



Annual Report

Innovation Promotion Agency CTI 2010



Schweizerische Eidgenossenschaft
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Swiss Confederation

Federal Department of Economic Affairs FDEA
Commission for Technology and Innovation CTI
Innovation Promotion Agency

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I A year of change

4 +



This year's schedule was ambitious. The revised Research and Innovation Promotion Act releasing the CTI from the care of the Federal Office for Professional Education and Technology (OPET) entered into force at the beginning of 2011. By this time the CTI was expected to be constituted as an independent commission with its own secretariat and rules of procedure.

In the summer, the Federal Council appointed the new President, the new Board and the 60 Commission members. The newly constituted CTI was thus faced with the task of completing the transformation process initiated by its predecessor, ideally without overly affecting our ongoing operations and the fulfilment of our performance mandate.

We believe that we have succeeded in our efforts. The CTI was able to further strengthen its position in its core fields.

Cooperation with the Swiss National Science Foundation, for example, and thus with federal research promotion, was intensified.

Cooperation with the Swiss Design and Architecture Schools also developed positively with the number of project applications more than doubling. Developments in the Start-up and Entrepreneurship field were also pleasing: The coaching process established by the CTI for young firms is receiving increasingly positive responses from founders of high-tech companies, while the 'CTI-certified' label is being perceived by a growing number of investors and business angels as a true sign of quality.

And lastly, we also have to mention a genuine highlight: the CTI Medtech Event was a resounding success. The turnout of some 450 visitors demonstrated that the CTI was able to create a national platform for an industry considered to be a driving force for economic growth.

But naturally not everything can go entirely to plan in a year of a great many changes. The internal restructuring was demanding for all concerned. Staff turnover was high, and at times the new working procedures required fine tuning.

One of the areas in which this was noticeable was that of project approvals. In purely statistical terms, 2010 was a record year with over 300 R&D projects approved and over 600 firms involved. However, a detailed analysis revealed that not everything ran smoothly. Following a boost in funding of CHF 21 million by the Federal Council as part of its economic stimulus packages, the CTI had clearly communicated that the special funding for 2010 would expire, which in turn led to a last minute rush

among many companies and a drastic increase in the CTI's workload. In mid-2010 the approval criteria therefore had to be tightened. With hindsight it seems clear that the criteria catalogue was altered rather abruptly, which resulted in understandable frustration in some business sectors.

The new status as an independent, decision-making commission broadens the CTI's scope. But it also means greater responsibility and accountability. That is why, in the reporting year in question, an impact analysis was set up for the KTT networks. The external evaluators will deliver their initial findings in 2011.

+ 5

In addition, beginning in mid-2010, we conducted a detailed analysis designed to improve the application process. This followed the suspension of the web-based solution known as 'Merlin' due to technical problems.

The CTI, in its new legal form, is therefore eager to orientate its activities even more intensively towards the needs of its business and scientific partners; with the aim of sustainably strengthening knowledge and technology transfer in Swiss businesses.

We are driven not least by the events of the current reporting year; the first year following the major financial and economic crisis. The Swiss economy experienced an encouraging upturn. Better products and more efficient production processes led to increasing market share and exports. Hundreds of businesses – from start-ups to corporations – have placed emphasis on creativity and innovation even in lean years.



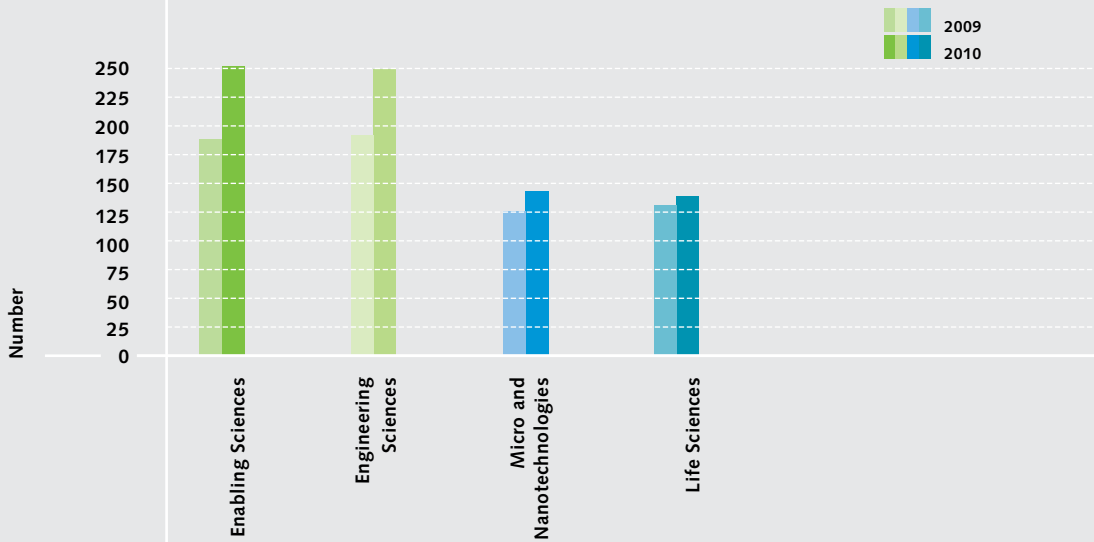
Dr Klara Sekanina
Director, CTI Secretariat

Facts and Figures on project promotion

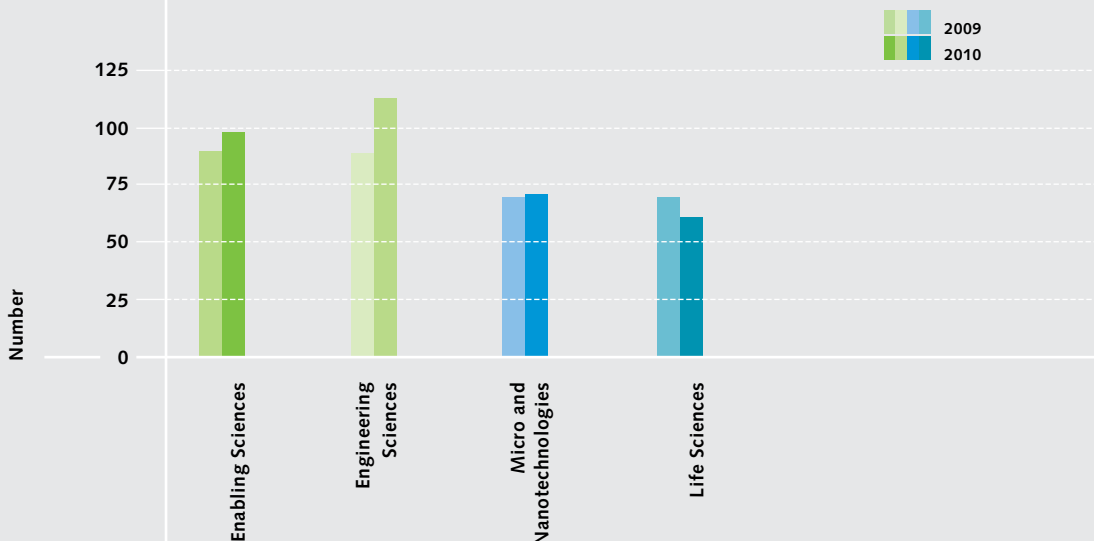
	No.	%	Project costs CHF million	Federal funding CHF million	Industry funding CHF
million					
Submitted grant applications	780				
Requested federal funding				247,8	
Approved grant applications	343				
Project approval ratio		44			
Federal funding approval ratio		41			
Cancelled projects	3	0,9			
Cost I financing the approved projects			234,9	100,4	134,6
Participating companies (approved projects)	667				
Participating SMEs, < 250 employees (approved projects)	495	74			
Participating corporations, > 250 employees (approved projects)	172	26			

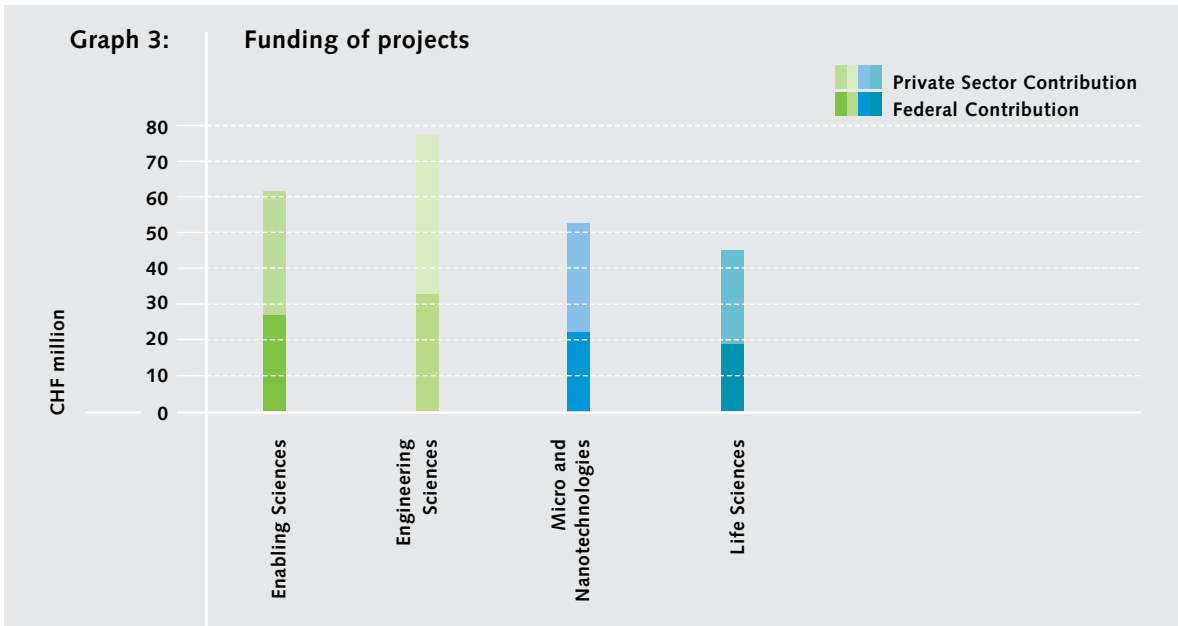
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Graph 1: Project proposals

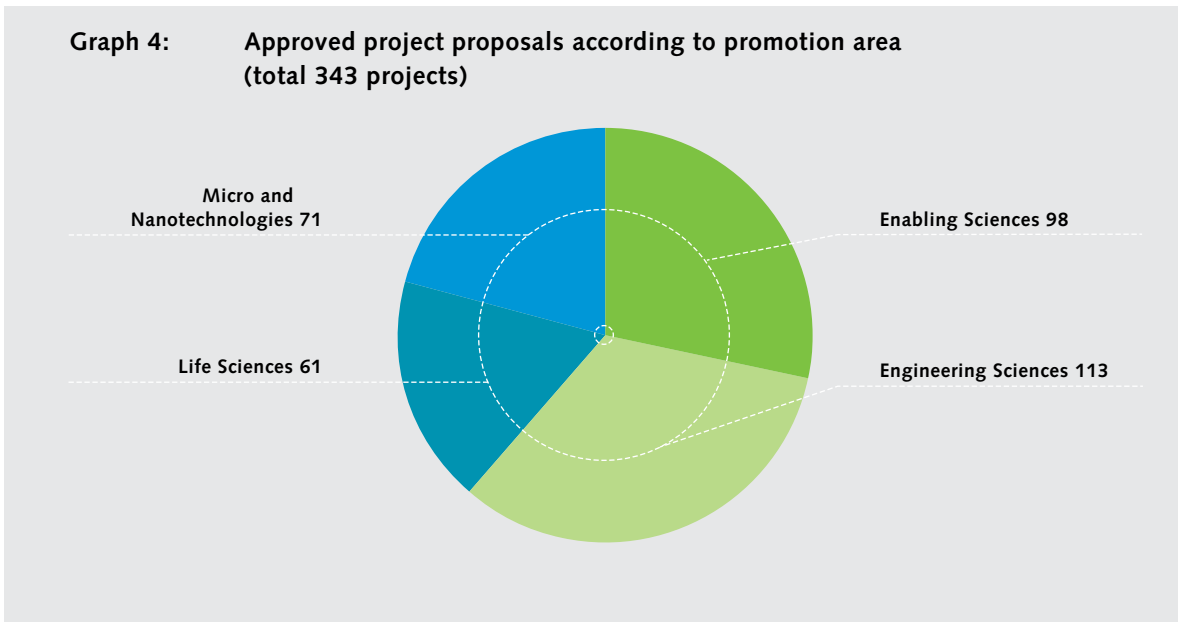


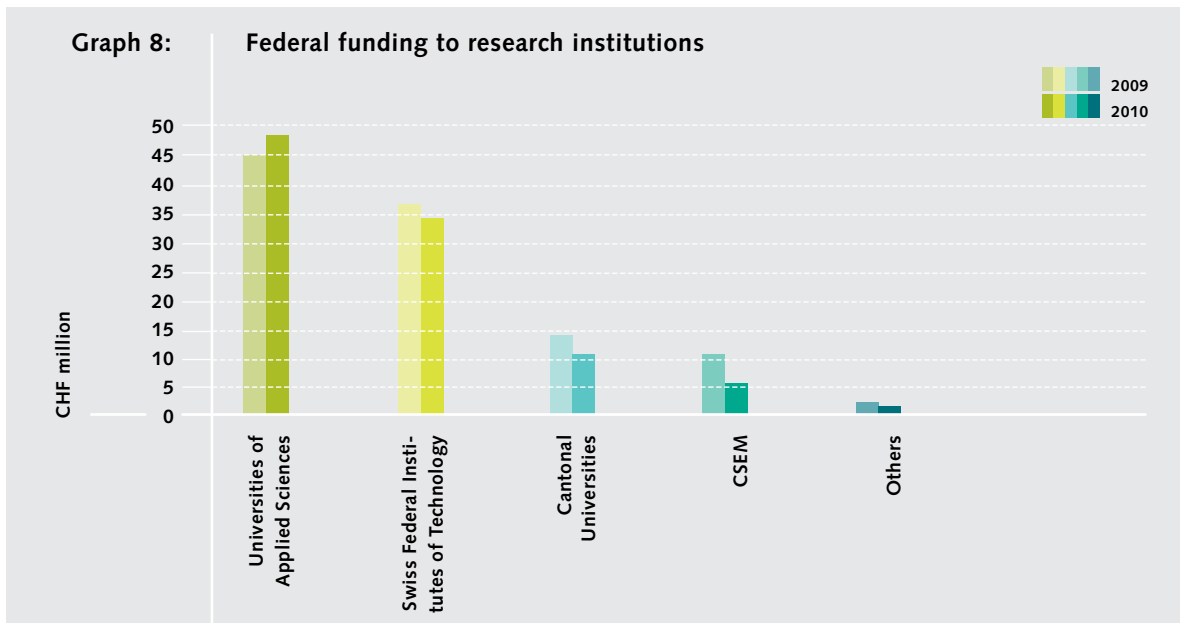
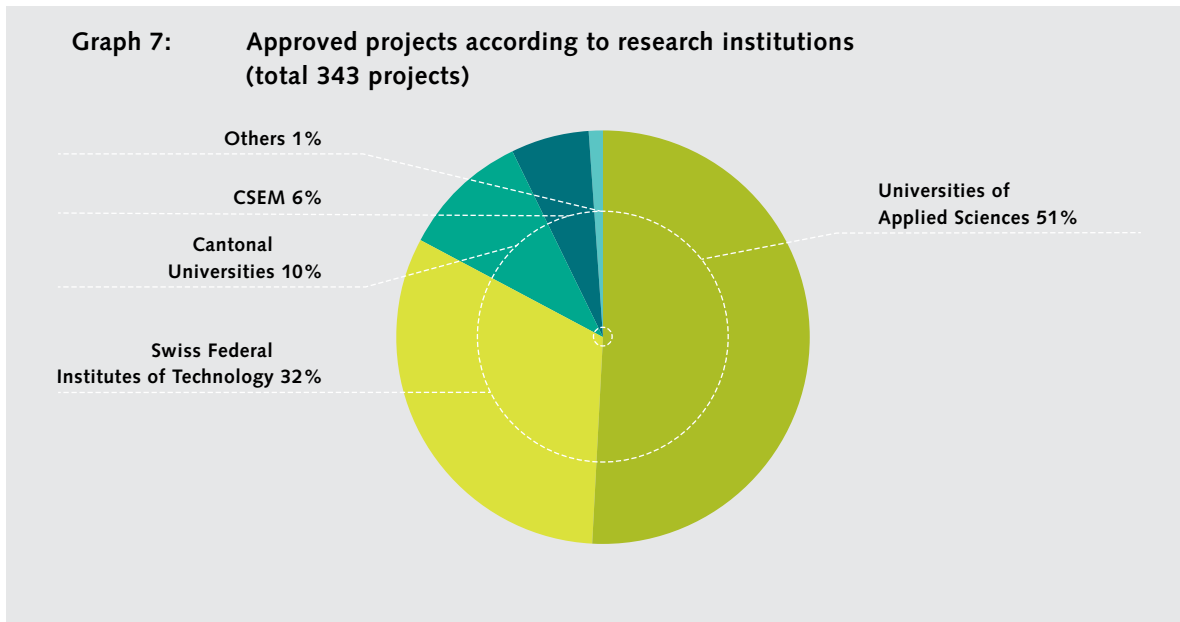
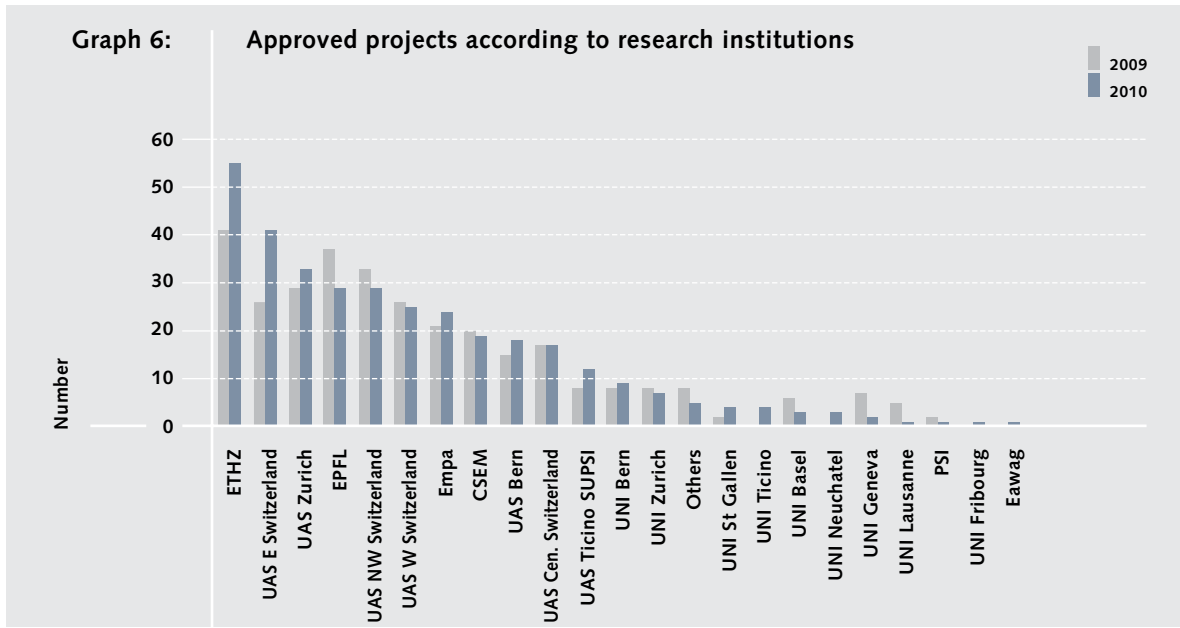
Graph 2: Approved project proposals



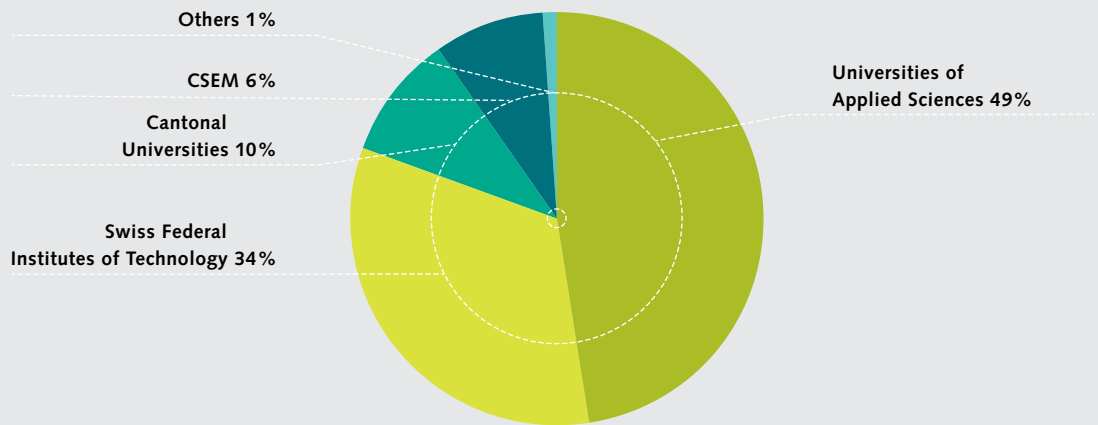


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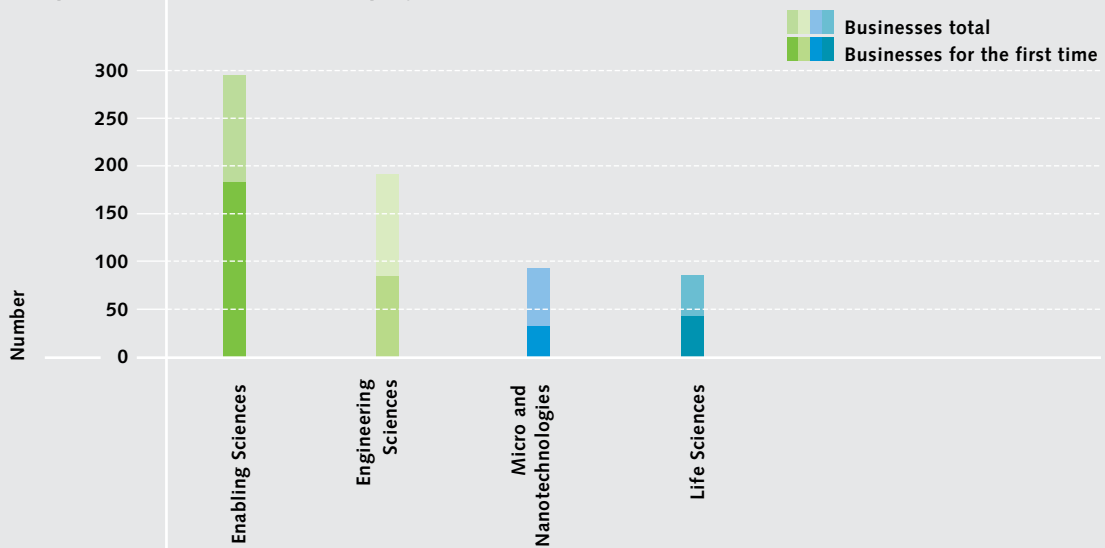




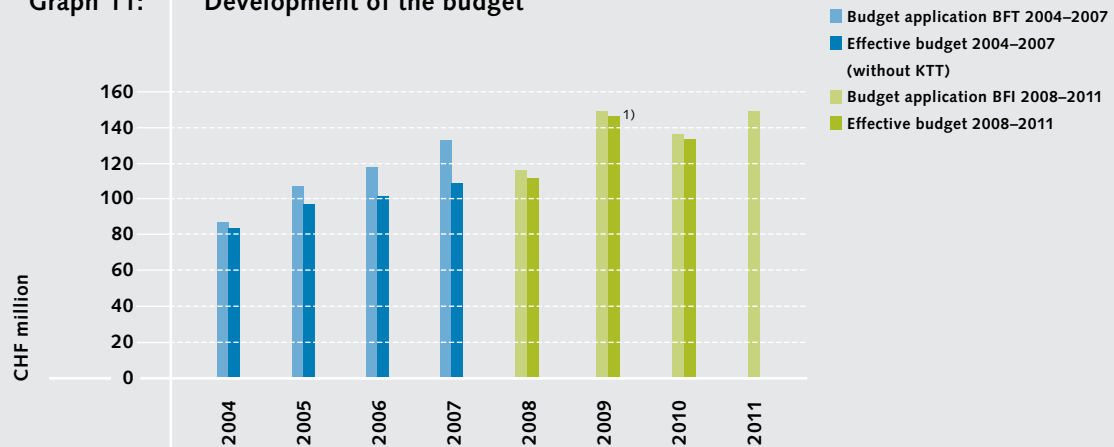
Graph 9: Federal funding to research institutions (total CHF 100.4 million)



Graph 10: Businesses in projects for the first time



Graph 11: Development of the budget



¹⁾ Incl. CHF 21.5 m stabilisation measures, 2009

I Focal points and special issues

10 +

2010 was considered by many in business to be a year of rapid recovery from the financial and economic crisis. But for many firms it was also a year of innovation. This resulted in a new record in terms of CTI project funding: 780 applications were received, more than ever before. With a total of 343 project approvals, the figure was another 8 per cent above the already very good figures of the previous year. Nevertheless, 2010 was a year of two distinct parts. After an extremely dynamic first few months there then followed a sharp downturn, both in the number of applications and approvals.

The great challenge for the CTI in 2010 was cutting loose from OPET to become an independent commission. Although the adjustment led to a greater burden on staff, the CTI not only continued to deal with ongoing business in 2010, but also completed additional projects. These included the innovation cheque for the Cleantech sector, the intensification of cooperation with the Swiss National Science Foundation SNSF, and the completion of a number of evaluations, for example of the KTT and R&D networks. Some of the changes and improvements based on those will already be introduced in 2011.

Innovation cheque

In November 2009, members of the Innovation Conference set up by Federal Councillor Doris Leuthard, decided to promote the Cleantech sector. One of the measures launched by the CTI in the summer of 2010 was the 'Cleantech innovation cheque'. The innovation cheque enabled SMEs to obtain research and development services from public research institutions to the value of up to CHF 7,500 per cheque. The number of cheques was limited to 133.

The instrument is designed to encourage SMEs to work together with research institutions in the field of innovation and gather initial experiences. This aim was met in full. There was intense demand on the part of SMEs for this instrument. Under the cheque scheme 40 per cent of businesses taking part cooperated with a university for the first time. 63 per cent of business partners were small and micro businesses. 84 per cent of users were using the CTI's services for the first time. The innovation cheque therefore proved to be an instrument, which satisfied the need of SMEs for an unbureaucratic, and straightforward introduction to knowledge and technology transfer.

Tightened approval procedure

The above-average level of application submissions at the beginning of the year meant that the CTI was forced to tighten the approval procedures. As of May the proven funding criteria (innovative content, market relevance and scientific quality) were applied more strictly. In addition, a project ranking system was introduced in the different fields. The expert teams drew up a ranking order of R&D applications worthy of funding, primarily taking into account their respective innovation potential. The applications at the bottom of the order were not considered for federal funding. This procedure meant that 23 projects were classed as 'approved but not funded'.

In the second half of the year the number of applications across all fields dropped off sharply. There were several reasons for this. Firstly, the reduction can be explained by a tactical waiting on the part of potential applicants who had learned of the budget-related tightening of the approval procedure. But there are also further reasons. The high number of projects approved in 2009 and the first months of 2010 sapped the resources of many research institutions and businesses. Businesses were also affected by the upturn in the economy in the second half of the year. Due to the sharply rising demand there was often no time to initiate new innovation projects.

Development of a new tool for the application process

Starting in mid-2010, the CTI conducted a detailed analysis of 'Merlin', the webbased platform used in the application process since 2009. The tool was taken offline in September due to various technical problems and the unsatisfactory user interface. At the same time, the CTI reactivated the old submissions process. With regard to the twostage process also introduced in 2009, many applicants were unable to submit a summary of the decisive points concerning the evaluation, which subsequently led to the rejection of their applications. A new, more user friendly solution is being developed based on the results of the analysis. The tool should be introduced in the course of 2012.

Cooperation between the CTI and the SNSF

Cooperation with the Swiss National Science Foundation (SNSF) was further intensified in 2010. The aim is to ensure the seamless transition of funding for projects, which move from knowledge-oriented research to application. Evaluations for the project periods 2001-2008 show that around 5 per cent of the CTI's federal funding derive from earlier research projects at the SNSF. The CTI expects this share to rise as a result of the growing implementation of the SNSF's national centres of competence in research (NCCR). Furthermore, in future the SNSF will be giving greater support to implementation-oriented National Research Programmes (NRP).

In establishing closer cooperation, it has also been possible to draw on experiences from the DORE programme (DO REsearch) through which the SNSF is funding practice-oriented research at universities of applied sciences and universities of teacher education until autumn 2011.

The highlight of the cooperation was the successful start of the National Research Programme, NRP 62 'Intelligent Materials', conducted by the SNSF and the CTI in collaboration. 21 teams were already able to begin work on their approved projects in 2010.

In addition, the CTI and the SNSF initiated closer cooperation between their experts. An information exchange was also set up for staff responsible for knowledge and technology transfer from the CTI and the SNSF's Centres for Competence in Research.

CTI Secretariat

At the beginning of 2011, the Ordinance on the Promotion of Research and Innovation entered into force (RIPO). The prerequisite for this – the separation of the CTI from the central federal administration – had to be fulfilled by the team in 2010 alongside its ongoing business. The burden on staff was therefore high, which resulted in a significant increase in staff turnover. Nevertheless, thanks to the good support of the OPET, the CTI successfully accomplished its shift to independence in the second half of the year. In the spring, the Federal Council nominated Walter Steinlin as President of the CTI. And in the summer it appointed Klara Sekanina as Director of the CTI Secretariat. Now that this intensive process has been completed, the CTI has solid foundations on which to build the future.

II CTI Life Sciences – New impetus for medical and food technology

12 +

Just a few more funding applications were submitted for the Life Sciences sector in 2010 than in the previous year. However, only 61 of the 136 project applications were approved. The project approval ratio decreased significantly to 45 per cent (2009: 53%). The number of approved project proposals was lower than last year, when 70 projects received funding. The Life Sciences sector was particularly hard hit by the tightening of approval criteria due to budget constraints. The reason for this is that the development of new products within the Life Sciences sector tends to take more time and involve more risks than in other technology sectors. Such projects were therefore often turned down due to the tightening of criteria. Most of the applications were from the Medtech sector, followed by applications from the Biotech sector. The trend in the newly established Foodtech sector was encouraging: in 2010, the CTI received an increasing number of high-quality applications. This can be attributed to the greater research efforts at universities, such as at the EPFL. In addition, the CTI gained an internationally renowned expert in this field in the shape of ETH Professor Erich J. Windhab. The 2010 CTI Medtech Event was very successful. The number of participants rose by 30 per cent in comparison with the previous year, to 450 people. The main topic of this event held at the Gran Casino Hotel in Bern was 'Start-ups', which was comprehensively presented in a speech by Urs Althaus (Head CTI Start-up Coach). The event's topic coincided with the highlight of the day: the presentation of the CTI Medtech Awards. The economic partners of all three finalist projects were young companies. MaestroHeart from Geneva has cooperated with the EPFL to develop a new type of catheter that facilitates heart surgery. Nanopowers from Lausanne is working with Vaud University

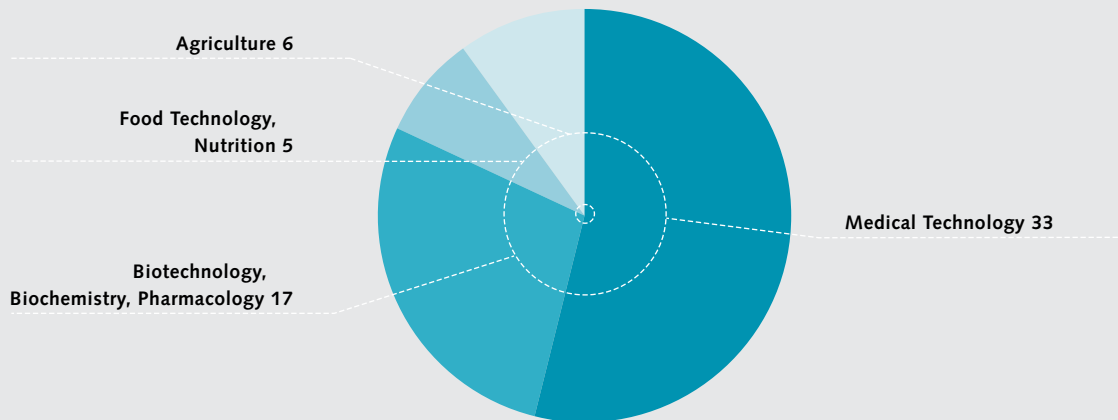
Hospital (CHUV) and other university partners to develop an artificial sphincter that provides relief to people suffering from urinary incontinence. The winning project of the Medtech Awards 2010 was developed by Compliant Concept from Dübendorf. Compliant Concept is working with Empa, ETH and the Swiss Paraplegic Centre in Nottwil to develop a bed that prevents bedsores in bedridden patients. In addition to the Medtech Award, the CTI awarded a Best Poster Award for the first time. The winner was a team from VirtaMed in Zurich and the ETH Zurich. The team presented its project on computer-based simulation of a knee arthroscopy. 2011 sees the introduction of the new Ordinance concerning the Federal Act on the Promotion of Research and Innovation, which offers significant improvements. Among other things, regulations on intellectual property have been made more attractive for companies. This in itself is particularly important for Life Sciences companies. In addition, the CTI is extending funding opportunities to smaller clinical trials. These measures will stimulate funding in the biotechnology sector. The achievements of biotechnology companies that received funding from the CTI in the past are testimony to the validity of this approach. A good example of this is Molecular Partners, a company that is developing an alternative to antibody drugs. In 2005, the CTI provided funding for this work in the form of a Discovery Project. Molecular Partners is currently one of Switzerland's biotechnology companies with the greatest potential. This led venture capitalists to invest no less than CHF 64.5 million in the Zurich-based company up until the end of 2010.

Facts and figures on CTI Life Sciences

	No.	%	Project costs CHF million	Federal funding CHF million	Industry funding CHF million
Submitted grant applications	136				
Approved grant applications	61				
Cancelled projects	1				
Project approval ratio		45			
Cost I financing the approved projects			44,7	18,8	25,9

+ 13

Graph 12: Approved projects according to research areas Life Sciences (total 61)



Fishing for molecules

14 +

Quicker discovery of pharmaceutical substances. Small organic molecules are ideal as pharmaceutical active substances. The search for suitable substances is, however, time-consuming and costly. This may be about to change thanks to a new process developed by Philochem AG, which is based on what are known as DNA-encoded small-molecule libraries.

One way the body's immune system responds in the fight against pathogens is by producing antibodies. In order to have a healing effect, the antibodies must be able to bind to one particular protein of the intruder. This is the only way to initiate an interaction. Pharmacists apply this same principle in the development of new pharmaceutical products: Every new substance must fit the target protein, like a key to a lock. Even small organic molecules, such as paracetamol, the active substance used in numerous analgesics, are capable of binding very specifically. In contrast to larger substances, small molecules can also penetrate cells.

The search for suitable molecules is, however, technically very difficult. Until now, it was first and foremost the large pharmaceutical companies that had access to the necessary means to carry out this procedure. They use large-scale robotic systems to test several thousand substances to see if they are suitable for therapeutic use. In a project funded by the CTI, researchers from Philochem AG and a working group from the Institute of Pharmaceutical Sciences at the ETH Zurich developed a novel process which significantly speeds up the search for suitable active substances. "Within a very short time, this process enables us to test more than a million small organic molecules," explains chemist Luca Mannocci from Philochem.

The search for the key to the lock

The basis for this new approach is DNA-encoded small molecule libraries. The idea for this type of library was already in the pipeline in the 1990s; however, the appropriate methods to implement it were not available until now. This gap has now been closed with the new process that has already made it possible for researchers to identify a small organic molecule suitable for use as an anti-inflammatory agent, for example to treat rheumatoid arthritis.

"We select suitable molecules from a large selection of candidates," explains Professor Dario Neri from the Institute of Pharmaceutical Sciences. Researchers create various 'libraries', consisting of over a million organic molecules, and place them together with the target protein in a 0.5 ml Eppendorf tube. Some of the library molecules bind to the target protein, while others do not. Non-binding molecules are removed in the next stage – what remains are the 'keys' that fit the 'lock'. "All we need to do now is find out which molecules are keys," says Luca Mannocci.

Unique identification 'barcodes'

Every single molecule from the library has its own DNA code – similar to barcodes at the supermarket. Each molecule can be clearly identified on the basis of these codes. Given the fact that the libraries are very large and that most often several molecules in these libraries are able to bind to the target protein, several million codes may need to be decrypted in order to identify the corresponding molecules. Mr. Mannocci uses high throughput sequencing to speed up this complex process. He was the first scientist in the world to apply this process, one that had already been wellknown for some time, to the field of DNA-encoded small molecule libraries. His success proved him right. This efficient method now enables scientists to decipher several thousand codes in about a day.

This breakthrough has opened up a promising field of research for Philochem. At present, the process is still in the initial stages. Mr. Neri stresses that “the targeted development of therapeutic substances is not yet an issue”. The current priority is to refine and establish the method. Philochem currently offers services to pharmaceutical companies allowing them to search the small-molecule libraries for active substances for their own target proteins.



The target protein (above right) binds to a small organic molecule, which can be identified by its 'barcode'.
(Source: placed at disposal)

III CTI Enabling Sciences – Interdisciplinary innovation creates new opportunities

16 +

Following a record year in 2009, in which the positive effects of the stabilisation measures could be felt, the number of applications made in the field of Enabling Sciences rose again by a third in 2010. The experts met eleven rather than the usual ten times, frequently discussing over twenty applications at each meeting. In March, they dealt with a record number of 42 applications. In the final three meetings, only about fifteen applications were discussed on each occasion.

The approval ratio of 39% was 9% less than that of the previous year. To a large extent this was due to the stricter application of funding criteria dictated by budget constraints. However, compared with 2009 there was an overall rise in application approvals, from 90 to 98. Only four projects were classed as 'approved but not funded' in the field of Enabling Sciences.

As in 2009, 54 of the approved projects were in Information and Communication Technologies, covering a very broad spectrum. Current trends such as Web 2.0 or Social Media were represented, along with the usual topic of security. The quality of these projects shows that Switzerland is extremely innovative in the ICT sector, even though public awareness of this may not always be particularly high. For example, with CTI support, the Geneva-based company Sensometrix and its research partners are currently developing a biometrics solution, which recognises the blood vessels in the human palm reliably and extremely rapidly. EM Microelectric-Marin, a company belonging to the Swatch Group, is a further example of a highly innovative firm. In conjunction with the Zurich University of Applied Sciences in Winterthur, this company is developing a battery-less remote control device for use in entertainment electronics. Amazingly, this device generates the electricity it uses as it is lifted up from the table.

Of the other main areas covered by Enabling Sciences, three stood out: 14 of the projects approved involved business management and finance, 13 projects involved design and architecture, and 11 projects involved economics, social sciences and health. Public administration

and tourism, and integrated production and logistics each made up a mere three per cent of the projects approved. Another surprising development is the marked rise in design and architecture, economics, social sciences and health projects compared to the previous year. In 2009, just 16 projects were in these fields; in 2010 this figure rose to 24. The figures show that the CTI's close involvement with and support of applicants in these fields who have no previous CTI experience is beginning to bear fruit. First-time potential applicants interested in the possibility of receiving CTI funding are given brief initial advice.

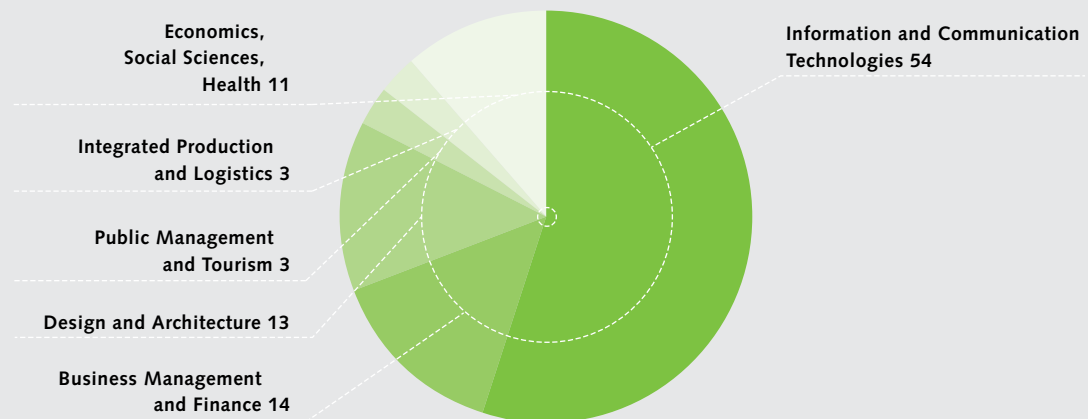
Projects in more creative fields such as design, architecture and art are frequently interdisciplinary and can therefore also be drivers of technical innovation. This is illustrated by the following example from the field of design. In 2010 a CTI project to develop the technology to print colours on fabric in three dimensions was launched jointly by the design department of the Lucerne University of Applied Sciences and Arts, the Institute for Product Design, Development and Construction at the Rapperswil University of Applied Sciences, and industrial partners such as the Oerlikon Saurer machine engineering company and the long-established Jakob Schlaepfer textile company in St. Gallen. Until now, creating plastic colour structures of this kind has required laborious work by hand. This project creates exciting new design opportunities and at the same time, a new technology is being developed. There is still great potential for such innovative projects, particularly in the design field. The CTI wants to increase its work in this area in the coming years and continue to give support to applicants. There will already be much demand for this support in 2011 when the Swiss National Science Foundation's DORE programme, which has promoted similar projects in the fields of health, social work and art and design over the past years, ends in this year. As a result, researchers will most probably turn increasingly to the CTI.

Facts and figures on CTI Enabling Sciences

	No.	%	Project costs CHF million	Federal funding CHF million	Industry funding CHF million
Submitted grant applications	252				
Approved grant applications	98				
Cancelled projects	0				
Project approval ratio		39			
Cost I financing the approved projects			61,1	26,7	34,4

+ 17

Graph 13: Approved projects according to research areas Enabling Sciences (total 98)



The digital business card – Networking 2.0

18 +

Managing contacts and a network takes a lot of time, and it's often time that we don't have. The Poken company could change that. Their digital business card allows you to collect up your contacts and insert them into existing networks on social networking platforms with a simple click of the mouse.

Contact data are often exchanged using a business card. Over time, you collect ever more contacts and it becomes increasingly difficult to manage them. If someone in your network changes jobs, the contact may be lost. To prevent this from happening, Stéphane Doutriaux founded Poken in 2007, a company which received the CTI Start-up Label in 2010. Doutriaux was looking for a way to record and manage contact data quickly and easily, and so his company joined with the School of Business and Engineering Vaud (HEIG-VD) to develop the technology to do this. The technology was then integrated into pokens, small cordless devices which can exchange data when held up to each other. Contacts are saved and managed on a website. A personal profile can also be saved on the site, just like on Xing or LinkedIn. This means contacts are no longer lost when a person changes their address or telephone number. With a click of the mouse, contacts can be integrated immediately into social networking platforms such as Facebook. The system can also be used in programmes such as Outlook.

No substitute for business cards

"We target the events, trade fairs and conferences market. Sponsors or event organisers use pokens as a service to improve their networking," explains Doutriaux. The technology also allows them to collect information on how event visitors network. Most of these are large companies such as Microsoft, BMW or Deloitte. Consultancy firms and event organisers also buy the product. "We are active in about 25 countries and are building up a network of representatives," says Doutriaux. Efficiency is an important aspect when it comes to digital information exchange. It is not necessary to scan or type in a business card after a meeting. However, the intention is not to replace traditional business cards. According to Doutriaux, "Poken is an additional tool which helps you to be better organised and to record who you meet."

Forming contacts

Sophisticated technology is required if information is to be exchanged without a hitch.

"One of the biggest challenges was energy supply," remembers research partner Bertrand Hochet, whose team at the School of Business and Engineering Vaud (HEIG-VD) was responsible for the technical realisation of the new technology. Once contact has been established between two pokens, communication can occur using low levels of energy. Before this can happen though, a device has to identify its communication partner. Establishing initial contact always uses the most energy. "As soon as wireless communication is involved, energy supply becomes an important issue. That's why this detection mechanism was of great interest to us," says Hochet.

New products

Doutriaux is planning further developments with his company. Quite soon he hopes to market new products equipped with the poken technology: "One new product will be in the form of a credit card, which can be used as a membership card, as an example." There are also plans for apps so that mobile phones can be used like pokens. Doutriaux explains his strategy as follows: "We are putting our technology onto a range of platforms so that our service can be used in all kinds of situations."



When held up against each other, pokens exchange data using wireless communication.
(Source: Poken SA)



As well as the challenge of making the device very small, when it came to the technical realisation the issue of energy supply was a big hurdle.
(Source: Poken SA)

IV CTI Micro and Nanotechnologies – A boost for new growth sectors

20 +

The first six months of 2010 saw a continuously high number of applications compared with the previous year. As a result, CHF 13.6 million – a large proportion of the total funding budget – was allocated in the first half of the year. Once the criteria had been tightened and a ranking system introduced due to budget considerations, the figure shrank considerably. Federal funding in the second half of the year amounted to just CHF 8.5 million. Compared to 2009, the amount of grant money awarded declined by a marked 50%. An average of CHF 310,000 was awarded per application, which is also less compared to 2009.

The sectors which benefitted from CTI funding in 2010 were optics and laser technology with 32% of all projects funded, followed by nanomaterials and nanocoatings with 22%, microelectronics with 15% and MEMS with 14%.

Laser technology and associated optic components are international growth markets in which Switzerland is well positioned. In the last few years numerous companies have sprung up which enjoy a successful niche position internationally, and frequently launch innovative products in conjunction with Swiss universities. CTI projects play an important role in this. The number of applications in this field has risen in recent years, and as a result the CTI's team of experts in this field has had to grow.

The Zurich-based company Exalos, founded in 2003, is prime example of a Swiss company active on the global stage in this field. Exalos specialises in Superluminescent Light Emitting Diodes (SLEDs), which combine the advantages of laser diodes and LEDs. SLEDs can be used in navigation systems and in medical imaging, for example. In a CTI project, the company worked with the EPFL to develop the first ever blue SLED. In 2010, Exalos launched the first products stemming from the project.

The nanomaterials and nanocoatings field also enjoyed considerable success in 2010. Although this field had not previously received particular attention, in 2010 about a quarter of approved projects were in this sector.

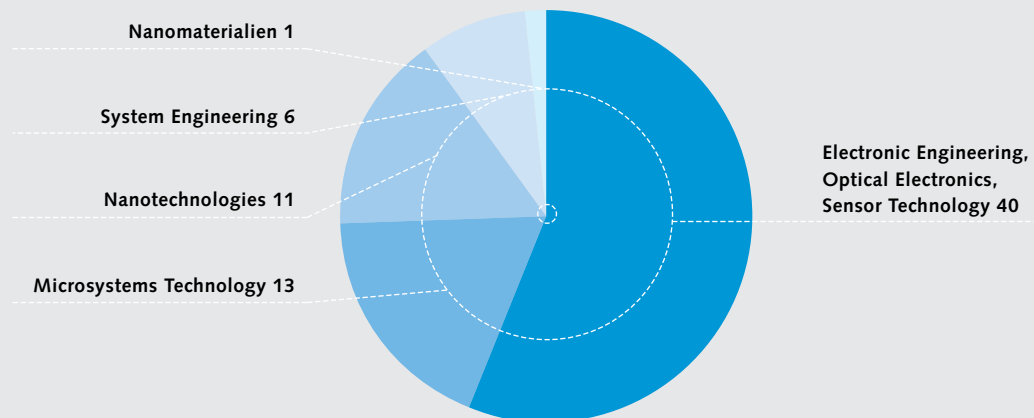
The traditional MNT annual event, 'The Impact of Miniaturization', was not held in 2010, not due to lack of interest, but because the decision had been taken to join forces with the Swiss NanoConvention and hold a combined event from 2011 onwards. The aim is to create a joint forum for interested parties from the fields of microtechnology and nanotechnology and a broad platform where industry and research can meet. This joint event took place for the first time in May 2011.

Facts and figures on CTI Micro and Nanotechnologies

	No.	%	Project costs CHF million	Federal funding CHF million	Industry funding CHF million
Submitted grant applications	143				
Approved grant applications	71				
Cancelled projects	0				
Project approval ratio		50			
Cost I financing the approved projects			52,4	22,1	30,3

+ (21)

**Graph 14: Approved projects according to research areas
Micro and Nanotechnologies (total 71)**



3D-Sound out of the box

22 +

Twenty years ago large stereo systems were a bit of status symbol and enjoyed pride of place in the living room. Today though, consumers prefer small, compact systems which can be easily concealed amongst the furniture, but still produce high quality sound. And that's been made possible, thanks to a microchip.

We associate a really great sound experience with expensive stereo systems which take up a lot of space and have a complicated jungle of cables. But the more recent generations of compact systems can produce high quality sound at an affordable price. The challenge for the manufacturers is to build small devices with loudspeakers that can fill a room with an even quality of sound. "In concert halls, museums or theatres we can achieve the same effect with 3D sound installations," explains Matthias Rosenthal of Sonic Emotion. "We equip the walls of a room with several loudspeakers and so generate wave fronts which create a natural surround sound. You can tell exactly where each sound is coming from." In 2005, Sonic Emotion received the CTI Start-up Label for the first product of this kind.

About three years ago they had the idea of launching this sound experience on the consumer goods market. "It's too expensive to work with lots of different loudspeakers, so we generate a virtual acoustic field from one single device," explains Rosenthal. "We work on the basis of wave field synthesis, a technology that allows you to generate acoustic wave fronts from several loudspeakers arranged in a row." An algorithm computes the audio signals before they are transmitted via the loudspeakers – usually six – contained in a single box. This can be done thanks to a microchip created in a joint CTI-FHNW project. As Karl Schenk, Director of the Institute for Microelectronics at the University of Applied Sciences Northwestern Switzerland (FHNW) explains, the problem was not the algorithm itself: "The real difficulty lay in modifying the existing algorithm so that it could fit onto the microchip and be applied quickly."

Microchip brings advantages

The basic algorithm already existed as software. However, vast computer power is required to run it and this can only be provided by expensive standard processors. Integrating this algorithm into a microchip is an important step on the way to making the product marketable. First of all, a way of making it affordable had to be found. Copyright was also an important criterion. "An algorithm running as software on a processor is relatively easy to copy," explains Schenk. "But it is much harder to copy a chip."

Another advantage of the chip is that it can be built into any kind of device to create a 3D sound effect. As Matthias Rosenthal explains, "Our microchip can be integrated into any kind of device because it can be placed between the amplifier and the signal input." This makes it very easy for stereo system manufacturers to build 3D sound into their equipment. The chip analyses the input signals and disperses the sound evenly in the room via the loudspeakers. The result is a surround sound effect, which sounds the same from wherever you are in the room."

Trendy developments

The first products containing this chip have been available on the market since the middle of last year. Devices made by Lenco, Scott, Pinell, Haier and Coby already use Sonic Emotion 3D sound technology. Matthias Rosenthal sees a lot of potential for the future: "At best, someone might have a large hi-fi system worth over 2000 francs, usually installed in the living room. But perhaps they would like to hear good quality sound in several places – for instance in a child's bedroom, or in the kitchen or car." This is why Sonic Emotion is looking at this kind of application. The top end of the market – which only makes up between ten and fifteen per cent of the total market – will come later. Most end users want good sound quality from a compact device which integrates everything, from DVD player to amplifier to loudspeakers, all in one box. "At the moment, everyone is talking about home theatre in a box and docking stations," explains Rosenthal. "Both of these things will become really popular in the next few years, and that's exactly where we can meet the trend."



The advantage of the chip is that 3D sound can be built into any device.
(Source: placed at disposal)



Lenco equipment already uses Sonic Emotion 3D sound technology.
(Source: placed at disposal)

V CTI Engineering Sciences – High demand in a range of fields

24 +

The spectacular number of project applications submitted and processed in 2009 was exceeded once again in 2010; the number of applications rose from 192 to 249 and the number of projects approved rose from 89 to 113. The numbers could have been even higher, but due to the budget-related tightening of the approval requirements, a ranking procedure left 16 projects 'approved but not funded'. The reduced chances of receiving funding led to a decline in the number of submissions. From up to 25 applications per month at the beginning of the year, the number dropped to a low of only ten in November.

While there was a clear tendency towards grant applications from the mechanical and electrical engineering industry in 2009, there was a more even spread across sectors in 2010, particularly among approved applications.

It was very clear from many of the applications that numerous implementation partners operate in mature business areas, where innovations lead to gradual technological progress. In order to be able to determine objectively just how innovative these incremental changes actually are, the experts made slight adjustments to their assessment criteria. They now increasingly assess a project by looking at whether it will result in long-term differentiation in the marketplace and significant economic success for the implementation partner.

As Engineering Sciences are by definition an applied discipline, there is not always a distinct dividing line between engineering as a service provided by a university for a client on the one hand, and research geared towards practical applications on the other. Over time, criteria have been developed which allow the experts to reach a well-founded decision also in this respect.

To have a good chance of being accepted, a project should demonstrate that it can make an original contribution to the development of a certain technology. As a rule, a proposal is based on the results of earlier research. For this to be the case, a research institute has to have built up know-how in a special field over many years.

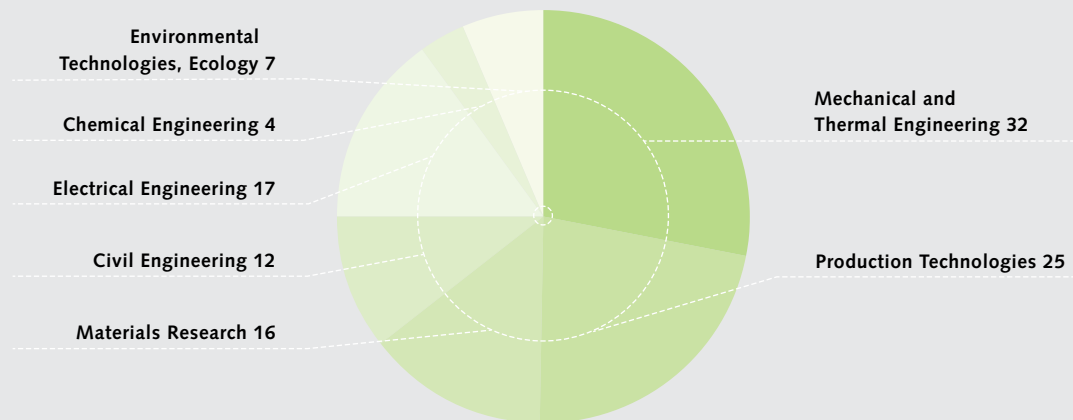
Nowadays, the universities of applied sciences (UAS) are also in a position to carry out highly innovative projects. Over the past few years, they have created efficient structures in a range of disciplines. Well qualified, mainly young engineers now work in excellently equipped laboratories. In addition, the UAS have begun to specialise, and so are increasingly able to build on a body of expertise when developing innovative ideas in their specialised areas.

In 2010, funding for Engineering Sciences was affected when the federal government's second stabilisation programme expired. Initially this led to a sharp increase in applications, followed by a sudden decline. In 2011 the situation should be more stable. The prospects are good, not only thanks to continuing improvements in the UAS, but also because of the convincing innovative activity of Swiss companies, from small firms with 20 employees through to internationally active corporations.

Facts and figures on CTI Engineering Sciences

	No.	%	Project costs CHF million	Federal funding CHF million	Industry funding CHF million
Submitted grant applications	249				
Approved grant applications	113				
Cancelled projects	2				
Project approval ratio		45			
Cost I financing the approved projects			76.8	32.8	44.0

Graph 15: Approved projects according to research areas Engineering Sciences (total 113)



Plasma improves textile quality

26 +

The Swiss textile industry is under considerable pressure to innovate. In order to survive in a highly competitive climate, new products with even better functionality must be developed, while at the same time keeping production costs down.

Modern textiles have a range of characteristics. Sports clothing, for example, must be windproof, transport sweat outwards and prevent the growth of microorganisms so that unpleasant odours cannot develop. Protective clothing for fire fighters has yet other criteria: it must be fire-resistant, abrasion-proof and light and pleasant to wear. Both the textile fibres themselves and their finish are important in determining these characteristics. For example, textiles can be made to be either water-absorbent (hydrophilic) or water-repellent (hydrophobic).

As Peter Eschler, CEO of the Swiss textile manufacturer Eschler, explains: "Because we use synthetic materials so much nowadays, there is a lot of focus on what is known as sweat management: textiles need to transport perspiration away from the body and then dry out again quickly. As synthetic textiles are only partially wettable, they need to be either coated or impregnated."

An extended process

In a CTI joint project, six industrial companies, the Lake Constance nano-cluster and the Empa in St. Gallen developed a dry process based on existing low-pressure plasma technology. With this technique, both water-absorbent and water-repellent textiles can be produced. Peter Eschler explains its advantage over other processes: "Common impregnation techniques are based on fluorocarbons, which are not particularly sustainable. This new technique allows us to create hydrophobic textiles without the use of fluorocarbons."

At the moment, this kind of finishing mainly involves wet chemical processes. But these alter the characteristics of a fabric, such as how it feels to the touch. What is more, the finish is only wash-resistant to a certain extent and a lot of energy and water is used in the coating process.

This is not the case with the dry process: "The coating is only a few nanometres thick and increases the wetting properties of the fabric without changing the textile characteristics," explains Dirk Hegemann from the Empa in St. Gallen. The coating is very stable and closely bonded with the fabric. Clothing made from this material is pleasant to wear and does not become less wettable when frequently washed. "Thanks to the newly developed process platform, plasma technology can now be used economically in the textile industry," Hegemann explains further.

Difficult market situation

This is an important step for the textile industry, even if it is not actually addressing the end consumer. "Functional fabrics are a sated niche market. One big problem is that the end consumer cannot recognise the difference between a high tech product and a cheap substitute," explains Peter Eschler. For the Swiss textile industry, developments like the new low-pressure plasma technique are important, as they keep innovation at a high level. Only in this way can it keep pace with powerful competition from Asian countries.

Although the advantages of the plasma process are clear, it has yet to become established in the market place. The process is still too young and the products made using this technique are barely profitable. However, Peter Eschler is convinced: "Commercial interest will grow. How things develop will depend on demand. Functional clothing manufacturers concerned with sustainability issues will make use of the process." And even if this means just a few manufacturers, we could be looking at an interesting niche market for the Swiss textile industry.



Environmentally friendly plasma technology is an alternative to conventional wet chemical textile processing.
(Source: Empa)



Both water-absorbent (hydrophilic) and water-repellent (hydrophobic) textiles can be produced using the plasma technique.
(Source: Empa)

VI CTI Start-up – Switzerland's best new companies

28 +

The CTI's Start-up support is in great demand. In 2010, 141 company founders submitted applications for the coaching process. Ninety-six of these applicants met the grant funding criteria and 61 start-ups were eventually accepted for coaching, which amounted to 13 per cent less than in the previous year. In spite of the decrease, the CTI's coaches had more than enough to do with more than 230 companies in the coaching process last year, amounting to 30 more than in the previous year. Twenty-four new companies were awarded the CTI Start-up Label. Investors have come to regard CTI coaching and the CTI Start-up Label as an essential quality standard for newly established technology-oriented companies. This is confirmed by Andreas Schweizer from Start-up Finance at the Zurich Cantonal Bank: "We have funded 109 start-ups over the last five years. Around three quarters of these companies have completed the CTI Start-up coaching process." Contact with potential investors is for the most part established through CTI Invest, which is an investor association under private law initiated by the CTI. Under the auspices of this financing platform, 22 start-ups were introduced to investors in Switzerland and abroad last year.

CTI Start-up also works closely with promotional and training establishments in the regions. The experts from these establishments are also employed as coaches. This strategy gives CTI access to an extensive national network, whose actors are regionally based. "CTI Start-up is very important to us," acknowledges Jean-Philippe Lallement, who is himself a CTI coach. Mr. Lallement, President of the Association of Swiss Technology Parks and Business Incubators (SwissParks.ch) and Director of the Science Park at the EPFL (PSE), stresses: "CTI provides our companies with a network where they have access to specialists, experts and know-how providers." Around two-thirds of the 100 companies established at the PSE are either in the coaching process, have received the CTI Start-up Label, or are involved in a CTI applied research project.

Mr. Lallement believes CTI Start-up also plays an important role for new companies seeking to

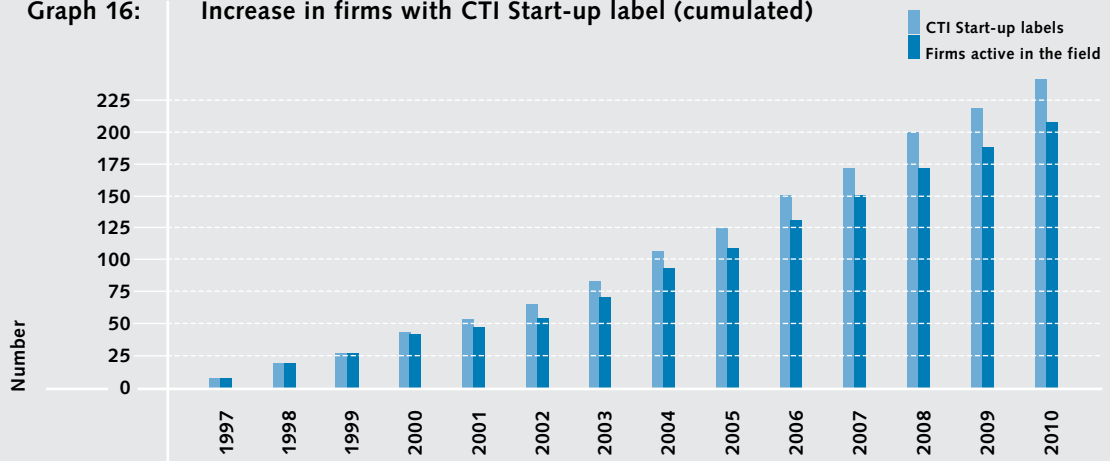
expand their activities abroad. This is particularly true in the United States, where CTI Start-up works closely with the Swissnex network. The Swissnex centres in San Francisco and Boston have enabled 30 young Swiss companies to develop business contacts. Cooperation with the Science & Technology Office Tokyo and Swissnex Shanghai has also made it possible for CTI Start-up to secure a bridgehead in Asia.

The companies funded by CTI Start-up are among Switzerland's best new companies. This is confirmed by the companies having won awards for innovative and new companies. The five winning companies of last year's W.A. de Vigier Prize, namely Aïmago, GreenTEG, Nanotion, Nektoon and Pearltec, went through the CTI coaching programme. CTI start-ups BioVersys, InSphero and Compliant Concept were awarded the Heuberger Winterthur Young Entrepreneur Award 2010, each receiving CHF 150,000. The BCN Innovation Prize of half a million francs awarded by the Banque Cantonale Neuchâteloise was won by InfraSurvey. In addition, Neurimmune Therapeutics won the ZKB Technopark Pioneer Award 2010, and Heiq Materials received the Swiss Technology Award in the Maturity Stage category.

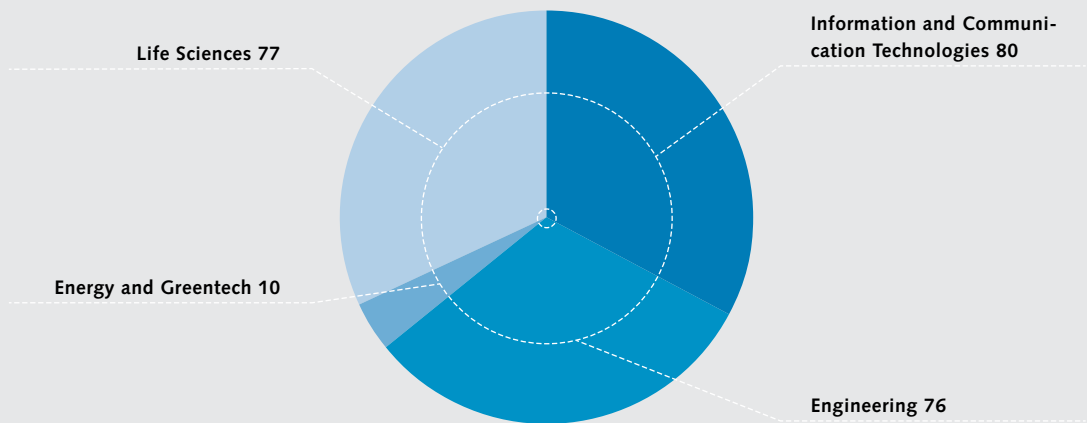
Since 1996, 243 companies have been awarded the CTI Label. Two-hundred and three of these companies are active in business. Twenty-one label companies have been bought out by a corporate corporation or have merged with another company. The companies promoted by CTI Start-up have directly created a total of more than 3500 jobs¹. Synova, Biketec, Svox, Dartfish and Evolva each have more than 50 employees. Hocoma employs 130 people, Anteis more than 150 and Sensirion, whose founders, Felix Mayer and Moritz Lechner, won the Entrepreneurs of the Year Award in 2010, employs more than 200 people worldwide.

¹ For market success rates, capital procurement and job creation see the comparative study of innovative new companies with or without the CTI Label by Prof Pascal Gantenbein et al.: "Die KTI-Start-up-Förderung für innovative Schweizer Jungunternehmen", Faculty of Business and Economics of the University of Basel, February 2011.

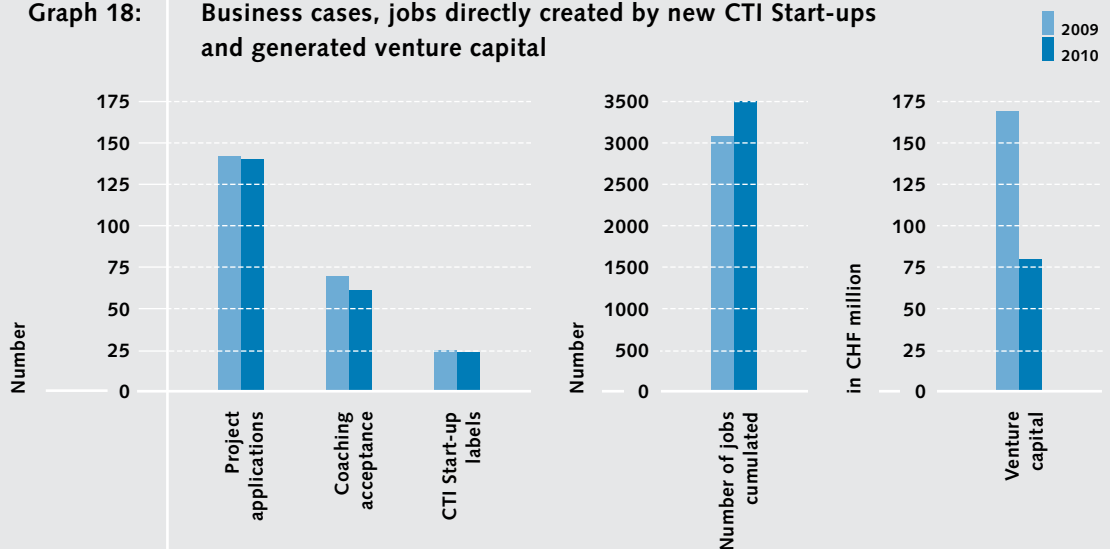
Graph 16: Increase in firms with CTI Start-up label (cumulated)



Graph 17: Firms with label according to sector (total 243)



Graph 18: Business cases, jobs directly created by new CTI Start-ups and generated venture capital



Digital medical assistant

30 +

Blood is the fluid of life. The flow of blood in the body keeps it alive; if a part of the body is cut off from the blood flow, it will die. This is why blood flow visualisation plays a central role in the diagnosis and treatment of numerous diseases and injuries.

Experts were abuzz with excitement when the world's first camera capable of visualising the capillary blood flow to organic tissue non-invasively and in real time was launched in August 2010. The camera was developed by Aïmago, a recently established company in Lausanne, run by Michael Friedrich.

"The field of application," according to Mr. Friedrich, "covers a broad range of areas of medicine. At present, however, we are focussing on plastic and reconstructive surgery." This may include treatment of severe burn wounds to monitoring a skin graft in the reconstruction of a female breast.

The revolutionary camera is called Aïmago EasyLDI. LDI stands for Laser Doppler Imaging and refers to the physical effect used by the camera. The Doppler Effect means that sound or light sources sound or look different depending on how near or far away the observer is. With the EasyLDI, the laser light penetrates the skin, the backscattered light is measured, and when the Doppler Effect takes place, the physician knows that red blood cells are moving and that the vessel is still alive.

"Professor Theo Lasser from the EPFL achieved a decisive breakthrough," says Michael Friedrich. Mr. Lasser developed a technology in his Laboratoire d'Optique Biomedicale that makes the Doppler Effect immediately visible, unlike conventional cameras, which take around five minutes to record an image. The image is sharper because it cannot be clouded by micro-movements in the tissue.

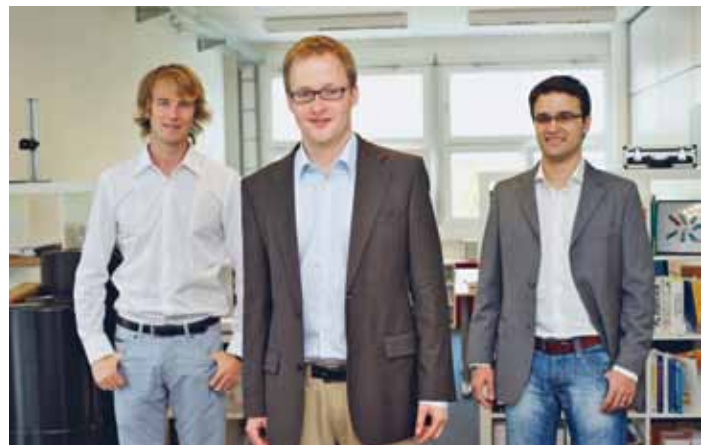
Mr. Lasser filed a patent application for the innovation and looked for a way to turn the intellectual property into a marketable product. In December 2007, he met Michael Friedrich, who had just completed a degree in microtechnology. Mr. Friedrich, who is now 30, was fascinated by the project. He assembled a small team, established Aïmago in August 2008, moved the company headquarters to the Technopark of the EPFL and set about optimising the image processing electronics.

As early as March 2009, as an industrial partner of the EPFL, Aïmago launched a CTI project with the aim of miniaturising the blood flow meter and making it easier to handle in the operating theatre or on hospital wards. The resulting prototypes provided the basis for introducing the product on to the market: the clinical trials were conducted by the university hospitals in Lausanne and Zurich.

At the same time, Mr. Friedrich completed the CTI Start-up coaching process. Looking back, he says, "I regarded our coach, Reto Hartmann, as a key contact person right from the start." With his knowledge of the sector, Mr. Hartmann knew how to ask the right questions and guided participants to solve problems independently.

Building up sales is a good example of this. EasyLDI's global market potential amounts to around CHF 200 to 250 million. With just twelve employees, Aïmago can only provide a direct service to hospitals and special clinics in Switzerland and in neighbouring countries and is dependent on specialised medtech distributors in other countries. The first contracts were concluded and orders received. "This was only possible in such a short time thanks to Reto Hartmann's insider knowledge," explains Mr. Friedrich.

In January 2010, Aïmago conducted a first round of financing and collected CHF 1 million from business angels and banks. "Since then," continues an upbeat Michael Friedrich, "business has been booming."



The Aïmago team: Tyler Thacher, Michael Friedrich and Pascal Harbi (from left to right). (Photo Ben Huggler)

VII CTI Entrepreneurship – Network for continuing education and research

32 +

Never before have so many new companies been entered in the commercial register as in 2010. The slight reduction in entries triggered by the financial and economic crisis of 2009 was soon overcome. The long-term trend towards entrepreneurial independence is continuing. A growing number of providers from a wide range of fields are offering continuing education programmes for company founders to ensure not only that there are enough new companies, but also that these are of a high enough quality. At the same time, an increasing number of scientists are discovering the entrepreneurship theme as a field of research.

CTI Entrepreneurship fully supports efforts to increase the quality and quantity of company start-ups. It further increased its presence and activities in 2010, firstly by raising the number of cooperation partners at the UAS and university level, and by increasing the number of entrepreneurial training providers that it supports. One example of this is its cooperation with the company, Business Tools. This continuing education and training provider conducted one-day public seminars at the ETH Zurich with the support of the CTI.

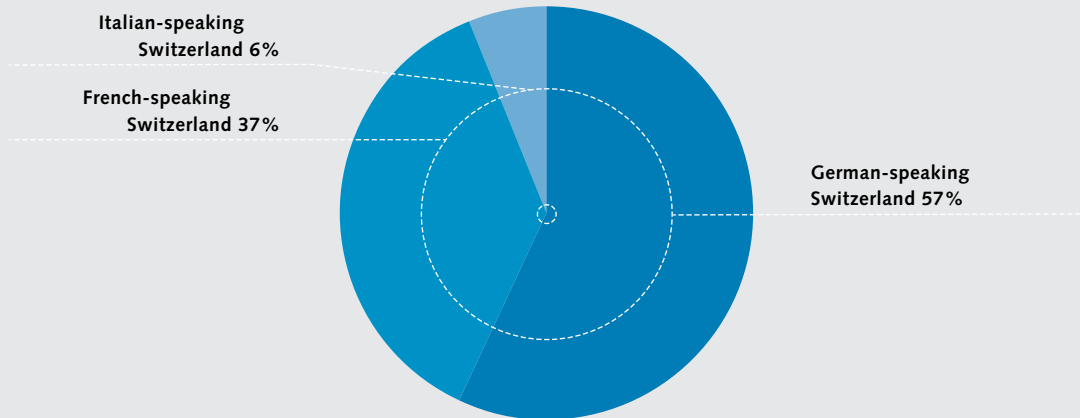
At the same time, CTI Entrepreneurship promotes networking among scientists in the relatively new field of research into entrepreneurship. One of the highlights here was a CTI-supported scientific conference. This was organised by the EPFL together with Babson College in the USA, which is considered to be one of the best addresses in the world for entrepreneurship education. A workshop at the conference presented and discussed research conducted in Switzerland. No fewer than 30 scientists from all regions of Switzerland attended the workshop.

In addition, CTI Entrepreneurship facilitates networking among providers of continuing education and training and runs courses for their lecturers. In 2010, for example, the CTI held a seminar together with the Swiss Research Institute of Small Business and Entrepreneurship at the University of St. Gallen. This annual event provides an opportunity for lecturers to exchange information, thus providing the basis for long-term networking.

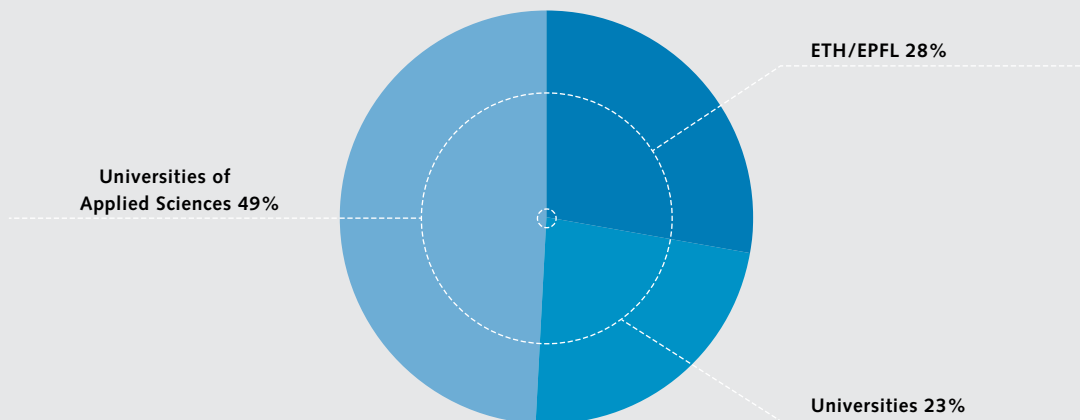
In addition to the financial support for CET providers and researchers, the event in 2010 again focussed on awareness-raising and training as part of the Venturelab initiative. Venturelab plays an important role in the foundation and quick development of science-based start-up companies in Switzerland. In 2010 alone, 55 courses were conducted with a total of 2,050 attendees. Since the beginning of the programme in autumn 2004, 16,370 potential company founders have further developed entrepreneurial projects in the seminars.

The four awareness-raising and training modules 'venture challenge', 'venture plan', 'venture training' and 'venture leaders' accompany young entrepreneurs from the initial formulation of a business idea to the preparation of a business plan capable of attracting investment. A quarter of participants come from universities, the ETHZ and the EPFL. The largest share of participants (around 50 per cent) consists of UAS graduates. Last year the 'venture leaders' module received special recognition. The 20 winners of the annual competition will spend ten days in Boston, where in addition to a few days of seminars, they will most importantly have the opportunity to network with investors, start-ups and industry partners. The programme was originally established by the Gebert Rűf Foundation. It is now part of the Venturelab initiative and was run for the tenth time in 2010. To celebrate the programme's 10th anniversary, the US embassy in Bern organised a reception for all 187 winners at which Ambassador Donald S. Beyer gave a welcoming speech. In addition to the anniversary, the 115 companies created through the competition to date were themselves a reason for celebration. Overall, the new companies have created more than 1000 highly qualified jobs and raised CHF 210 million in growth capital.

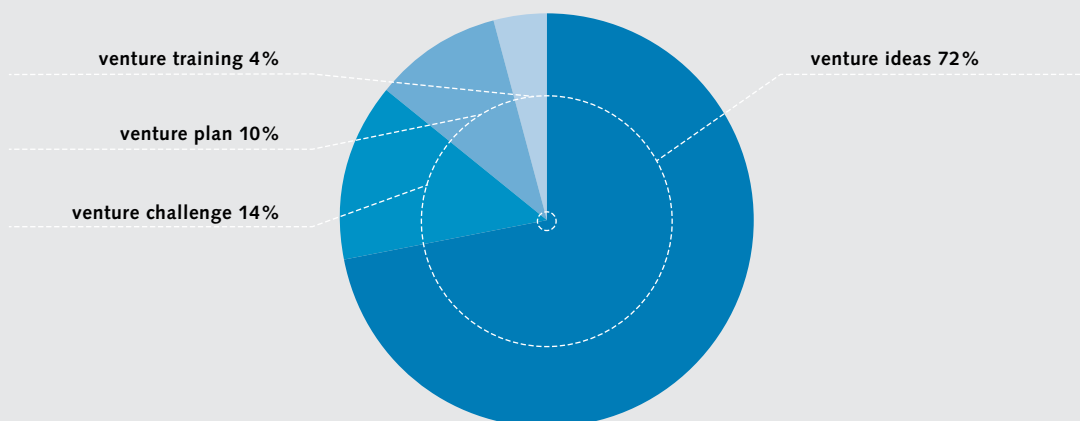
Graph 19: Participating students and Start-ups 2008–2010



Graph 20: Ratio of participants at universities 2008–2010



Graph 21: Ratio of participants at venturelab according to type of course 2008–2010



Start-up brings product to mass market in record time

34 +

Every year, the large electronics companies present their major innovations at the Consumer Electronics Show in Las Vegas.

In January of this year, the Korean company, LG Electronics, which is one of the heavyweights on the market with a turnover of more than USD 50 billion, presented a computer mouse that can also be used as a scanner. Texts can even be recognised automatically and saved directly as text files. The technology for the mouse originated in Zurich from the small ETH spin-off Dacuda.

Not only is this new company's achievement surprising, but so is the timeframe in which the company was created and developed its product. Dacuda was only established in autumn 2008. Before that the founders carried out very different activities. The current CEO, Alexander Ilic, is an economics graduate from the ETH and the Massachusetts Institute of Technology (MIT) in Boston. Chief Financial Officer Michael Born worked for the consulting company Capgemini Consulting. Only Erik Fonseca and Martin Zahnert, who are currently in charge of product development, were already pursuing the idea of a scanner-equipped computer mouse.

The meeting of these four founders was no coincidence. Each was toying with the idea of setting up a business. The technicians, however, lacked economic know-how. Ilic and Born were looking for a highly promising technology-based business idea and a strong team. The Venture Challenge courses of the Venturelab initiative are specifically designed for this type of situation and are attractive to consultants like Michael Born. That is why, in 2008, he and his future colleagues decided to attend a Venture Challenge course. That is where the four founders met and formed a team.

Despite Born and Ilic's experience, Ilic having previously managed a division at an Apple Software company, the course proved very useful, most notably because it provided the opportunity to consult experts. "However, after working together on the business plan for six months, we also knew that the chemistry between us was right," said Ilic, explaining another advantage of the course.

In addition, the team met one of their five investors through Venturelab. Dacuda was fortunate enough to be able to choose its financial backers. In May 2009, the company concluded its first round of financing.

The Dacuda team continued to forge ahead and also received CTI support. The company founders had decided not to produce the scanner mouse on their own, but to license the technology to leading globally-operating corporations in order to capture the largest possible portion of the mass market. CTI coach Ulf Claesson, an IT-Manager with decades of international experience, facilitated contact with major corporations.

The contract with LG is in its early stages. The team is already in talks with other potential licensees. Alexander Ilic met one of them at the Venture Leaders competition. Winners of this prize for company founders are awarded a ten-day trip to Boston, USA. In addition to networking opportunities, the itinerary includes several days of seminars at the renowned Babson College. "We learned a great deal there about team leadership and product positioning for our company," says Ilic. By the time the Dacuda founders had concluded the contract with LG, they had completed the first rapid phase of company expansion. But they are still seeking dialogue with experts and other companies from their field. "As young entrepreneurs, we are constantly confronted with new situations," says Ilic. "So we are happy to hear different opinions before we make a decision. The valuable input from Venturelab has been a great help."



The LG Scanner Mouse's "click and wipe" option allows you to quickly and easily scan various types of content (photos, drawings, text, etc.).
(Source: placed at disposal)



The Dacuda team (from left to right) consisting of Michael Born (CFO), Alexander Ilic (CEO), Erik Fonseca and Martin Zahnert
(Source: placed at disposal)

VIII CTI KTT networks – Competent partners for SMEs

36 +

The CTI introduces new companies to knowledge and technology transfer opportunities on an on-going basis. In 2010 the proportion of companies taking part in a CTI project for the first time was slightly more than 50 per cent. The six regional and two thematic KTT networks play an important proactive role, particularly in approaching SMEs. The network coaches contact companies directly, in particular those with research requirements. They carry out an initial analysis regarding the company's innovation needs and look for suitable partners to work on specific projects in the company. In this way the CTI attracts more, better quality applications. 2010 was also a very busy year for the KTT networks. On average across all the networks, there was a significant increase in the number of contacts formed with companies and in the activities of the KTT coaches.

Firstly, there was a rise in demand for these services which was attributable to the same reason as the rise in the number of CTI applications; many SMEs were aware that the CTI had more money at its disposal and therefore enquired about funding opportunities. Secondly, the CTI launched the Cleantech innovation cheque, a tool aimed directly at businesses which had not yet carried out any innovation projects with research institutions. The innovation cheque encouraged many SMEs to gain further information from a CTI coach.

Besides helping businesses, in particular SMEs, to find the right partners in public research institutions, the KTT networks were also involved in an evaluation and impact analysis of the CTI KTT initiative, a study which was carried out internally. In 2010 the CTI also took part in an OECD cross-institutional review of regional policy and knowledge transfer in Switzerland. These activities form part of a wide-ranging KTT strategy process, which will be completed in summer 2011 when the CTI Board makes its final decisions and the new strategy is implemented. The aim is to integrate the CTI-funded KTT networks into Switzerland's dynamic KTT landscape in the best way possible, thus bringing the greatest possible benefit to the businesses involved.

List of CTI-funded KTT networks

CHost

In KTT CHost a range of research institutions and universities operating in similar fields have joined forces to provide sustained support for the innovative activities of businesses in the east of Switzerland. The University of St. Gallen, the HTW in Chur, the HSR Rapperswil, NTB Buchs, Empa and the Lake Constance nanocluster provide critical resources to the four core fields in the east of Switzerland: textiles, machine engineering, plastics and surface structures. Alongside technological know-how, these include innovation management methods, laboratory infrastructure and an internationally renowned network of experts.

Alliance

Alliance is the Knowledge and Technology Transfer network in the French and Italian-speaking parts of Switzerland (Ticino/transfer). The network includes all higher education institutions (the EPFL, the universities of Fribourg, Geneva, Lausanne, Neuchâtel, the Università della Svizzera italiana, the universities of applied sciences of Western Switzerland and Southern Switzerland), the university hospitals in Geneva and Lausanne, the CSEM and Idiap research institutes and associations such as Swissmem. Alliance puts businesses into contact with scientific institutions in order to facilitate cooperation and technology transfers. Since it was set up in 2005, Alliance has supported over 700 businesses and initiated almost 200 joint ventures.

W⁶

Established in 2006, the aim of the W⁶ network is to strengthen the transfer of technology between universities and the world of business. W⁶ stands for 'Win-Win für Wissenschaft und Wirtschaft durch wirksamen Wissens- und Technologietransfer' ['win-win for science and business thanks to effective knowledge and technology transfer'].

W⁶'s activities are focussed on a few key areas divided into associated specialist fields; Life Sciences/MedTech Biology on the one hand and the Material/Timber/Engineering Sciences/MedTech Engineering on the other, which covers large areas of the technical sciences.

WKNW

The KTT network Northwest Switzerland (WKNW) operates in the cantons of Aargau, Basel-Stadt, Basel-Landschaft, Jura and Solothurn. The WKNW's aim is to strengthen the competitiveness of local businesses by providing them with targeted innovation support. An extensive network of scouts and innovation coaches provides businesses with information and following an innovation check-up, suitable knowledge partners are found for them either in Switzerland or abroad. In some cases, companies also receive follow-up project support. This enables businesses to benefit from the established WKNW network and from its solid links with the regional universities. Affiliated to the WKNW are two independent sub-networks, ITZ and eco.net.ch.

ITZ

InnovationsTransfer Zentralschweiz (ITZ) [Innovation Transfer Central Switzerland] organises knowledge and technology transfer and brings together partners in the WKNW's sub-network for Central Switzerland. This network works with innovation coaches who are not tied to a specific discipline, but can provide any SME with a 'single point of entry' in their immediate region, giving them low-threshold access to KTT, both on a national and international level. In Lucerne and Berne there are also innovation coaches operating in the specialist area of Design Management.

eco-net.ch

eco-net is the Confederation's network for Knowledge and Technology Transfer in the environment and energy field. eco-net brings together business and science in the areas of environmental technology and resource efficiency in order to encourage projects to improve ecological efficiency and business competitiveness.

energie-cluster.ch

energie-cluster.ch is an association with about 500 members, of which about 80 per cent are SMEs operating in the energy domain. The association specialises in technology transfer and coaching in this field, acting as a catalyst and accompanying projects from the initial idea all the way through to the finished product or new service. energie-cluster.ch also organises training courses in a range of areas and on a range of topics, e.g. comfort ventilation, heat insulation, metering or plus-energy houses. Professionals and business representatives are invited to 'energy drinks parties', at which the latest topics are discussed. energie-cluster.ch is also involved in export promotion, organising shared booths at well-known trade fairs in Germany (Hannover Messe), Austria (Energiesparmesse Wels) and Poland (POLEKO). It produces a bimonthly newsletter with a distribution of about 35,000 recipients to inform people of its current activities.

Invisible yet powerful – An easily accessible bacteria collection

Some can break down oil slicks, others allow us to use biomass as a source of energy or simplify industrial synthesis processes; bacteria have a wealth of characteristics which humans can make use of. A national master collection of bacteria has been created in Switzerland in order to protect their genetic diversity and make them available to research and industry.

Scientists at the University of Zurich have isolated purple-coloured bacteria from the back of a healthy midwife toad. These are a strain of the well-known *Janthinobacterium lividum*, a pigment better known in the field as violacein. This substance protects amphibians from a fungal infection which threatens whole populations in certain regions. Violacein also has antitumoral characteristics and can inhibit the growth of some types of cancer cell. Bacteria which produce the pigment are therefore also of interest in pharmaceutical research. Various types of bacteria are able to do this, although the ability is restricted to certain sub-species, known as strains. And among the thousands of species of bacteria in the world, there are numerous strains, all with totally different and interesting characteristics. In order to create a systematic catalogue of this information in Switzerland and make the microorganisms more easily accessible for research purposes, the Zurich University of Applied Sciences in Wädenswil and the Swiss Biotech Association (SBA) have built up a collection of bacterial strains, the 'Culture Collection of Switzerland' (CCOS), with support from the CTI and the Federal Office for the Environment.

A real find

"Research institutes provide us with their bacterial strains, we validate the information given by the research scientists, catalogue the strains and store them at a temperature of -196 °C," explains Martin Sievers, director of the CCOS in Wädenswil. This is the procedure that the strain *Janthinobacterium lividum*, isolated by scientists in Zurich, also went through. It received the code CCOS 423 and can now be quickly and easily ordered by research scientists. Martin Sievers has already received 1500 bacterial strains, and some of these have proved to be real treasure troves. Take the collection of bacterial strains which are resistant to antibiotics, isolated from clinical material by a university professor in the 1970s. "Up until now, hardly anyone has had access to this archive," says Sievers. "Now we have already delivered the first order." A company has used it to validate methods for establishing the presence of antibiotic-resistant bacteria.

Keen interest in the business world

Since autumn 2010 scientists and companies have been able to request the CCOS to send them strains with the characteristics they require. The ball was set rolling back in 2007, when the idea was discussed with representatives from research and industry under the 'Transferkolleg' system at the Swiss Academy of Technical Sciences (SATW).

Cathy Kroll, 'Life Science Industry Leader' in the W⁶ KTT network, took part in this process, her role being to approach companies and advertise the national culture collection project. "Bacteria are a key resource for innovation in biotechnology," explains Kroll. She even managed to convince the Swiss Biotech Association to become the main business partner in the CTI project. For projects like these to be established, providing an active communication link between industry and research is essential. "Companies are already very busy dealing with their daily business. SMEs in particular often lack the necessary resources to look around for new ideas or attempt innovation." This is the role which W⁶ industry leaders take on.

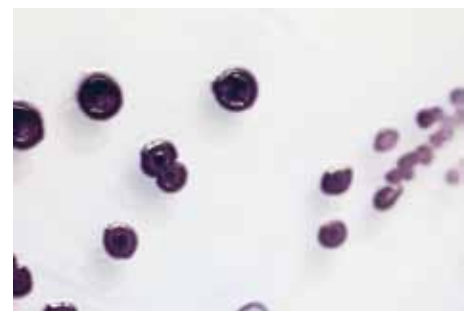
40 +

Preserving genetic diversity

The national culture collection does not just serve scientific and economic interests. Its main purpose is to preserve biodiversity, a task to which Switzerland committed itself when it ratified the UN Convention on Biodiversity. This led to the creation in different parts of the world of several collections which catalogue microorganisms and preserve them outside their natural habitat. Sievers is proud of the fact that Switzerland now also has a centre for the genetic biodiversity of microorganisms and a national culture collection. In Wädenswil, for example, there are 100 bacterial strains which were found in a Swiss glacier by the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL). These will now be preserved for posterity, even though their habitat in the glacier may no longer exist.



In the Culture Collection of Switzerland (CCOS) bacterial strains are stored in liquid nitrogen at $-196\text{ }^{\circ}\text{C}$.
(Source: CCOS)



Janthinobacterium lividum CCOS 423: The bacterial strain isolated in Switzerland produces the purple pigment violacein – a substance which is effective against fungus, viruses and tumours.
(Source: CCOS)

IX CTI R&D networks – Combining the powers of research

In the same way as KTT networks, R&D networks encourage the submission of higher quality projects. Different research institutes pool their know-how, resources and infrastructure into thematic networks; these are also a source of valuable contacts and information on research trends and activities which are of interest in the European context. This provides business partners with an attractive range of clearly defined and relevant topics.

The CTI currently funds eleven R&D networks. The Sustainable Engineering Network Switzerland and the Swiss Institute of Service Science SISS joined the group in 2010. These two institutions represent two fields which are of great importance for maintaining the competitiveness of Swiss businesses.

The first R&D networks were set up in 2007. Three years later they reported on a total of 110 launched R&D projects funded not just by the CTI; in 2008/09 the figure was 72. In 2010, the CTI had funded 48 of these projects (2009: 33), providing a total of CHF 16.5 million in grants (2009: CHF 12.3 million).

Just like the KTT networks, the R&D networks are part of the CTI's strategy development. An evaluation process was begun in 2010; the CTI Board's decisions will be presented in mid-2011, after which the new strategy will be implemented.

List of CTI-funded R&D networks

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www.biotechnet.ch

In biotechnet Switzerland the university of applied sciences faculties in Wädenswil, Muttenz and Sion combine their expertise in research and development, training and CET programmes for the biotechnology industry. They provide access to infrastructure and a wide range of high level expertise in the biotech field.

www.brenet.ch

brenet (building and renewable energies network of technology) is a network established between Swiss universities of applied sciences, research institutes at the ETH and EPFL and private institutions working in building technology and renewable energies. Its role is to encourage a holistic approach to buildings and exert a sustainable influence on the building technology sector, paying particular attention to environmental and economic factors.

www.ecademy.ch

The Ecademy is the national R&D network of Swiss universities, companies and public institutions for creating ICT-supported, sustainable business models and business processes. It combines training, research and practice to promote Switzerland's competitiveness in a globalised information and knowledge society.

www.manufuture.ch

ManuFuture-CH is the Swiss subsidiary of the European ManuFuture platform. Its focus is MEM and related industries. In particular it addresses SMEs looking for contact with other companies in their segment or for development partners. The manufacturing industry is the basis for successful product development in medical technology, biotechnology, the watch industry, precision instruments, microtechnology and nanotechnology, energy technology and the chemical/pharmaceutical industries.

www.netzwerkh Holz.ch

In March 2000 the national competence network of the universities of applied sciences for the wood industry was founded by the Architecture, Wood and Civil Engineering Department of Bern UAS in Biel with 12 partners from all of the universities of applied sciences. The network partners' aim is to work with the wood industry primarily in research and development projects, and thereby deploy the knowledge and expertise of almost 200 specialists in all parts of the country.

www.foodresearch.ch

The R&D network, Swiss Food Research, is a network of publicly financed Swiss universities and research institutes, founded with the objective of promoting the competitiveness of the Swiss food industry and its suppliers. The Federation of Swiss Food Industries (FIAL) is also a member of the network.

www.swisslasernet.ch

Swisslaser Net (SLN) is a not-for-profit organisation which acts as a network of joint vision and growth for the photonics industry in Switzerland. SLN's aim is to improve the competitiveness and growth opportunities of its members by promoting innovation, from science and technology to market launch.

www.swiss.mnt.network.ch

The Swiss MNT Network is an R&D network of public research and development institutions in Switzerland in microtechnology and nanotechnology. It helps industries searching for skills and expertise for their projects to gain simple access to the latest knowledge and supports them in finding original solutions for industrial partners.

www.tourespace.ch

TourEspace is the national competence network for tourism and the lived environment, which operates both on a regional/local level, as well as nationally and internationally. Its objective is to increase the competitiveness of the tourist industry, encourage development in tourism and the lived environment and contribute to the sustainable development of the lived environment.

www.sustainableengineering.ch

The slogan of the Sustainable Engineering Network Switzerland is 'Contributing to the environment with economic success'. This addresses the immediate and long-term sustainable protection of resources. The network operates in an interdisciplinary fashion, providing innovative solutions in the fields of 'environmental product development', 'efficient resource use', 'reducing noise pollution', 'improving air quality', 'increasing drinking water and waste water quality' and 'better use of waste materials'.

www.service-science.ch

The Swiss Institute of Service Science SISS is the competence network for service research, in particular in the field of IT-supported services. It serves the service sector and the Swiss mechanical engineering industry. One of its key functions is to provide a consistent link between the three disciplines of Technology, Economics and Social Sciences by bringing together specialists from the different fields.

Well connected – How projects are set up in networks

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Wood has been used as a material and source of energy since time immemorial. If this important resource is to be used economically in future, innovative solutions are required. This is the aim of the R&D network 'Netzwerkholz'. An example of just such a solution is a new system for joining elements in prefabricated timber constructions.

"I can see huge optimisation potential for joining prefabricated wooden elements," explains Max Renggli to his collocutor during dinner at the annual Netzwerkholz winter conference. As CEO of Renggli Holzbau AG, he knows where the practical challenges lie in modern timber construction techniques. His discussion partner, Andreas Müller, listens carefully as this touches on his area of research. As head of the Wood and Composite Construction research unit at the Architecture, Wood and Civil Engineering Department of Bern UAS in Biel, he recognises the problem immediately: it is becoming more and more common for wooden buildings to be constructed from prefabricated elements. The increasing degree of prefabrication and ever larger construction panels mean greater demands on the technology used to join these elements.

Sparking off ideas

The research scientist, Müller, and the practical man, Renggli, continue their discussion over dessert, analysing the problem and suggesting initial ideas. The project begins to take shape in their heads. "If it weren't for Netzwerkholz, the spark for this idea may never have been set off," Andreas Müller is convinced. The research institutes of eight universities of applied sciences, Empa and the ETH in Zurich have come together in this CTI-funded R&D network. Their aim is to actively encourage Knowledge and Technology Transfer between research and business. A group of representatives from the timber industry and other associations helps to form a link with the practical field. "Events such as the winter conference provide a platform where we can exchange news and ideas, find research and implementation partners and launch projects," explains Thomas Näher, director of Netzwerkholz.

Project launch in the network

Shortly after their informal discussion takes place, Max Renggli and Andreas Müller meet at a Netzwerkholz workshop to draw up the 'Innovation Roadmap 2020' for the Swiss timber industry. The discussion confirms that joining techniques in prefabricated timber constructions present a challenge. This helps to get the project under way; in further workshops, the project idea becomes more concrete, the initiators formulate a research project and, via Netzwerkholz, rapidly find the research institutes with the required know-how. Renggli AG encourages other partner companies to join. The result is a CTI project with three research institutes and four industry partners.

Huge economic potential

Five years have passed since the two men met. Since then, the three-year CTI project 'Development of new joining systems for timber construction' has been completed. A patent application has been filed for a new technique for locking wall elements together; an adapted mortar pump for the joint between concrete or brick and timber constructions has been developed, as well as innovative joint profiles. The complete joining system should be in use from autumn 2011. "The new technique overcomes the problems associated with current methods, such as the formation of cracks in the

interior wall cladding,” explains Andreas Keller, project manager at Renggli AG. “This new solution allows us to join elements quickly and easily on site. Some of these new systems are even cheaper than those currently available.”

Targeted research

Numerous innovation projects have already been successfully launched and carried out via Netzwerkholz. The ‘Innovation Roadmap 2020’ ensures that the Swiss forestry and timber industry has a targeted strategy for research and development. This roadmap was set up by Netzwerkholz in conjunction with the Federal Office for the Environment (FOEN) and the Swiss timber industry’s umbrella organisation, Lignum. “In a process involving several stages we have worked with over 50 representatives from research and industry to draw up, evaluate and prioritise strategically important research topics,” explains Näher. Among other things, this work gave rise to the new ‘Resource Wood’ national research programme (NRP66).



Six-storey timber construction in Steinhausen, made from prefabricated elements.
(Source: Renggli AG)



More and more frequently, timber constructions are being built from prefabricated elements. A high quality joining technique is essential.
(Source: Renggli AG)



Production of a prefabricated wooden element.
(Source: Renggli AG)



As part of the CTI project, a new locking technique was developed, for which a patent application has been submitted.
(Source: BFH)

X CTI Diversity Management – Diversity is a key factor for innovation

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Thanks to its highly qualified workers, Switzerland is a world leader in innovation. Part of the innovation potential remains untapped, however, due to the lack of women's participation in science and industry. Generally, women are not sufficiently involved in the innovation process. This is also reflected in the promotion of applied research and science-based innovation by the CTI.

The CTI has set itself the goal of fostering diversity in its core activities. It aims to create a favourable environment for female entrepreneurs and researchers and increase the number of female experts and coaches at the CTI. To this end, the CTI set up the Diversity@CTI project two years ago.

Since 2006, the proportion of female researchers at universities involved in the CTI-funded R&D projects with universities and business partners has increased by two per cent, from 7.6 to 9.7 per cent. Last year, however, there was a slight decrease compared with the previous year. In 2009, the proportion of female researchers was still at 10.6 per cent. The participation of women in industry in comparison to 2009 remained stable at slightly over 7 per cent. These values are still low in international comparison.

A breakdown by discipline does, however, reveal differences. The most significant change can be seen among female economic partners in the field of micro- and nanotechnology. Here the proportion of women has increased by a good three per cent. Results show that the proportion of women in the areas of enabling sciences and life sciences are higher as last year. The proportion of women in fields such as social work, health care, pharmacy and biotechnology is generally higher.

Of a total of 141 applications and 368 team members who participated in a CTI coaching programme, the proportion of women was nine per cent.

The proportion of women in CTI expert teams remained unchanged compared to the previous year, at 15 per cent for R&D project promotion and 10 per cent for start-up coaching, including the Coaching Certification Board.

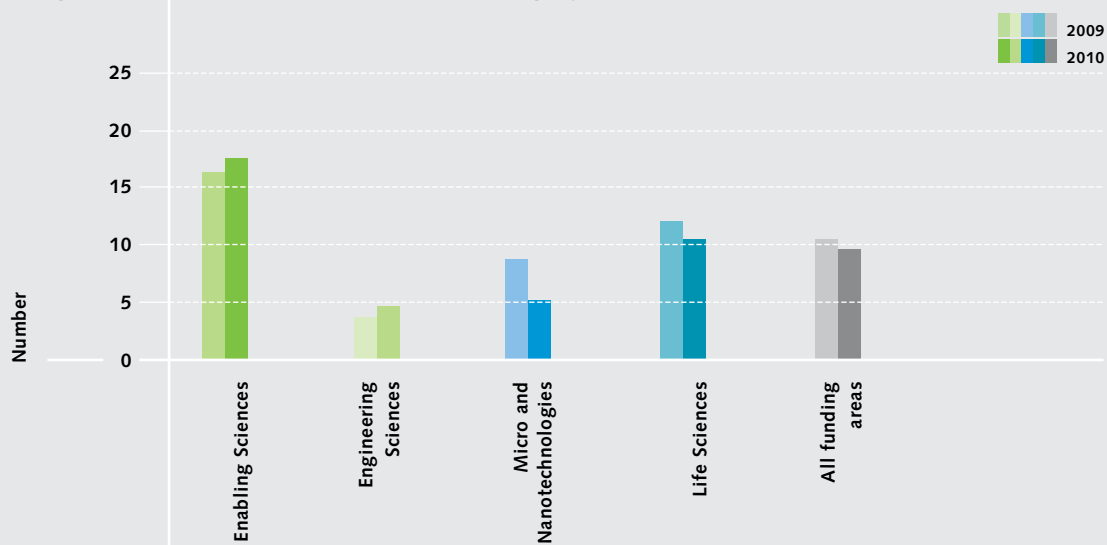
In addition to information and networking events, new communication media were used to raise awareness of the CTI funding programmes among women and to motivate them to participate.

In spring 2010, an event entitled 'women@venture' was organised at the Venture 2010 Business Plan competition. The aim of this event was to encourage women to participate in the competition and provide them with the necessary information to set up a company of their own. A networking event on CEO Day 2010 in Bern in October 2010 was also organised by Diversity@CTI. Both events were met with enthusiasm. The CTI has also become a member of the European Center for Women and Technology (ECWT), in order to expand its network at European level and to facilitate the exchange of information and experiences with other countries.

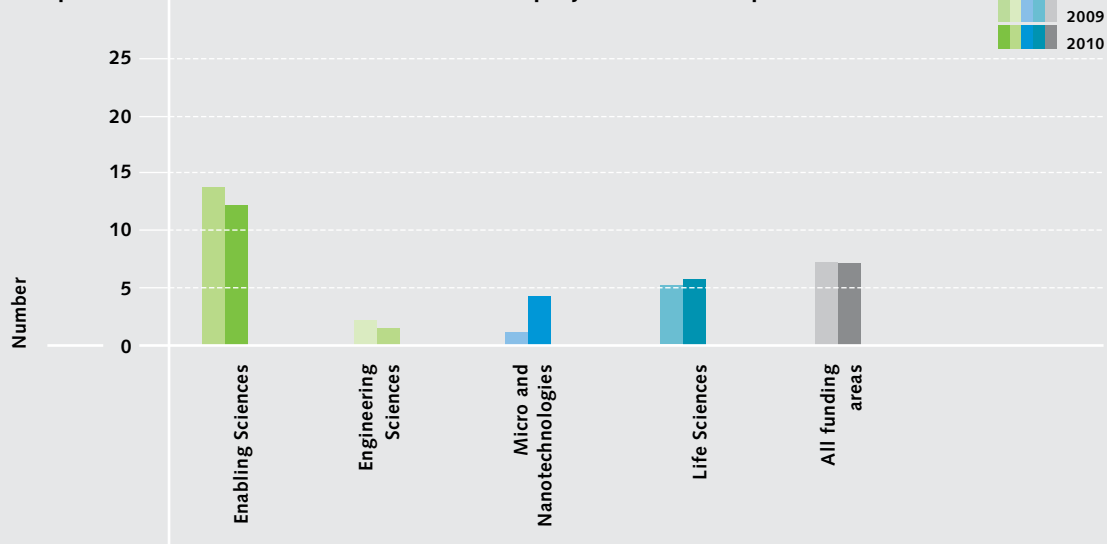
Diversity@CTI uses the Web 2.0 networking platform XING as one of its means of communication. Members of the Diversity@CTI group can exchange information and take part in discussions online.

The CTI will pursue its existing strategies and measures in the coming years. The promotion of gender equality leads to better gender diversity and thus also boosts innovation. The CTI intends to continue fostering diversity by increasing the number of female researchers, inventors, experts and coaches.

Graph 22: Numbers of women in R&D projects (research institutions)



Graph 23: Numbers of women in R&D projects (business partners)



The instruments of the Innovation Promotion Agency CTI

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R&D Promotion

The CTI stimulates cooperation between science and industry through the annual financing of several hundred projects in application-orientated research and development. It thereby helps those scientists who wish to jointly convert their research results into successful products and services in cooperation with companies.

CTI Start-up

Young entrepreneurs often have inspiring ideas but frequently lack the experience to set up a successful company. That is where CTI Start-up comes in. In a four-stage process, around 50 experienced coaches are available to support the start-up and help them on their way to becoming their own company and positioning themselves on the market. Those that make it through the tough coaching process can claim the CTI Start-up label, which marks the young company out as being ready for sustainable growth or venture capital financing.

CTI Entrepreneurship

With its Entrepreneurship initiative the CTI helps to establish a culture, which encourages entrepreneurial spirit and develops risk tolerance. Venturelab offers young entrepreneurs a set of modular services to help them on their way to independence. The spectrum ranges from motivational events (venture ideas), to semester courses (venture challenges) and five-day instruction on strategy development (venture plan) to venture training, where participants optimise their business plans.

R&D Networks

As collaborations between universities and industrial partners in R&D networks often result in highly innovative outcomes, the CTI provides targeted support to R&D networks. These networks offer quick and straightforward access, particularly for SMEs, to the latest knowledge from public research institutions and smooth the way for them to conquer new markets.

KTT Networks

KTT networks have been available to interested firms throughout Switzerland, predominantly SMEs, since 2005. They stimulate knowledge and technology transfer by enabling contact to research institutions and access to specifically required university knowledge via expert consultancy. The KTT networks therefore work closely with the R&D networks.

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Abbreviations:

LS/MD (Life Science/Medical Devices)
ICT (Information & Communication Technology)
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