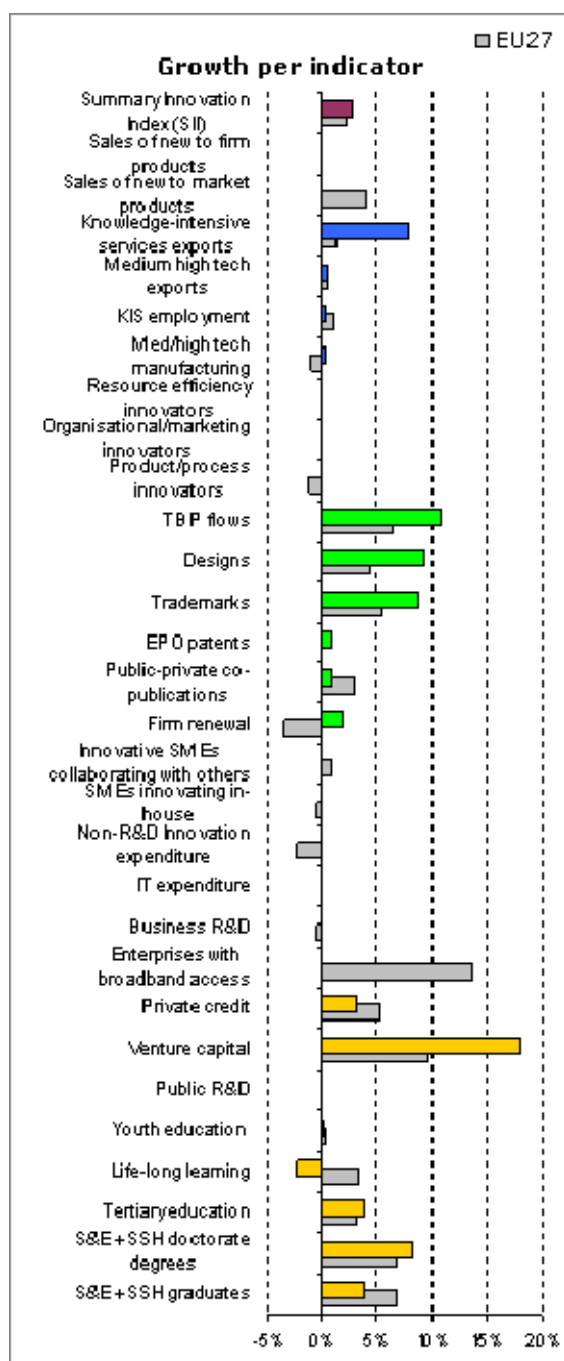
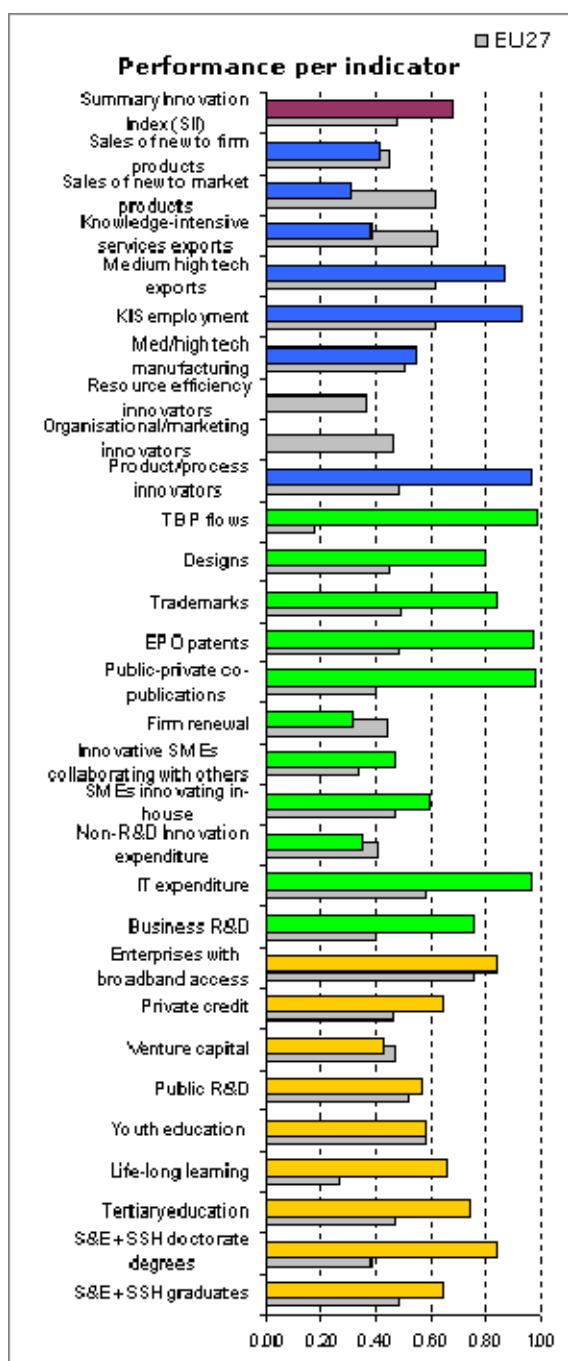
## Exhibit 2: European Innovation Scoreboard: country pages



Switzerland has the highest overall level of innovation performance and its rate of improvement is also above that of the EU-27. Relative strengths, compared to the country's average performance, are in Throughputs and Innovators, while relative weaknesses are in Linkages & entrepreneurship and Economic effects.

Over the past five years, Human resources, Finance and support and Throughputs have been the main drivers of the improvement in innovation performance, in particular as a result of strong growth in science and engineering (S&E) graduates and Social Sciences & Humanities (SSH) doctorate graduates (8.2%), as well as in Venture capital (18.1%), Community trademarks (8.8%), Community designs (9.3%) and Technology Balance of Payments flows (10.8%). Performance in Firm investments has not improved.

<sup>18</sup> OECD (2007).



	2001	2002	2003	2004	2005	2006	2007	2008	growth
<b>SII</b>				<b>0.612</b>	<b>0.615</b>	<b>0.632</b>	<b>0.661</b>	<b>0.681</b>	<b>2.8%</b>
<b>ENABLERS</b>									<b>3.8%</b>
<b>Human resources</b>									<b>2.7%</b>
1.1.1 S&E and SSH graduates	--	41.6	42.2	44.1	46.2	48.5	--	--	3.9%
1.1.2 S&E and SSH doctorate graduates	--	1.70	1.65	1.86	2.20	2.33	--	--	8.2%
1.1.3 Tertiary education	25.4	25.4	26.9	28.1	28.8	29.9	31.3	--	3.9%
1.1.4 Life-long learning	--	--	24.7	28.6	27.0	22.5	--	--	-2.3%
1.1.5 Youth education	80.4	79.4	77.5	78.7	78.3	78.1	--	--	0.2%
<b>Finance and support</b>									<b>5.1%</b>
1.2.1 Public R&D expenditures	--	0.67	--	0.69	--	0.69	--	--	0.0%
1.2.2 Venture capital (3-year average)	--	--	0.073	0.047	0.076	0.120	0.141	--	18.1%
1.2.3 Private credit	1.54	1.53	1.57	1.59	1.64	1.71	1.78	--	3.2%
1.2.4 Broadband access by firms	--	34.0	--	--	85.0	--	--	--	0.0%
<b>FIRM ACTIVITIES</b>									<b>2.9%</b>
<b>Firm investments</b>									<b>0.0%</b>
2.1.1 Business R&D expenditures	--	--	--	2.14	--	--	--	--	0.0%
2.1.2 IT expenditures	--	--	--	3.7	3.7	3.7	--	--	0.0%
2.1.3 Non-R&D innovation expenditures	--	--	--	0.92	--	--	--	--	0.0%
<b>Linkages &amp; entrepreneurship</b>									<b>0.7%</b>
2.2.1 SMEs innovating in-house	--	--	--	34.4	--	--	--	--	0.0%
2.2.2 Innovative SMEs collaborating with others	--	--	--	12.1	--	--	--	--	0.0%
2.2.3 Firm renewal (SMEs entries + exits)	--	--	3.5	3.8	--	--	--	--	2.0%
2.2.4 Public-private co-publications (2-year avg.)	--	179.5	180.3	186.5	189.2	193.1	--	--	0.9%
<b>Throughputs</b>									<b>7.4%</b>
2.3.1 EPO patents	382.1	360.0	367.9	400.7	411.1	--	--	--	0.9%
2.3.2 Community trademarks	140.9	135.9	205.1	178.8	149.0	308.7	350.3	--	8.8%
2.3.3 Community designs	--	--	161.0	183.4	221.8	237.5	372.7	--	9.3%
2.3.4 Technology Balance of Payments flows	--	3.64	3.37	4.60	5.56	5.48	--	--	10.8%
<b>OUTPUTS</b>									<b>1.3%</b>
<b>Innovators</b>									<b>0.0%</b>
3.1.1 Product/process innovators (SMEs)	--	--	--	52.9	--	--	--	--	0.0%
3.1.2 Marketing/organisational innovators (SMEs)	--	--	--	--	--	--	--	--	
3.1.3 Resource efficiency innovators									
3.1.3a Reduced labour costs	--	--	--	--	--	--	--	--	
3.1.3b Reduced use of materials and energy	--	--	--	--	--	--	--	--	
<b>Economic effects</b>									<b>1.5%</b>
3.2.1 Employment in medium-high/high-tech manuf	8.14	7.50	7.07	7.02	7.27	7.29	7.19	--	0.4%
3.2.2 Employment in knowledge-intensive service	18.21	18.30	19.51	19.54	19.16	19.23	19.85	--	0.4%
3.2.3 Medium/high-tech manufacturing exports	--	61.7	62.3	62.8	63.0	63.0	--	--	0.5%
3.2.4 Knowledge-intensive services exports	--	23.9	26.0	26.2	28.5	32.4	--	--	7.9%
3.2.5 New-to-market sales	--	--	--	4.9	--	--	--	--	0.0%
3.2.6 New-to-firm sales	--	--	--	5.8	--	--	--	--	0.0%

## 1.3 Identified Challenges

Swiss innovation policy focuses on the improvement of framework conditions rather than on direct innovation policy interventions through, for example, direct R&D funding to private businesses. Thus, Swiss policymakers are following a rather indirect approach to encourage firms to adopt new technologies and to commercialise innovative products and, as a consequence, to contribute to overall economic growth. In this way, the Government emphasises knowledge and technology transfer between research institutions and firms. In addition, the adoption and development of future technologies, entrepreneurial spirit in general and framework conditions for start-ups are particularly emphasised by Swiss innovation policy. Internationalisation of the innovation system is a further point of importance in order to strengthen the innovation performance of the Swiss economy. Swiss innovation policy predominantly follows a bottom-up approach. Basically innovation promotion is open to all disciplines and sectors, including the construction and service sector. However, there are a few public promotion campaigns to encourage applied research or innovation activities in specific fields, e.g. medical instruments (MedTech - Life Science) or ageing-related innovations (Innovation for Successful Ageing).

Due to a successful dynamic performance in respect to Economic effects, Throughputs and Linkages & entrepreneurship, Switzerland has been able to improve its position its EIS score relative to the EU average between 2007 and 2008. On the other hand, the relatively slow growth in respect to innovation-related human capital and the fact that Switzerland loses ground on Finance and support, paints a less bright picture with respect to innovation enablers. Against this background and based on a predominantly quantitative analysis of relevant innovation indicators, the following three main challenges for firms' innovation activities are emphasised (see exhibit 3):

1. **Financial crisis:** The State Secretariat for Economic Affairs (SECO) forecasts Swiss real GDP growth to be -2.2% in 2009 and merely 0.1% in 2010 (<sup>19</sup>). The unemployment rate is projected to rise to 3.8% in 2009 and 5.2% in 2010. The IMF forecast is even worse. Real GDP growth is predicted to be -3.0% in 2009 and -0.3% in 2010 (<sup>20</sup>). Furthermore, De Lucia and Fauser (2009) find that the equity market has essentially dried out. The debt market is still active, but the availability of debt is restricted to applicants with a good rating, implying that SMEs might have a hard time acquiring funds. Furthermore, De Lucia and Fauser (2009) note that it is mainly long-term financing that has dried up. As research and innovation expenditures have a long lag until they are turned into cash flow, the availability of long-term funding is crucial. Hence the financial crisis could endanger these investments and consequently the long-term innovation prospects of Switzerland.

To prevent this from happening, the Swiss government has launched a measure package that includes additional expenditures of EUR 470 million. About 7% of these or EUR 32 million is being channelled into research and innovation expenditures. Innovation policy budget is increased by EUR 14million. The budget of the KTI/CTI, the main funding agency for applied research, is increased by EUR 13 million. Furthermore, a pilot scheme with innovation cheques to encourage SMEs to engage in technology transfer has been launched. For this measure, the government is spending EUR 0.65 million. Third, the government is launching a EUR 0.3million information campaign targeted at the academic and private sector on the subject of funding opportunities offered by the KTI/CTI.

2. **Human capital formation:** The EIS 2008 shows that the share of S&E graduates is growing in Switzerland, but at a substantially slower rate than in the EU as a total. Furthermore, the EIS 2008 further shows that the participation rate in life-long learning has a negative trend in Switzerland. As a result, the human capital component of the EIS 2008 has grown below the average of the EU. The weakness in respect to the participation rate in life-long learning is pointed out by the Swiss Science and Technology Council (SSTC) in its 'Recommendations for the Swiss Education-, Research- and Innovation-Policy 2008-2011' (SSTC 2007) as well.

The importance of these developments is connected to the crucial role of the capability to absorb new knowledge for the Swiss innovation performance. As mentioned above, it is not primarily the generation of 'radical' innovations that characterises the Swiss innovation system. The strength of the economy rather lies in the ability to absorb new knowledge rapidly and efficiently and integrate it in an innovative manner into the existing production, thereby creating significant incremental innovations.

In this context, human capital as one of the most important determinants of absorption capability plays a crucial role. Consequently the decrease in the share of S&E graduates and the participation rate in life-long learning is a major challenge of Swiss innovation policy.

3. **Lack of entrepreneurship:** The EIS 2008 shows that the Swiss innovation system performs very well in respect to throughputs and firm investments. But a weakness in gilding these strengths appears from the relative weakness in respect to Linkages & entrepreneurs and Economic effects where Switzerland is ranked 9<sup>th</sup> and 6<sup>th</sup> respectively. Similarly, a study by the Swiss-American Chamber of Commerce (SACC) and the Boston Consulting Group (BCG) in 2008 finds that Switzerland is underperforming in turning its inventions into innovations. Therefore, they recommend promoting the entrepreneurial culture in Switzerland.

<sup>19</sup> State Secretariat for Economic Affairs (2009).

<sup>20</sup> International Monetary Fund (2009).

In recent years, the KTI/CTI has taken several actions that intend to foster entrepreneurship in Switzerland. First, it has expanded the measure CTI Start-up, which provides mentoring, networking opportunities and a quality label to start-ups. Secondly, it has introduced the Venturelab measure which organises courses for students to promote their entrepreneurial spirit. Furthermore it provides workshops for prospective entrepreneurs that help them to launch the business in a professional manner. Thirdly, the KTI/CTI has created the initiative CTI invest, an organised platform for business angels and venture capitalists offering selected start-ups the opportunity to present the business idea to them. Fourthly, the initiative Discovery Projects helps spin-offs which are realising radical innovations to get off the ground by funding their R&D-projects. Finally, the KTI/CTI intends to introduce the measure Diversity@CTI which should help utilise the potential of female entrepreneurs better by increasing the share of female coaches at the KTI/CTI, introducing mentoring and networking measures geared for women and establishing best practices. However, so far there is no evidence of any path-breaking impact; the overall indicators (EIS 2008) or the recommendations of the SACC and BCG (2008) do not show that this challenge has been successfully faced so far; quite opposite they suggest that these areas should be further promoted. Thus, strengthening existing measures or introducing further initiatives is recommended.

### Exhibit 3: Main innovation policy challenges

Description of challenge	Relevant indicators and trends
1. The financial crisis has caused a substantial economic downturn in Switzerland.	The SECO forecasts Swiss real GDP growth to be -2.2% in 2009 and merely 0.1% in 2010 <sup>(21)</sup> . The IMF forecast is even worse. Real GDP growth is predicted to be -3.0% in 2009 and -0.3% in 2010 <sup>(22)</sup> .
2. Human capital formation. The growth in the acquisition of innovation relevant human capital is decreasing.	EIS (2008) shows that the growth in the human resources dimension is below the EU average.
3. Lack of entrepreneurship. Although Switzerland is strong in the business of invention, it lacks the ability to turn these into innovations.	EIS (2008) confirms that Switzerland is ranked comparatively low in the dimensions Linkages & entrepreneurship and Economic effects. SACC and BCG (2008) recommend fostering the climate for entrepreneurship.

It should be noted that innovation policy in Switzerland does not explicitly aim at the EU Lisbon goals. Therefore, Switzerland does not provide any Lisbon National Reform Programme. However, the SER issued in November 2004 a statement on the Swiss position on the European Commission's Communication *Science and technology, the key to Europe's Future* presented in June 2004. As to Lisbon and Research major Swiss stakeholders agree on the importance of research and innovation for economic growth, also on the assessment that adequate funding for activities is indispensable. While the overall goal of a ratio of two-thirds private and one-third public funding for R&D (already the case in Switzerland) is undisputed, a purely input-oriented view of the '3% objective' is not sufficient. Systematic monitoring of the effects and impact of European public research funding and especially its leverage on private R&D spending is required (see SER 2004). Furthermore, it was stated that an increase of the budget of the Seventh framework programme (FP7) should be balanced with national public R&D funding in the individual member or associated countries. As essential as any increase in public research funding are the political measures to create a European Research Area by establishing favourable conditions for research and innovation (see SER 2004).

<sup>21</sup> See <http://www.seco.admin.ch/themen/00374/00375/00376/index.html?lang=en> online.

<sup>22</sup> See <http://www.imf.org/external/pubs/ft/weo/2009/01/pdf/text.pdf> online.

## 2. Public Support to Innovation

### 2.1 Main objectives for innovation policy

#### Exhibit 4: Main innovation policy documents

*Statement to the Promotion of Education, Research, and Innovation 2008-2011 (ERI-Message)* (see <http://www.bbt.admin.ch/themen/00488/index.html?lang=de> online).

*Recommendation for the Swiss Education, Research and Innovation Policy 2008-2011* (see [http://www.swtr.ch/d/ablage/dokumentation/publikationen/swtr\\_posi2006D.pdf](http://www.swtr.ch/d/ablage/dokumentation/publikationen/swtr_posi2006D.pdf) online).

The most important policy document in respect to innovation policy is the *Statement to the Promotion of Education, Research, and Innovation 2008-2011* (ERI Message). This document is the government's proposal for mid-term policy measures to the parliament, i.e. its four-year plan for education, research and technology at the federal level. The document contains the rationale for proposing certain policy measures and the respective budgets for realising these measures. The parliament may change the plan, which it has done in the last ten years mostly by cutting or reducing certain budget positions. Nevertheless, the document remains a quite reliable guide of the policy measures that are going to be realised. There is no follow-up document containing all modifications undertaken by the parliament because these modifications take the form of specific government decisions (*Bundesbeschlüsse*) or federal laws (*Bundesgesetze*).

The goal of all planned measures is to enable the players and institutions of the ERI sector to help extend the capacities of Switzerland as a location for thought and work. In order to coordinate all of the planned promotional measures, the Federal Council's policy is oriented along two overarching guidelines: The first is the Education Guideline: sustainably securing and improving quality. The second is the Research and Innovation Guideline: increasing competitiveness and growth.

In respect to innovation policy, the document proposes a budget projection for the Innovation Promotion Agency (KTI/CTI). In comparison to the volume of EUR 269 million (CHF 404 million) it has received between 2004 and 2007, the total budget is expected to increase by 32% to EUR 365 million (CHF 532 million) in the period 2008-11. Of these, EUR 29 million (CHF 44 million) are dedicated to the promotion of entrepreneurship and start-ups, EUR 103 million (CHF 154 million) are devoted to the establishment and administration of national and international networks and EUR 223 million (CHF 334 million) are used for the promotion of applied research and development projects.

Furthermore, the goals of the KTI/CTI for the period 2008-11 are set out. Firstly, the KTI/CTI should extend the target group of applicants. Notably, it should target between 10 000 and 15 000 firms that either do not yet or not regularly cooperate with universities, even though they have the potential. The KTI/CTI should facilitate the initiation of cooperation agreements. Secondly, the KTI/CTI should focus more intensely on R&D projects of non-technological fields, e.g. services, health, social work and art. Thirdly the Federal Council wants the KTI/CTI to increase the share of risky projects with a high upside potential. Fourthly, the promotion process should be made more customer-friendly. Fifthly, the KTI/CTI should devote more energy to the establishment and administration of national and international networks. Sixthly, the KTI/CTI is asked to increase its supply of entrepreneurial education and to support more start-ups by professional coaching.

Additionally, the Swiss Science and Technology Council (SSTC), which advises the Federal Council on science and technology policy has published a policy document that contains recommendations for the education, research and innovation policy between 2008 and 2011 (*Schweizerischer Bundesrat*, 2007). The SSTC formulates specific policy recommendations for nine policy areas: Prioritisation of education and research policy, International positioning, Promotion of scientific offspring, Responsibility for basic research of the Swiss National Science Foundation (SNSF), Coordination of innovation policy, Promotion of social, Modernisation of medical sciences, Definition of goals of the

university reform project and Official, independent consultative institution for education, research and innovation policy.

In respect to innovation policy the SSTC recommends that the Federal Council take more responsibility in respect to the coordination of the efforts and initiatives of private firms, the federal government, the cantons and the universities. The SSTC further stresses the relevance of technology transfer and consequently the need to monitor this policy area. Furthermore the SSTC proposes to bridge the gap between basic and applied research more determinedly and to create stronger clustering at the university level. Finally, it proposes to give more weight to education resulting in abilities that are relevant for innovation. Besides teaching more business and administration knowledge, the SSTC asks universities to foster creativity, the readiness to assume risk and an open mindset. This direction should be implemented in all types of tertiary education as well as in continuing education.

## 2.2 Innovation governance system

### 2.2.1 Governmental bodies

The main responsibility for innovation policy in Switzerland is held jointly by the two federal departments OPET (Federal Office for Professional Education and Technology) and SER (State Secretariat for Education and Research). While the former is in charge of vocational education (both at the upper secondary and the tertiary level) and technology, the latter takes care of university education and research. The two are interconnected through the so-called 'steering-committee', which is a policy platform where the different actors of innovation policy come together. A further important actor of the Swiss innovation policy is the SSTC, which mainly acts as a consulting body.

Furthermore, there are a number of bridging institutions. At the political level there are the EDK (Swiss Conference of Cantonal Ministers of Education) which coordinates the cantonal universities. A subgroup of the EDK, the Universities of Applied Sciences (UAS) council governs the coordination among these universities. The coordination between the cantonal and the federal level regarding universities is done by the Swiss University Conference (SUK). The institutions responsible for the coordination at the management level, there are the Swiss Federal Institute of Technology Zurich (ETH) Council for the ETH domain, the CRUS (Rectors Conference of the Swiss Universities) for the cantonal universities and the KFH (Rectors Conference of the Swiss Universities of Applied Sciences) for the UAS.

Finally, there are the two funding agencies, the KTI/CTI and the SNSF. The SNSF, considered the main research promotion agency, is responsible for basic research funding. It is a foundation that is mainly funded by the State Secretariat for Education and Research (SER). The KTI/CTI is responsible for the funding of innovation projects. Most of its funds stem from the Federal Office for Professional Education and Technology (OPET).

For a more detailed description of the Swiss innovation system, see the TrendChart report 2007 and the Swiss page on the Pro-Inno website <sup>(23)</sup>.

### 2.2.2 Main bodies managing implementation of policies

Innovation policy implementation mainly takes place through the KTI/CTI, an agency of the OPET. The KTI/CTI is responsible for innovation promotion in Switzerland. It should be noted that there is no strict separation between policymaking and policy implementation. The reason is that policy decision-making is conducted in a very comprehensive consultation process. All stakeholders (e.g. unions, employer federations, political parties) are involved and – in case of law adjustments – the citizens may have the final decision-making power (referendum). The most important 'consultation procedure',

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<sup>23</sup> See <http://www.proinno-europe.eu/index.cfm?fuseaction=country.showCountry&topicID=263&parentID=52&ID=45> online.

which involves all stakeholders and pressure groups, is the so-called *Vernehmlassungsverfahren*. This procedure allows the stakeholders to criticise (within a certain time limit) changes of laws and regulations proposed by the Government at an early stage (even before the Government's proposal will be submitted to the Parliament).

The Swiss parliament has passed an amendment that will grant the KTI/CTI more autonomy. The agency's current legal status will be changed from a merely consultative 'administrative commission' (*Verwaltungskommission*) into that of a so-called 'authoritative commission' (*Behördenkommission*), which decides independently of the administration within the scope of responsibilities given to it by the law. The Swiss Innovation Agency (KTI/CTI) will be granted more autonomy with this change in status. Currently it is integrated into the OPET, while the amendment will make it an undirected administrative agency. This means that the agency will be able to make autonomous decisions about project financing, education programmes and its start-up label.

The SNSF is responsible for the implementation of the Swiss research policy. This means that it funds basic research project as well as fostering the career development of researchers.

## 2.3 Public funding to innovation

### 2.3.1 Review of the current range of support measures for innovation

With respect to budget trends, the development of Swiss innovation policy in the recent past and future are set out in the ERI-message (*Bundesrat 2007*). The strongest increase in the budget projection for the period 2008-11 is for bilateral and multilateral cooperation; its yearly growth rate is 14.9%, although on a rather low budget level. In contrast expenditures for vocational education on the secondary and tertiary levels are substantial, and are expected to increase at a rate of 8.7% and 7.8% per year. Besides increases in investments for professional education, only the budgets of the SNSF and the innovation promotion agency KTI/CTI grow above 5%, namely 7.5% and 7.3% per year respectively. The budget for basic research promotion through the SNSF is substantially larger than the budget of the KTI/CTI. The fact that the budgets grow at the same rate indicate that the Swiss innovation policy receives a somewhat higher priority than in the past. Furthermore the fast growth in the budgets available for competitively distributed funding sources indicates a change in the governance of the research sector towards more competition.

As for the use of funding sources by the innovation promotion agency KTI/CTI, the ERI message 2008-11 (*Bundesrat 2007*) specifies the use of the budget more explicitly than in the previous period. More than 60% of the budget is allocated to the support of research projects. The budget now contains a budgetary item for the support of national and international networks and programmes, amounting to nearly 30% of the funding. Finally, about 8% of the budget is to be used for the promotion of entrepreneurship and start-ups. The explicit specification of funding for the promotion of start-ups indicates that the innovation policy becomes somewhat more active in the support of firms as opposed to the rather enabling approach in the overall innovation policy mix.

Considering policy mix and international comparisons, Figure A1 shows the policy priorities addressed by Swiss innovation policy measures and compares the results with the EU-27 average. Swiss innovation measures address 26 policy fields out of 40. In Switzerland policy priorities are related to the promotion of R&D cooperation, especially between firms and public research organisations (more than 60% of the measures) and promotion of the excellence of research in Universities. The comparison with the EU-27 average reveals that Swiss innovation promotion activities are restricted to fewer policy fields, but these policy fields are more intensively promoted than in the EU-27 average. This is valid for all fields in which Switzerland has policy activities (accounting for more than 5% of the measures), except Horizontal measure in support for financing and Cluster framework policies.

Turning to the share of budget used for different policy priorities reveals that the long-term research agenda is the most important target (nearly 60%), followed by Policy measures concerning excellence of research in universities (19%) and R&D cooperation mainly between firms and universities (15%). This confirms somehow that the policy focus lies in the improvement of innovation framework

conditions rather than direct policy interventions (see Figure A2). The number of policy measures is not essentially mirrored in the budget (see Figure A3). Fewer measures with greater budget can be found in the field of Long term research agendas, while in the field of R&D cooperation single measures have relatively lower budgets.

Figure A4 allows a comparison of the focus on different R&D fields. The highest share of measures targets health, followed by nanosciences and nanotechnology as well as biotechnology. In all of these fields, the share of measures is higher for Switzerland than in the EU-27. However, for ICT, where the Swiss industry is traditionally rather weakly represented, the share of targeting measures is substantially lower. Evidence shows that the Swiss innovation policy focuses on the promotion of research and technology transfer. This is supported by the distribution of policy measure target groups depicted in figure A5. It shows that the most important target groups are research units at higher education institutions and other non-profit research organisations. Both of these categories are substantially more important in Switzerland than in the EU-27.

Figure A6 displays aspects of the innovation process that are targeted by the measures in Switzerland compared to the EU-27. It shows that the development and creation of prototypes as well as the promotion of applied industrial research are more important in Switzerland than in the EU-27. This might reflect the focus of the policy mix on the promotion of technology transfer. Figure A7 shows the distribution of funding forms across measures. It shows that the most prevalent form is grants. This is not surprising as grants are the most common instrument to foster academic development and the research and technology transfer that goes with it.

The policy factsheet suggests that the volume of public support to innovation is almost EUR 551 million. However, this figure must be interpreted very cautiously due to several reasons. First, the amount includes expenditures for basic research, which makes up the bulk of the figure. Secondly, assuming that expenditures for basic research should be included, the presented figure underestimates the true value grossly. The main reason is that it does not include global budgets of universities, universities of applied sciences and public research institutions. It also does not account for research funded by individual government agencies. Due to these reasons the figures have to be interpreted very carefully. A more serious approximation of the public support to innovation is the budget of the innovation promotion agency KTI/CTI. The KTI/CTI will receive on average EUR 89 million annually (between 2008 and 2011) according to the Government projection. Although the overall budget appears to be rather small, the growth rate (7.3% per year) is well above the projection for the funds available for education, research and innovation policy. These funds in turn grow substantially faster than the overall budget.

Among the most important non financial innovation policy measures are Venturelab and CTI Start-up, both of which intend to foster entrepreneurship – the former through education and sensitisation of potential entrepreneurs and the latter through a coaching process of start-ups. By providing knowledge to entrepreneurs these initiatives enable the optimal use of private knowledge, which creates a strong leverage of the measures. There are also two initiatives that promote the creation of networks, thereby realising large spill-over and leverage effects: the KTT Initiative and R&D Consortia.

## 2.3.2 New or modified support measures

### Exhibit 5: New Innovation Policy Support Measures

Only one new measure was introduced in the course of the last year, namely the Innovation cheque.

IPM N°	Title	Innovation policy framework category	Organisation responsible
CH 60	Innovation cheque		KTI/CTI

As economic prospects have worsened due to the financial crisis, the Swiss government has launched a stabilisation package. Part of it is a pilot scheme called Innovation cheque that intends to encourage small and medium-sized enterprises (SMEs) to engage in technology transfer. The intention is to

prevent a reduction in the research and development (R&D) budget of firms which could negatively affect future innovation potential. A similar measure has been successfully implemented since 2004 in the Netherlands under the name Innovation Voucher or *Subsidieregeling Innovatievouchers* as well as in other countries e.g. Austria, Germany (Nordrhein-Westfalen, Baden-Württemberg, Bayern), Ireland and the UK (West Midlands).

SMEs can apply at the KTI/CTI for an innovation cheque of a maximum of EUR 5 000 (CHF 7 500), which they can use to buy services at public research facilities. The total amount available for SMEs is EUR 670 000 (CHF 1 million). Services that can be financed through this mean are idea studies, preparatory operations for an R&D project, analysis of the technology transfer potential and analysis of the technical innovation potential of a process, product, service or technology. The main goal of the innovation cheque is to give firms an incentive to adhere to R&D activity in difficult economic times. Furthermore the initiation of innovation cooperation between firms and public research institutions should be facilitated. Finally, the measure should improve the use of knowledge located in public research institutions. The innovation cheque immediately met with a very positive response among SMEs. Within one month all available innovation cheques were issued. The projects are currently under way, and the KTI/CTI commissioned an independent evaluation of the new support measure.

### **2.3.3 Strengths and weaknesses in the innovation policy support system**

The current set of innovation policy measures is largely organised in a bottom-up approach. Thus policy focuses mainly on the promotion of existing strengths. The potential misallocation of funds is diminished by the concentration of public intervention in the domain of basic research and technology transfer and the low level of direct policy interventions. As a consequence the Swiss innovation policy mix minimises the distortions of private allocation of R&D efforts. Also the promotion of start-ups takes place in a rather indirect way, since it focuses on education, training and coaching.

A weakness of the existing policy mix is that technology transfer to firms that do not conduct R&D themselves is fostered insufficiently. The reason is that technology transfer is only promoted if the private firm bears at least half of the project cost. While this condition ensures the relevance and quality of the funded projects, it may prevent firms without existing R&D to participate. The new Innovation Cheque measure offers firms the possibility to use the knowledge and services of public research institutions without previously conducting R&D themselves. This opportunity might help to broaden the number of firms that profit from technology transfer. The measure currently has the status of a pilot scheme, and an extension or even enlargement of this measure could be likely if one considers that this idea has been already successfully implemented in other countries (e.g. Austria, Germany, Ireland, the Netherlands and the UK).

## 3. Innovation policy and competitiveness: an appraisal

### 3.1 The ability of policy to address challenges

National innovation policies set priorities based on perceived challenges while often are motivated by international agreements and commitments, i.e. the Lisbon agenda. Therefore national policies act and react in a complex set of overall policy priorities and commitments. Building on the analysis in the previous chapters, this chapter investigates how well national innovation policies identify and respond to systemic challenges, which may or may not be common in other EU Member States or even other countries outside the EU.

#### 3.1.1 How well does policy respond to innovation challenges?

As a reaction to the financial crisis, the Swiss government has launched three business cycle stabilisation packages that include additional expenditures of EUR 1 757 million. This corresponds to less than 0.5% of the Swiss GDP. In comparison to other countries, e.g. the UK or the US, this stimulus is tiny. But this does not imply that the government has not reacted adequately. In order to assess the full magnitude of the political reaction, it is necessary to account for other factors. An example is the current debate about tax reductions for families and the correction for 'cold progression' which is caused by the fact that the tax tariffs do not automatically adapt to inflation while wages are frequently renegotiated. Both law adjustments might become active in the beginning of 2010, which would imply an additional stimulus of EUR 800 million for Swiss households. A further reason why the magnitude of the reaction is underestimated are automatic stabilisations as the unemployment insurance and other social networks that have an anti-cyclical effect. Also, one has to keep in mind that Switzerland is a fairly decentralised country where a substantial amount of funding is governed by the cantons. This implies that a comparison of the federal business cycle stabilisation package with those of more centralised countries would be inappropriate. Finally, one has to account for the money as the Swiss National Bank is set to buy toxic assets for EUR 36 billion from the financial firm UBS. Additionally, the government has provided EUR 4 billion equity to the UBS to secure financial stability. While the long-term cost of these measures are not determinable at this point in time, the investment amounts to nearly 8% of the Swiss GDP.

Switzerland is a small open economy. Keynesian business-cycle stabilisation measures have large spill-overs to other countries, rendering stabilisation measures less attractive for smaller countries compared to larger ones. Furthermore, the Swiss construction sector is not the weakest point in the economy and therefore traditional measures, i.e. pre-drawing of infrastructure projects, would have a limited effect. In this light, the Swiss approach to increasing disposable income through non-traditional measures appears adequate.

The federal government has not taken any measures to meet the second challenge of 'Human capital formation' directly. This is mostly due to the nature of the challenge which needs to be addressed through measures that have an impact on the choices of individuals. Since the Swiss innovation policy is mostly organised in a bottom-up approach, such measures would be surprising. Instead of approaching the challenge directly, the federal government is taking an indirect approach by increasing the overall budget for the various branches of the Swiss Federal Institute of Technology Zurich (ETH) and the Universities of Applied Sciences (UAS), thereby increasing their attractiveness to prospective students.

Furthermore, the migration of foreign workers and students is promoted by the introduction of the freedom of movement and residence between Switzerland and the European Union. Since these measures do not target the challenge specifically but intend to alter the environment in a favourable way, the effects cannot be quantified, although the migration of good qualified people from Europe increased during the last few years (see e.g. Arvanitis and Bolli, 2008).

On a regional level there is one initiative that addresses the challenge, the so-called ilab, which is organised jointly by the Aargau canton and the Paul-Scherrer Institute. It addresses the formation of human capital by increasing the attractiveness of science. The idea is to present science in an attractive way to high school students (<sup>24</sup>). This measure clearly targets an increase of the share of science and engineering students. Consequently, it is a measure that is complementary to the measures taken at federal level to improve the 'Human capital formation'.

The KTI/CTI has already taken several actions that intend to foster entrepreneurship in Switzerland. First, it has expanded the measure 'CTI Start-up', which provides mentoring, networking opportunities and a quality label to start-ups. Secondly, it has introduced the Venturelab measure, which organises courses for students to promote the entrepreneurial spirit in them. Furthermore it provides workshops for prospective entrepreneurs that help them launch the business in a professional manner. Thirdly, the KTI/CTI has created the initiative CTI invest, an organised platform for business angels and venture capitalists, offering selected start-ups the opportunity to present the business idea to them. Fourthly, the initiative Discovery Projects helps spin-offs which support radical innovations to get off the ground by financing them directly. Finally, the KTI/CTI intends to introduce the measure Diversity@CTI, which should help to utilise the potential of female entrepreneurs more efficiently.

In addition to these measures at the federal level, the Canton Basel-Stadt supports entrepreneurship in the fields of nanotechnology, greentech and ICT through the measure i-net Basel, consisting of an expert network that helps start-ups evaluate and improve their business plans and strategies. Furthermore, the measure helps university spin-offs take off by advising them how to obtain rental cost reductions provided by the canton.

However, so far there is no evidence of any path-breaking impact; the overall indicators (EIS 2008) or the recommendations of the Swiss-American Chamber of Commerce (SACC) and the Boston Consulting Group (BCG) (2008) do not show that this challenge has been successfully faced; quite the opposite, they suggest that these areas should be further promoted. This is not too surprising given that an entrepreneurial culture cannot be constructed overnight. Such a change will take a long time and be of gradual nature. Nevertheless, the magnitude of the current effort is rather low, indicating that by intensifying the endeavour, the process could be hastened. Thus, strengthening existing measures or introducing further initiatives is recommended.

## 3.2 Effectiveness of policy design

The implementation of research policy is largely concentrated within the Swiss National Science Foundation. Innovation policy is delegated to the Innovation Promotion Agency KTI/CTI. Due to this concentration and the dominant role of the bottom-up approach, there is very little friction and conflict between the implementing agencies. The two agencies seem to be working well together, as is shown by the common initiative Do Research (DORE) funding programme, which supports research projects in social sciences. A further sign for the well-established division of labour between the two agencies lies in that the funding process is similarly organised. Both use a peer-review process to evaluate projects in the bottom-up approach. A further similarity is that both agencies fund directly the research projects of universities but not of firms.

Nevertheless the communication and information flow between the Swiss National Science Foundation (SNSF) and the KTI/CTI could and should be further improved as noted in an evaluation of the KTI/CTI in 2002 (<sup>25</sup>). The report highlights the gaps between the funding of basic research and applied projects, and recommends the improvement of the coordination between the KTI/CTI and the SNSF to improve the permeability of funding measures. To achieve this it proposes that membership in the relevant boards is the most effective way to ensure coordination. Since the peer review of the KTI/CTI in 2002, a number of improvements have taken place. At the board level mutual membership and annual bilateral consultations have been established. Furthermore, the SNSF and KTI/CTI collaborate closely in promoting spin-out firms from the National Centres of Excellence in Research (NCCR), and utilising NCCR research project results in applied research projects funded by KTI/CTI.

<sup>24</sup> See <http://ilab.web.psi.ch/> online.

<sup>25</sup> Federal Office for Professional Education and Technology (2002).

While little conflict between the implementing agencies exists, some potential for disharmony is given on the level of ministries. The Federal Office for Professional Education and Technology (OPET) is responsible for professional education and innovation policy while the State Secretariat for Education and Research is in charge of general education and research policy. The potential for conflict emerged when the OPET created a division for international relations, making it necessary to coordinate the division of labour with the international section of the SNSF. But as both research and innovation policy implementation are delegated to independent agencies which generally use a bottom-up approach, the potential for conflict between the ministries is quite small.

Note that the principle of subsidiarity is not challenged. In fact, parliament has passed an amendment that will grant the KTI/CTI more autonomy. Currently it is integrated into the Federal Office for Professional Education and Technology (OPET), while the amendment will make it an undirected administrative agency. This reveals a strengthening of good governance principles in Switzerland.

### 3.2.1 Process of delivery

The implementation of policy measures is by and large efficient. The KTI/CTI uses a peer-review process to evaluate applying projects. An evaluation of the KTI/CTI in 2002 revealed that the application process is very user friendly. One aspect is that the average duration of the peer-review process is six weeks, if no major revision of the application is required. The report further praises the possibility to submit projects at any point in time, as this reduces the time to market. The report commends that the KTI/CTI on providing the service to evaluate the chances of projects based on rough project outlines, thereby reducing the involved risk for approval. In 2009 KTI/CTI has formally introduced a two-step application process. Companies may submit a brief description of the intended project (pre-proposal), and receive a quick appraisal by KTI/CTI's experts together with recommendations for possible improvements. The second step is the preparation and submission of a full project proposal. This reduced the failure rate to a considerable extent. Additionally, companies may submit a pre-proposal, even if they may not yet have found a suitable university research partner. In this case, KTI/CTI also offers assistance in suggesting possible partners, even though the decision has to be made in any case by the partners themselves. Furthermore, a refusal to consider the case may be followed up by a revised version of the project description <sup>(26)</sup>/ Finally, the report recommends retaining a militia based system, as this ensures the proximity to the praxis.

Since the report was written, both the KTI/CTI and the SNSF have introduced the possibility to apply for funding online. This decreases the costs of application, reduces transaction costs and makes the funding opportunities more attractive for SMEs. Entry barriers have also been lowered.

### 3.3 Impact of public support for innovation

While both innovation and competitiveness are important keywords in the vocabulary of Swiss politicians, the respective policies are little developed and are of minor importance. Loosely speaking, the Swiss position is that innovation and competitiveness are the business of the private sector. The role of the government is to provide a favourable environment and to ensure that market participants adhere to the rules of the game. This position is supported by the OECD which stresses on the improvement of framework conditions as compared to the direct promotion of innovation. Furthermore, the Growth Report 2008 (SECO 2008) confirms, that innovation is primarily promoted by the creation of a favourable environment.

As a result of this perception, the relevance of innovation policy is relatively small. The total budget of the KTI/CTI was EUR 63 million in 2006 (KTI/CTI 2007) <sup>(27)</sup> compared to roughly EUR 6 billion in R&D expenditures of the private sector (BFS 2008). Besides being dwarfed by the private sector's contribution, the nature of measures implemented by the KTI/CTI fosters private-sector developments

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<sup>26</sup> Federal Office for Professional Education and Technology (2002).

<sup>27</sup> An exchange rate of 1.5 has been used to convert CHF values to EUR.

as opposed to steering them. Most of the funds are distributed bottom-up. Also, the financial support of the KTI/CTI is not paid to the private sector but is directed at research institutions alone.

A study conducted by the KOF Swiss Economic Institute on the transfer activities of firms with universities showed that 27% of firms with more than five employees have transfer activities with universities (Arvanitis et al., 2007). Arvanitis et al. (2008) further show that knowledge transfer activities improve the innovation performance of firms both in terms of R&D intensity and sales of innovative products. The positive effect of overall transfer activities can be traced back mainly to research and educational activities. In addition, knowledge transfer activities seem to exercise a positive influence on labour productivity both through a direct effect as well as through an indirect effect by raising the elasticity of R&D intensity with respect to labour productivity. These facts indicate indirectly imply (since it is no policy evaluation) that the promotion activities of the KTI/CTI, namely to focus on technology transfer, is an effective way to promote the innovation behaviour of firms.

### **3.3.1 Conclusions: possible future actions and opportunities for innovation policy**

The current organisation of the Swiss innovation strategy is quite good. Nevertheless, the situation could be improved even further:

Firstly, there is reason to believe that the financial crisis is not over yet. Consequently, the government should take further steps to alleviate additional pressure from the economy. The problem is that there is a limited amount of reasonable opportunities to push demand directly. The construction sector has not been affected as much as other sectors, meaning that pre-drawing investment projects are not solving the issue. The alternative is to increase available income of households. Therefore it is recommended that the government apply the plan to reduce taxes by a number of measures that are currently being discussed.

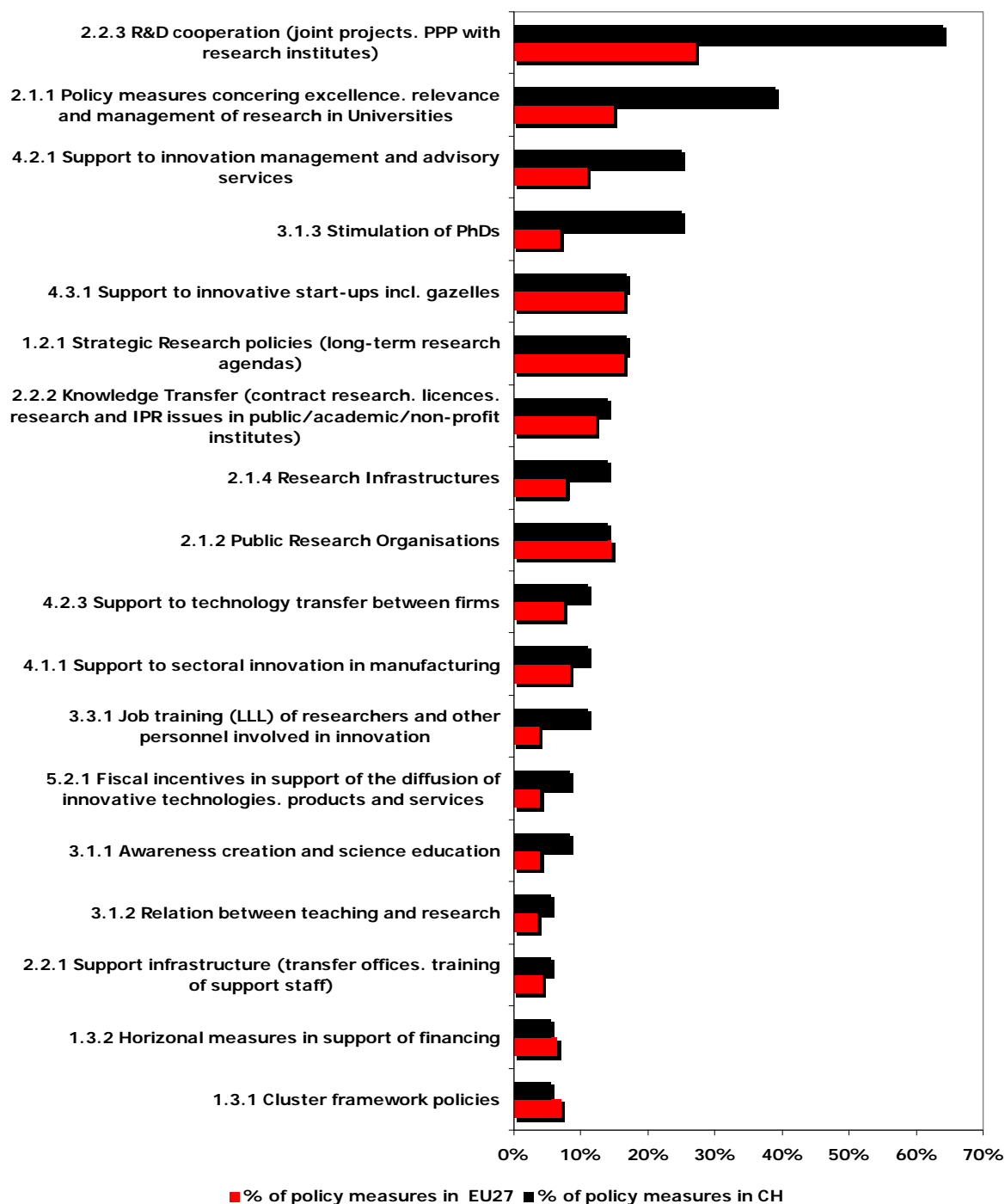
Secondly, in line with OECD experts, it is recommended that the framework conditions for innovation should be improved further. This includes the prioritising of public R&D spending in the budget of the government and an intensification of the technology transfer facilitation. Finally, the growth of human capital should be encouraged by strengthening higher education (OECD 2006).

## Annexes

### Annex 1: Country pages – Innovation Policy Support factsheet

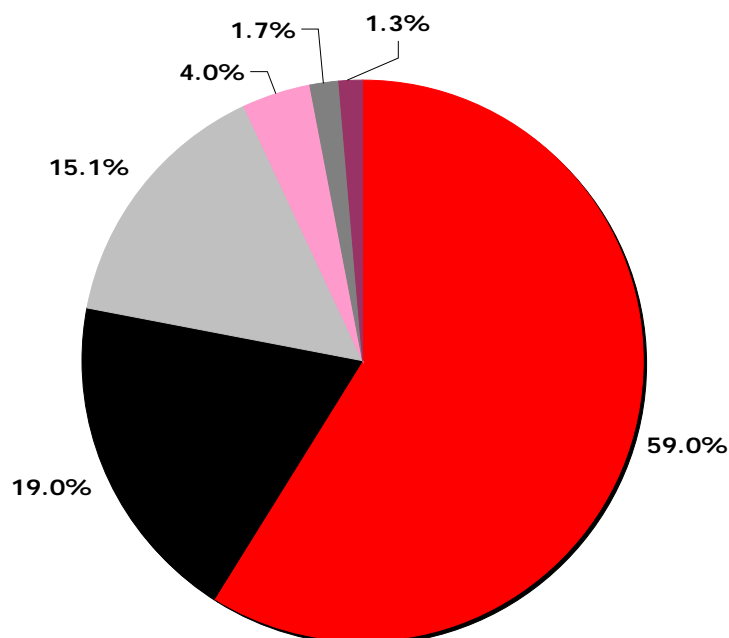
#### GENERAL OVERVIEW

Figure A1: Policy priorities addressed by the support measures in Switzerland and EU-27



**Source:** TrendChart-ERAWATCH database of support measures (data downloaded on 5 June 2009); analysis Technopolis Group

Figure A2: Estimated annual budget per policy priority in Switzerland

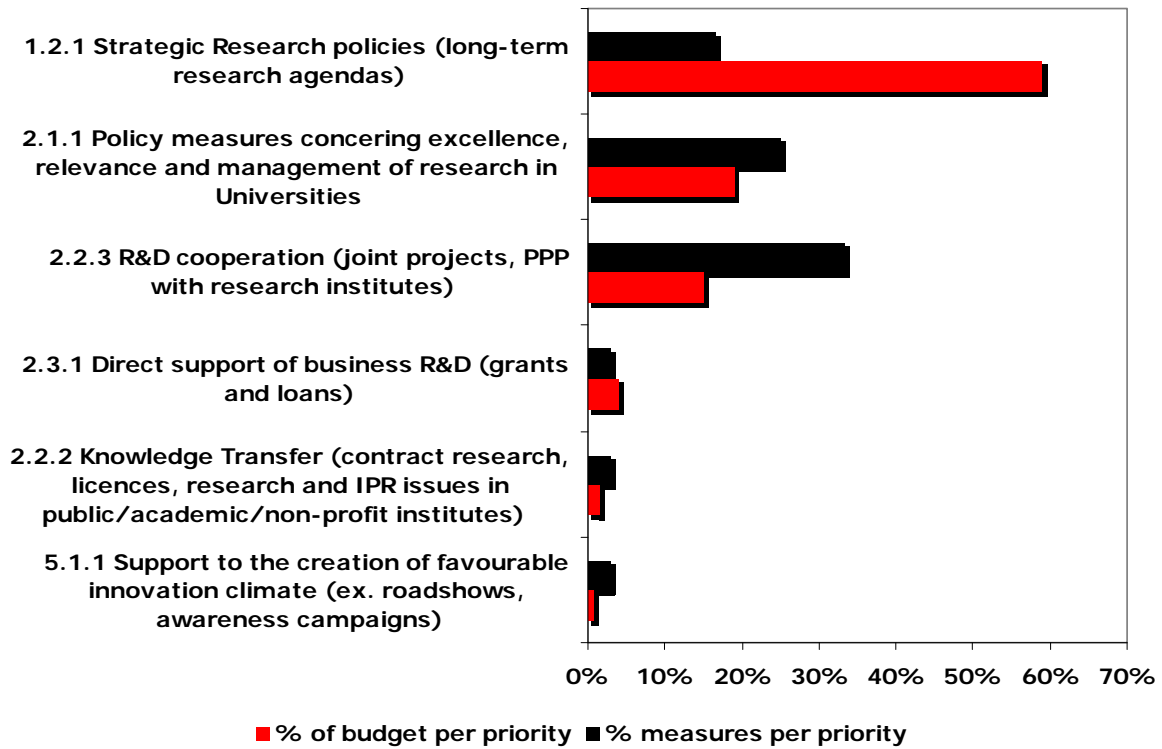


- 1.2.1 Strategic Research policies (long-term research agendas)
- 2.1.1 Policy measures concerning excellence, relevance and management of research in Unive
- 2.2.3 R&D cooperation (joint projects, PPP with research institutes)
- 2.3.1 Direct support of business R&D (grants and loans)
- 2.2.2 Knowledge Transfer (contract research, licences, research and IPR issues in public/aca profit institutes)
- Other

**Source:** TrendChart-ERAWATCH database of support measures (data downloaded on 5 June 2009); analysis Technopolis Group

# INNO-Policy TrendChart

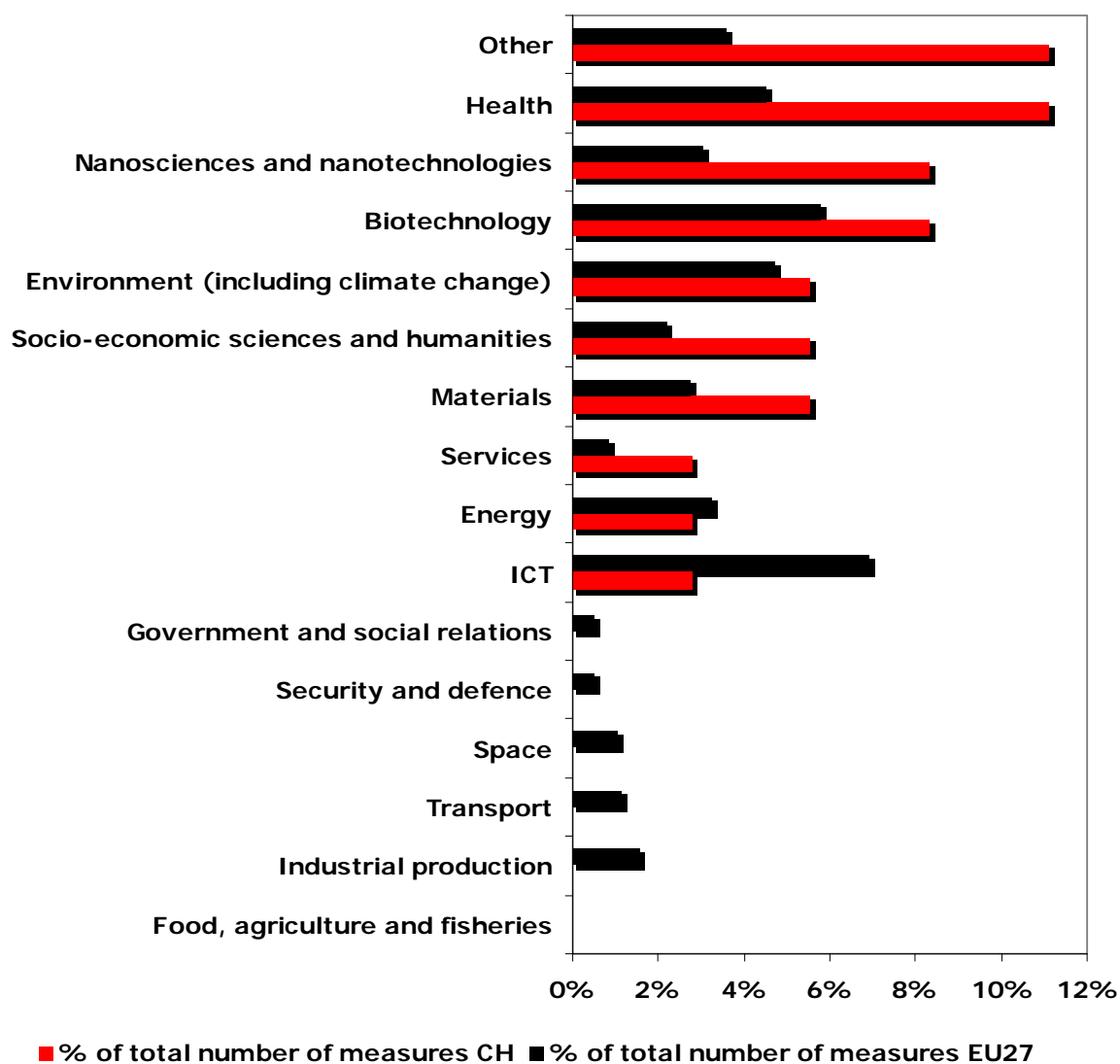
Figure A3: Estimated annual budget spent on policy priority and number of support measures in Switzerland



**Source:** TrendChart-ERAWATCH database of support measures (data downloaded on 5 June 2009); analysis Technopolis Group

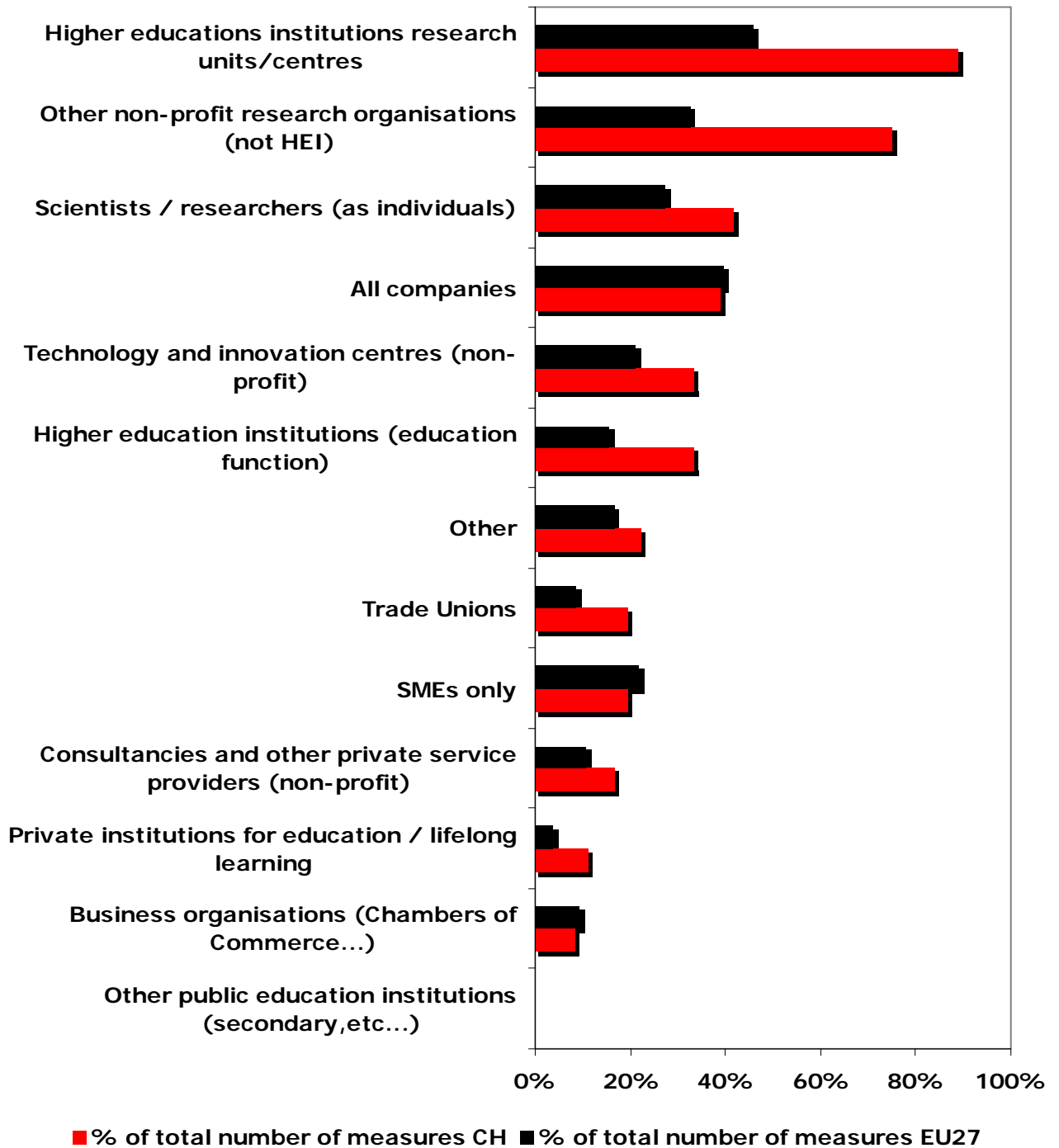
## PROFILE OF PUBLIC INTERVENTION IN INNOVATION

Figure A4: Targeted R&T fields by support measures in Switzerland compared to EU-27



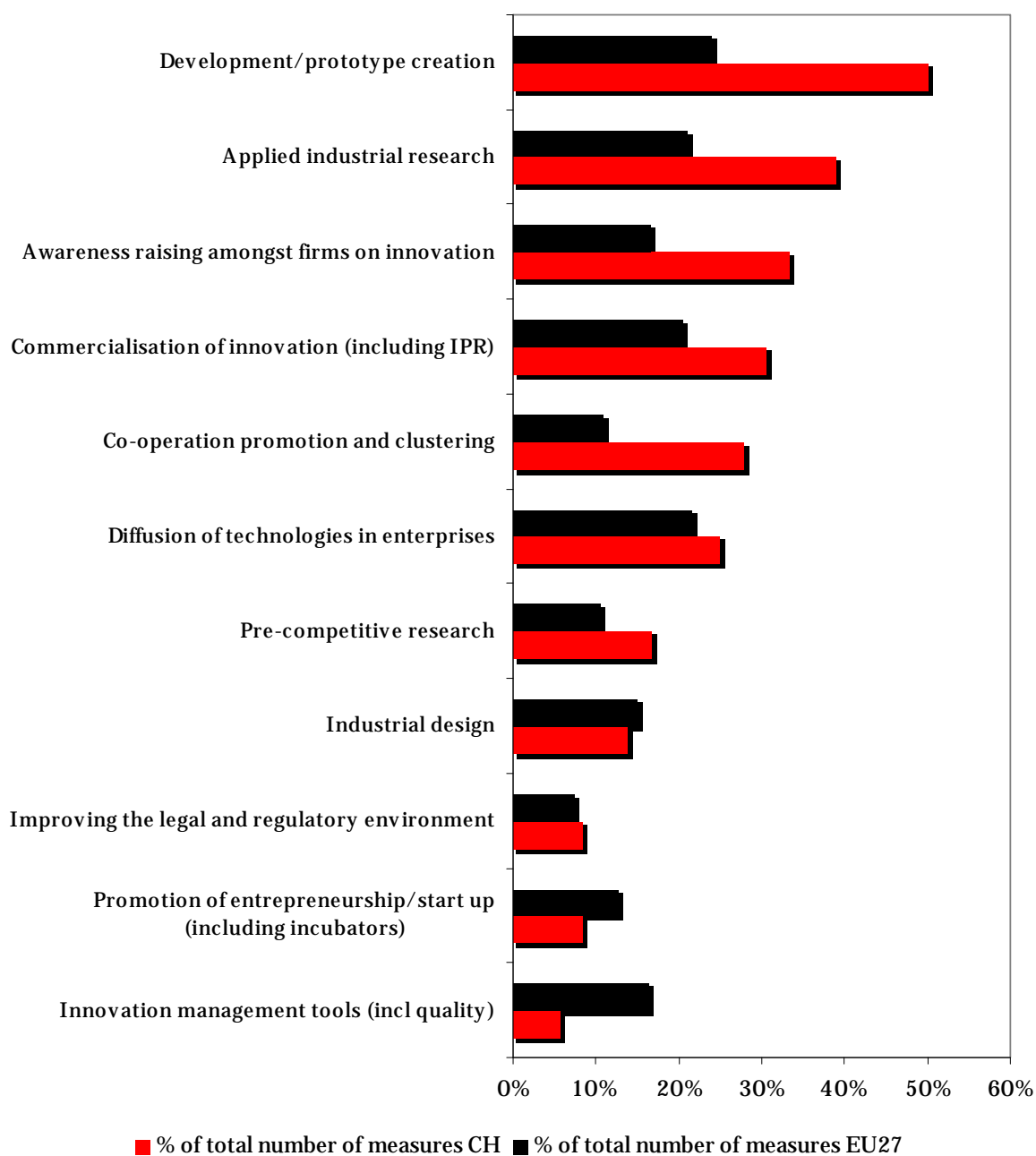
**Source:** TrendChart-ERAWATCH database of support measures (data downloaded on 5 June 2009); analysis Technopolis Group

Figure A5: Target groups of support measures in Switzerland compared to EU-27



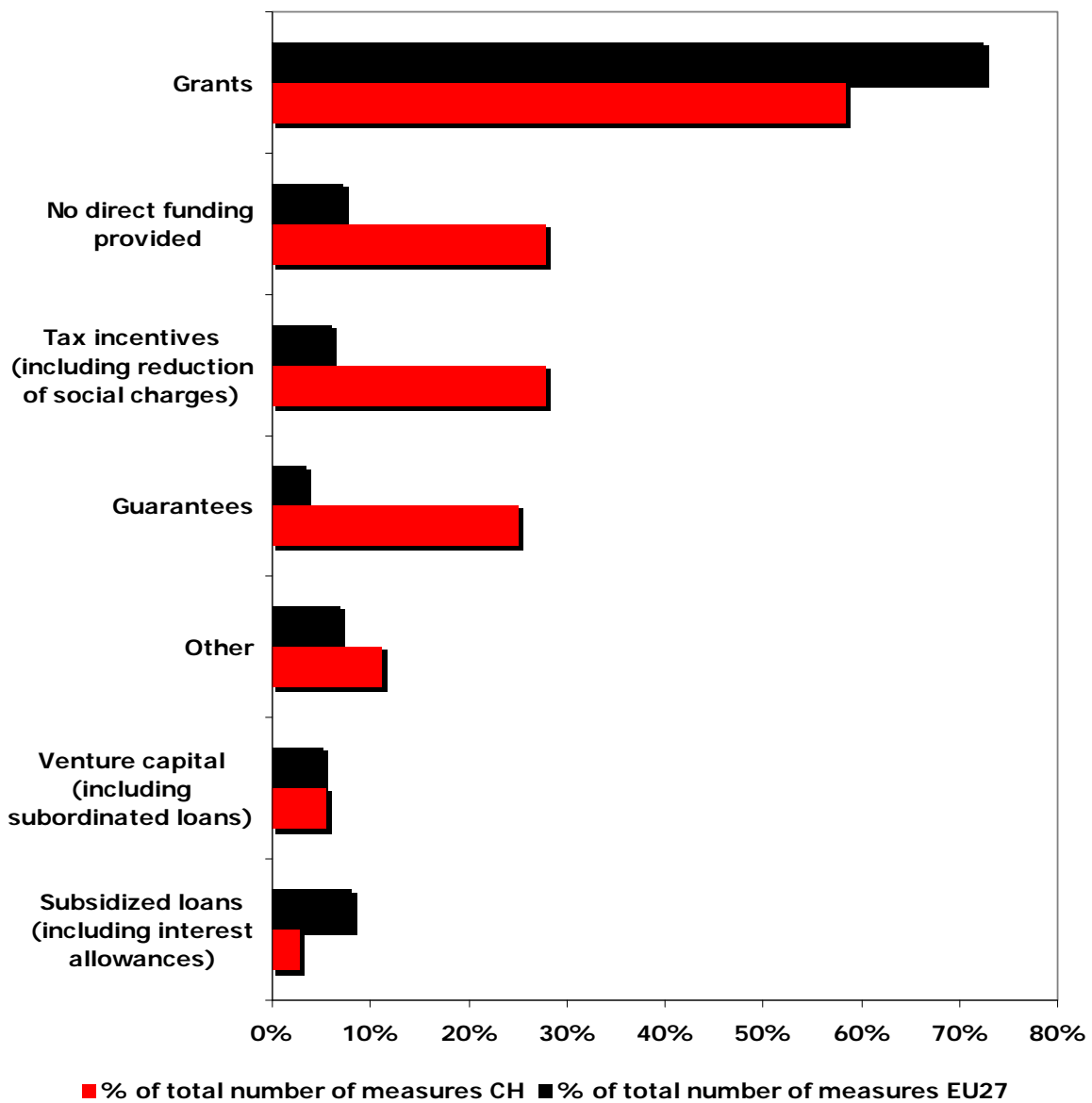
**Source:** TrendChart-ERAWATCH database of support measures (data downloaded on 5 June 2009); analysis Technopolis Group

Figure A6: Aspects of innovation process targeted by measures in Switzerland compared to EU-27



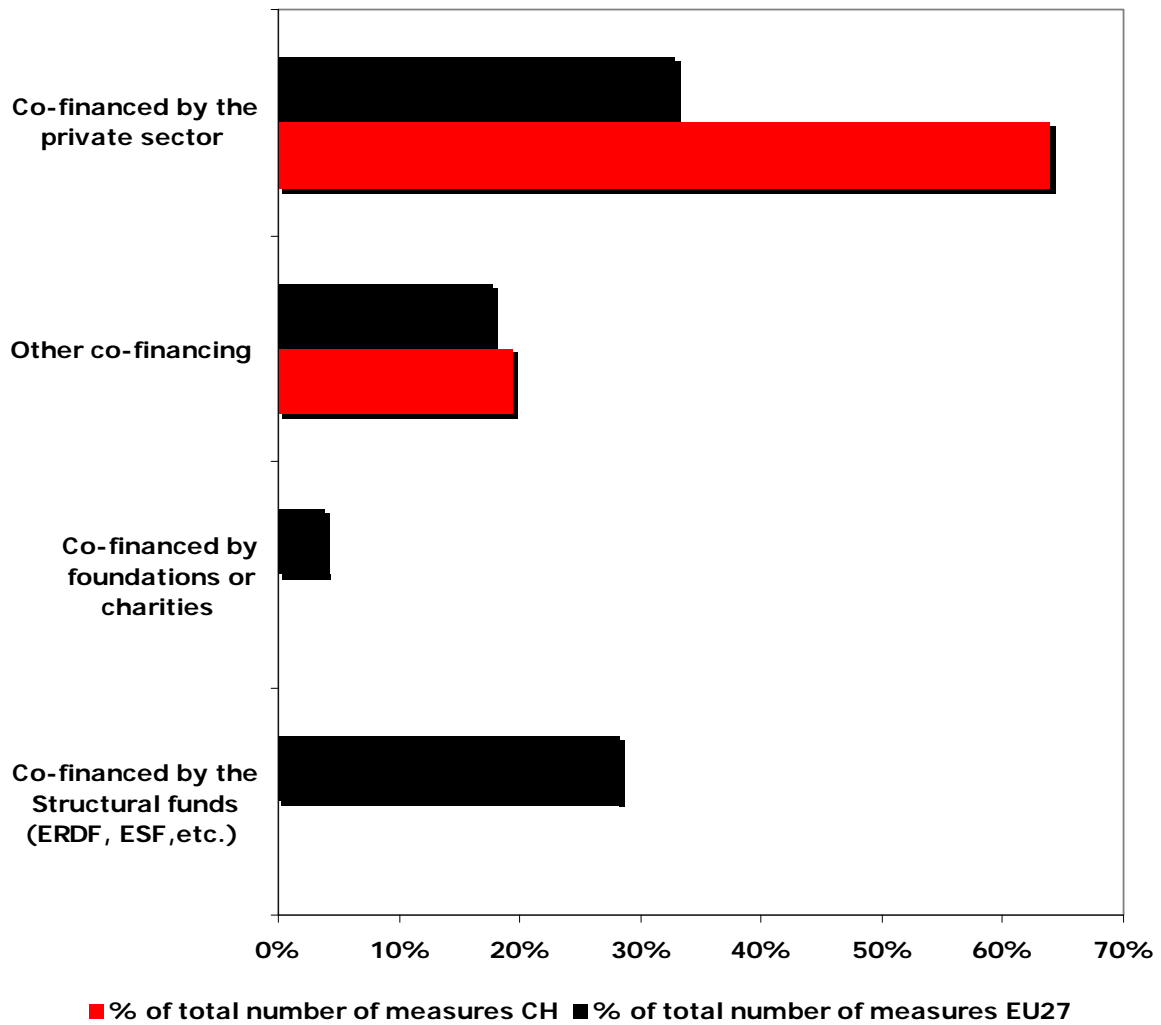
**Source:** TrendChart-ERAWATCH database of support measures (data downloaded on 5 June 2009); analysis Technopolis Group

Figure A7: Forms of funding of support measures in Switzerland compared to EU-27



**Source:** TrendChart-ERAWATCH database of support measures (data downloaded on 5 June 2009); analysis Technopolis Group

Figure A8: Sources of co-financing of support measures in Switzerland compared to EU-27



**Source:** TrendChart-ERAWATCH database of support measures (data downloaded on 5 June 2009); analysis Technopolis Group

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## ANNEX 3: Abbreviations

BCG	Boston Consulting Group
CRUS	Rectors Conference of the Swiss Universities
EDK	Swiss Conference of Cantonal Ministers of Education
EPO	European Patent Organisation
EIS	European Innovation Survey
ERI	Education, Research and Innovation
ETH	Swiss Federal Institute of Technology
EU	European Union
GDP	Gross Domestic Product
KOF	Swiss Economic Institute
KTI/CTI	Innovation Promotion Agency
ICT	Information and Communication Technology
IMF	International Monetary Fund
OECD	Organisation for Economic Co-operation and Development
OPET	Federal Office for Professional Education and Technology
PPS	Purchase Power Standard
R&D	Research and Development
SACC	Swiss-American Chamber of Commerce
SECO	State Secretariat for Economic Affairs
SER	State Secretariat for Education and Research
SME	Small to Medium-Sized Enterprise
SNB	Swiss National Bank
SNSF	Swiss National Science Foundation
SSTC	Swiss Science and Technology Council
SUK	Swiss University Conference
UAS	University of applied sciences
UK	United Kingdom
USA	United States of America