



CTI – Start-up and Entrepreneurship,
R&D Funding, KTT Support

A successful final year for the CTI.

Activity Report 2017







Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
Commission for Technology and Innovation CTI
Innovation Promotion Agency

From 1996 to 2017 the CTI was the Swiss Confederation's funding agency for innovation. By providing advice, networking opportunities and funding, it supported economic growth based on scientific research in order to create a strong Swiss economy. The organisation has continued to support science-based innovations in Switzerland under the new name of Innosuisse and with a new organisational structure since January 2018.

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Foreword

Innovation funding has a long and important history in the Swiss economy. As early as the 19th century, the newly formed country represented fertile ground for entrepreneurs. Towards the end of the Second World War, the seeds of today's programme of innovation funding were sown at a federal level. Over the decades, the Federal Council and the Federal Parliament have periodically modified the form and content of the programme, but always with the same aim in mind: converting scientific findings into economic value. Innovation projects involving companies and research partners lie at the heart of the activities today, as they did in the past.

Since 2011 the Commission for Technology and Innovation (CTI) has been an independent executive commission. Six teams of people were responsible for the funding instruments, supported by the Secretariat and by coaches and mentors for start-ups and SMEs.

In 2016 the Federal Council and the Federal Parliament decided that the organisation needed to take a new evolutionary step forwards. At the beginning of 2018 the CTI became Innosuisse, a public law entity.

What have been the organisation's main experiences over the last few years as a commission?

I spoke to many partners of the CTI and found out which features of our funding activities they most valued. These included rapid decision-making; responsible and helpful experts who could be contacted in person and provided guidance during the projects; individually tailored support for start-ups with decisions made immediately after the discussions; and experts with extensive networks who guarantee start-ups in particular the opportunity to work closely with other players.

In management terms, the key issue was to make the best possible use of the skills of the funding teams in the scientific fields and in the art of innovation management and to increase the motivation of the team members. The primary aim was to implement the clearly defined legal funding mandate, but also to develop funding instruments further.



Walter Steinlin, CTI President

The result was a management culture which is sometimes described as "EEE": enable, empower, enforce. This is very different from the "CCC" culture: command, control, correct.

"Enabling" meant equipping the members of the commission to carry out their independent work as efficiently as possible, as well as providing comprehensive information, helping with organisational issues and preparing for and following up on activities. This included selecting new team members not only on the basis of their technical skills, but also their ability to work in a team.

“Empowering” meant delegating decision-making to the greatest possible extent to the team meetings for decisions on applications, to the team members for on-site visits and to the special panels for their sphere of responsibility. This obviously also involved taking responsibility for the decisions that had been made and their consequences.

“Enforcing” meant applying the basic rules for dealing with subsidies – transparency, no hint of bias, the term of office – even if they sometimes ran counter to the direct innovation funding.

My experience of this culture was the huge commitment and sense of responsibility of the commission members, coaches and innovation mentors. The team meetings involved open and constructive debates, corrections, improvements and additions, which meant that individual opinions very quickly developed into well-informed, coordinated decisions. These were often very different from the original proposals.

My experience of the Energy funding programme at the Swiss Competence Centres for Energy Research (SCCER) was very similar. Here there was a multi-disciplinary innovation dynamic based on considerable respect for the researchers, but also consistent formal and process regulations, which will strengthen national energy research in the long term beyond the CTI era.

In 2017 for the first time we carried out a systematic assessment of the economic impact of the funding instruments. As we expected, the results were very difficult to quantify. However, they included a lot of information about funding partners, who were fundamentally satisfied, and the varied effects of the funding instruments. Of course we also received feedback about weak points and problems with the collaboration. Despite the best intentions and despite the responsibility taken by the decision-makers, there were some decisions which in retrospect should have been made differently. For this reason, the discussions with disappointed applicants were also important. They led at least to a better understanding and sometimes even to new or improved applications.

Innovation funding is and will remain an art. With its culture and its lean processes, the CTI made the best possible use of the money entrusted to it by showing a great deal of commitment and initiative. We helped to ensure that knowledge was turned into value for the benefit of our country.

I would like to thank everyone who has been involved so far and to give my best wishes to the people responsible for the new organisation. We handed over our funding mandate to Innosuisse on 1 January 2018.

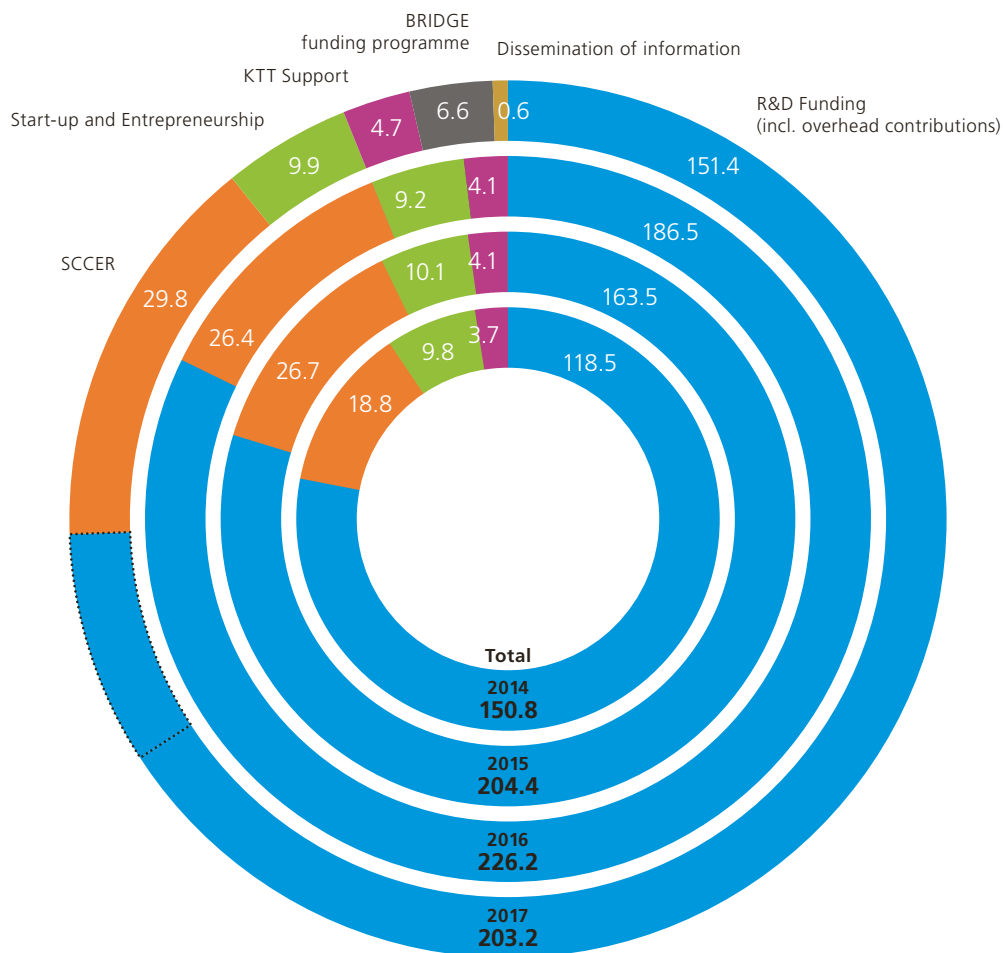


Walter Steinlin
CTI President

In focus

CTI Funding in 2014–2017

in CHF m



Since 1 January 2017 the CTI has been legally obliged for the R&D projects to pay a standard contribution to the indirect costs (overheads) of all the research institutions. The overhead contributions are calculated as a flat-rate percentage (in 2017: 15 per cent) of the staff costs.

“We launched the new organisation and continued the CTI funding activities on a high level.”

Annalise Eggimann, what was your personal experience of the final year of the CTI?

It was an extremely busy year. We launched the new organisation and, at the same time, we continued the CTI funding activities on a high level. I was very pleased with the hard work and commitment shown by everyone involved. But now I'm happy that Innosuisse is really getting off the ground.

What were the funding activities like in the field of R&D?

Given that once again it was a year without special measures, the level of interest was very high with 823 applications. Because the CTI was being transformed into Innosuisse, applications could only be submitted up to 3 November. We received almost 100 applications in October and nearly 200 during the first three days of November. All the applications were still processed under the aegis of the CTI. Although this final rush to submit applications indicated that there was a last-minute panic among applicants, they did not need to worry. Innosuisse has the same mandate as the CTI and the project funding in particular will continue almost unchanged.

What were the main activities in the field of start-ups in 2017?

As in the previous year around 200 start-ups are receiving coaching. The CTI Start-up Label was awarded for the last time in November. Since the beginning of the scheme in 1996, 418 companies have received the label. One new development is that in

future the coaching will take place in three phases: initial coaching, core coaching and scale-up coaching. We will give start-ups a voucher for coaching services and they can select their coach from a pool of experienced entrepreneurs. This is also a new process, because coaches were simply allocated in the past.

What are you expecting to happen as a result?

The new legal provisions give the start-ups more responsibility. They can choose a coach to meet their specific needs, but they are also more accountable for their personal progress. We also expect that the more obvious competition between the accredited coaches will help to increase quality levels.

“Innosuisse has the same mandate as the CTI.”

Annalise Eggimann, Director of the CTI and Chief Executive Officer (CEO) of Innosuisse

And the training modules?

They are going well and the modules that can be selected individually have proved to be very popular. The five-day modules 3 and 4, which we put out to tender in 2017, will run on an industry-specific basis from 2018 onwards.

What has been happening in the field of knowledge and technology transfer?

The proportion of R&D projects set up by innovation mentors and approved

by the CTI increased significantly compared with 2016 (from around 28 to 37 per cent). The National Thematic Networks (NTN) continued to play a key role. The proportion of approved R&D projects submitted by NTN was 14 per cent, which is slightly below the level in the previous year. The three new NTN for additive manufacturing processes and Industry 4.0, the digital economy and interactive and imaging technologies have begun work. The eight existing networks have successfully started their second period.

The aim in the field of energy is for the competence centres to take a more interdisciplinary approach to working together. Why is this?

During the first funding period, the

Swiss Competence Centres for Energy Research (SCCER) succeeded in establishing a nationwide research network. This is a significant achievement, because previously the individual players generally worked in parallel with one another rather than carrying out joint research. In order to achieve an even greater impact, the universities, federal institutes of technology and research institutions now need to increase their interdisciplinary cooperation. For this purpose, six common



Annalise Eggimann, Director of the CTI and CEO of Innosuisse

projects across the SCCERs have been started, which are known as the joint activities.

What about international cooperation?

The CTI laid the foundations to allow Innosuisse to put greater emphasis on international cooperation. In the En-

terprise Europe Network (EEN) the preparatory work has been carried out to enable Innosuisse to take over the operational management of the Swiss Secretariat alongside the strategic management. In 2017 Switzerland became fully associated with Horizon 2020, which opens up new funding opportunities for SMEs. We

will help them to continue to exploit these opportunities in future with an above-average success rate.

The BRIDGE funding programme was only launched in 2016 ...

... but there is already significant demand for its services. The programme, which is at the interface between basic research and scientific innovation and complements the funding from the Swiss National Science Foundation (SNSF) and the CTI, seems to have bridged a genuine gap. We are seeing an incredibly high level of demand for both the BRIDGE instruments. The SNSF and Innosuisse need to investigate what impact this very pleasing situation will have on their ongoing cooperation in this area.

Did Innosuisse get off to a good start? Where will you be putting the emphasis in the first year?

The initial period has been very successful and everyone involved is highly motivated, but there is still a lot to do. The first year of Innosuisse will obviously be a year of consolidation. The new structures and processes need to become established and some fine-tuning may be required. We also have to put together a pool consisting of the right number of experts with the ideal technical skills to ensure that funding applications are assessed quickly, objectively and to a high standard of quality.

Moving forward with Innosuisse

On 1 January 2018 Innosuisse, the Swiss Innovation Agency, replaced the CTI. It is continuing to fund science-based innovations with the aim of increasing the innovative ability of small and medium-sized enterprises (SMEs) in Switzerland.

Innosuisse intends to give SMEs easy access to the knowledge and resources of research institutions. In particular it plans to fund projects with a very high level of innovation potential. Its aim is to encourage SMEs to take calculated risks and approach challenges in a disruptive way. Innosuisse will also open up new prospects for SMEs by promoting innovative business models and entering into international partnerships. Finally it intends to strengthen the Swiss start-up ecosystem.

Digitisation will play a key role in maintaining and creating jobs with significant added value and in increasing our prosperity. For this reason Innosuisse is paying particular attention to the challenges in this area.

The Board of Directors is responsible for the strategic management of Innosuisse. The board consists of seven members and provides Innosuisse with strategic direction in accordance with the objectives of the Federal Council. It selects the members of the Innovation Council and chooses

the experts at the suggestion of the council. Finally the Board of Directors submits an annual report to the Federal Council covering the use of the funding budget and the results that have been achieved. As a specialist body, the Innovation Council is answerable to the Board of Directors. The council makes decisions about funding applications and draws up proposals for the funding strategy and instruments. Selected experts help it evaluate applications and support projects.

The executive members of both bodies contribute their valuable professional expertise to Innosuisse. Coaches and mentors who have been accredited by Innosuisse make their specialist knowledge available to start-ups and other companies. Together with the employees in the Secretariat, the five-member Executive Committee prepares the business to be dealt with by the board and council, executes their decisions and is responsible for finances, reporting and controlling.

How Innosuisse can help you



START YOUR
INNOVATION PROJECT

Would you like to start an innovation project?

Innosuisse primarily funds innovation projects run jointly by companies and research institutions. SMEs can investigate the feasibility of their ideas with the innovation cheque. Innosuisse also funds high-risk projects with a high degree of innovation run by researchers who do not yet have a partner to implement the results of their project.



START AND GROW
YOUR BUSINESS

Would you like to set up a company?

Innosuisse provides targeted training courses to encourage an entrepreneurial approach among the next generation of researchers and businesspeople. It also offers expert support in the form of individual coaching for start-ups and for people interested in setting up a company. Experienced coaches provide help and support during the process of establishing and developing a company and achieving lasting growth.



BE CONNECTED

Are you looking for the right partner?

Experienced mentors can give SMEs help in setting up innovation projects and identifying a variety of funding instruments. Innosuisse also supports eleven National Thematic Networks (NTN) and themed specialist events which bring SMEs and research institutions together.



GO GLOBAL

Do you want to move into international markets or find partners in other countries?

Start-ups have the opportunity to test their product or business model in Market Entry Camps outside Switzerland and to develop a local network. Innosuisse also gives companies easy access to international research networks and manages the Enterprise Europe Network (EEN) in Switzerland.

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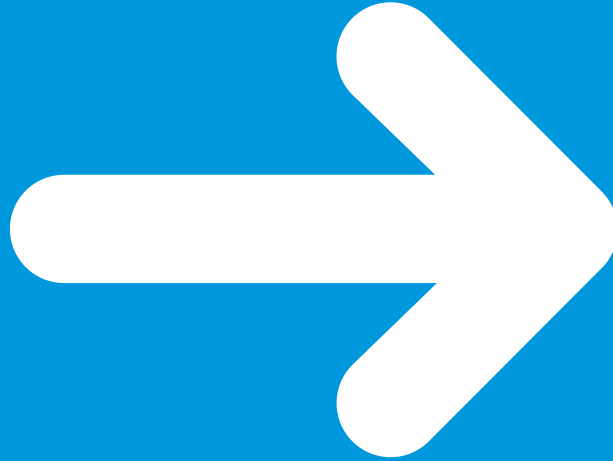
For information about
Innosuisse, visit
www.innosuisse.ch



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Innosuisse – Swiss Innovation Agency

R&D Funding



**Digitisation – the
latest megatrend.**

Artificial intelligence and self-learning software



Dr Martin Riediker
Head of the Engineering Sciences funding area

Self-learning machines are becoming increasingly common in industrial environments. Many projects are underway that involve self-learning software, self-regulating machines, failure prediction and proactive planning of maintenance. An intelligent combination of expert knowledge and self-learning algorithms can lead to shorter downtimes and greater reliability. At the same time, robots are increasingly often working together with people, which means that the robots need to become more intelligent. Huge progress has also been made in the field of additive manufacturing with metal powders, for example in the aviation industry and the dental sector.



Dr Matthias Kaiserswerth
Head of the Enabling Sciences funding area

In 2017 we saw unstoppable growth in the field of digitisation in this funding area. Our IT experts acted as presenters or co-presenters in the assessment of around 70 per cent of the applications (including those in the areas of health and management). An increasing number of artificial intelligence methods are being incorporated into many of the projects that are the subject of funding applications. The applicants expect this to give them a significant competitive advantage and believe that it offers the potential for defining new business models for their companies.



Prof. em. Beda Stadler
Head of the Life Sciences funding area

The Life Sciences funding area was established 15 years ago to support the medtech industry, which in the meantime has become a major contributor to GDP in Switzerland, and the biotech sector, which is no longer in its infancy. The projects that have been funded have probably generated added value that exceeds the funding budget several times over. Many of the CTI projects will continue for a few years to come. Some of them, however, are already showing signs of success that Innosuisse will benefit from in the future.



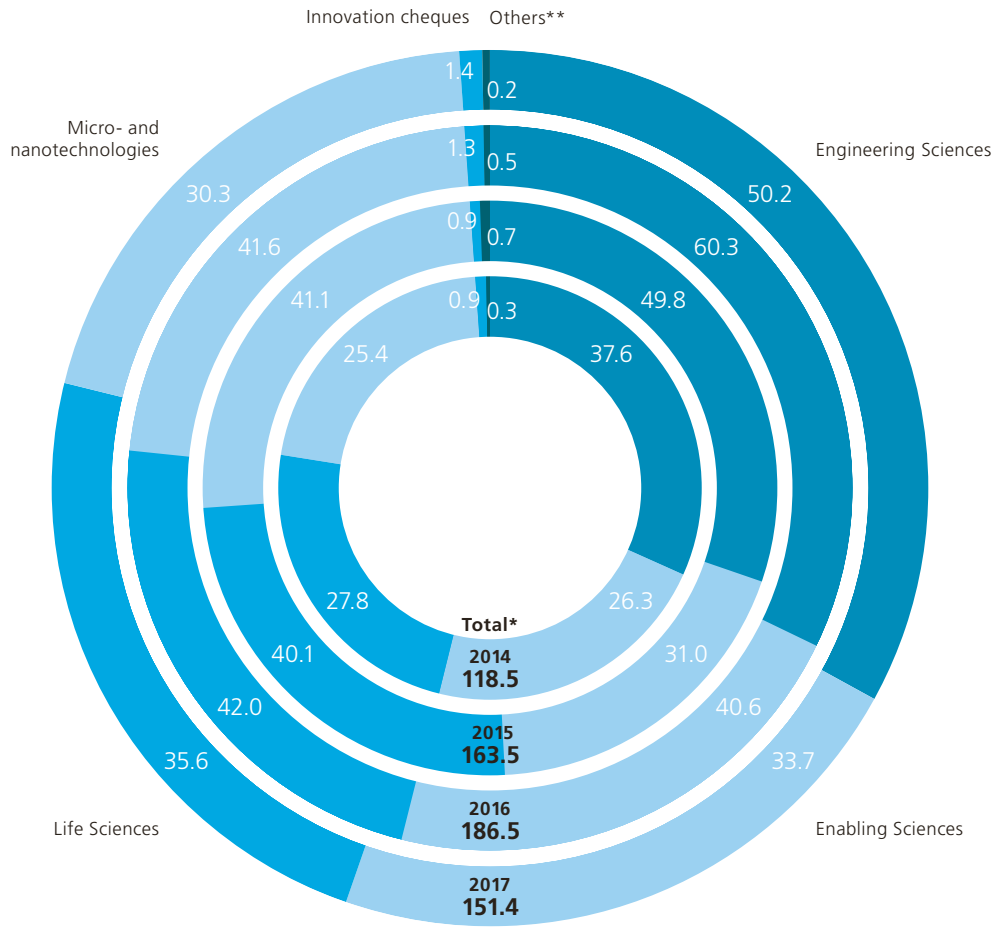
Dr Raymond Zehringer
Head of the Micro- and Nanotechnologies funding area

Additive manufacturing is an exciting new field in the area of laser technology. If targeted use is made of the energy in a laser in the production process, it can significantly improve the structure and mechanical properties of a product. In the field of micro-electronics, Switzerland has extensive expertise in designing microchips, for example for communication technologies. This makes a decisive contribution to added value, despite the fact that production primarily takes place in the Far East. Projects relating to the Internet of Things, which involve data transmission and networking, for example, continue to be of great importance.

The figures include standard R&D projects and overhead contributions.

Federal funding for R&D Funding in 2014–2017

in CHF m



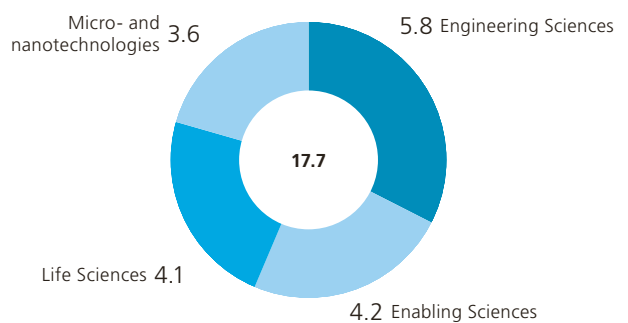
* 2015: including federal contributions for special measures to compensate for the strong Swiss franc amounting to CHF 36.2 million

2016: including federal contributions for special measures to compensate for the strong Swiss franc amounting to CHF 82.7 million

2017: including overhead contributions of CHF 17.7 million (see adjacent diagram)

** 2014–2017: platforms (Medtech, Biotech, Nanotech, Swiss Innovation Forum), SATW Transferkolleg, increase in salaries of PhD students (2014 only)

Share of overhead contributions in R&D project funding in 2017 in CHF m

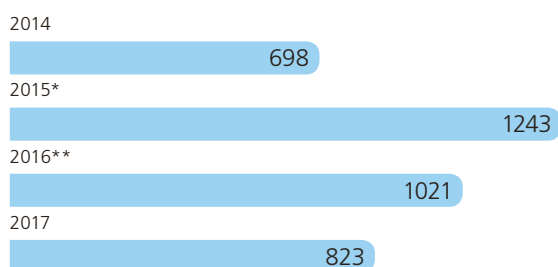


The figures include standard R&D projects and overhead contributions.

R&D project funding applications received 2014–2017

Almost 100 of the 823 applications were received in October and almost 200 on the first three days of November (the submission deadline for projects was 3 November 2017). All the applications received were assessed in 2017.

Number of applications received

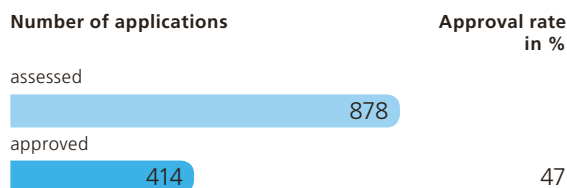


* including 293 funding applications received as part of the special measures for the strong Swiss franc in 2015

** including 338 funding applications received as part of the special measures for the strong Swiss franc in 2016

R&D project funding applications assessed and approved in 2017

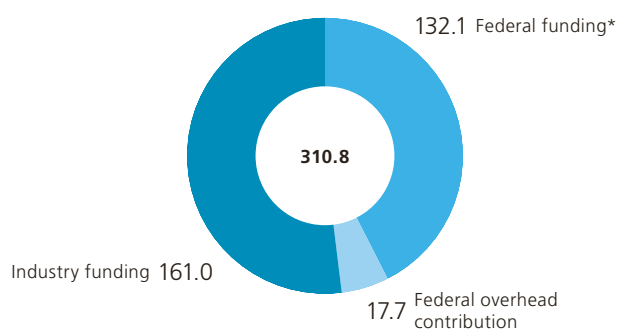
A total of 55 applications were submitted in 2016, but were not assessed until 2017.



R&D projects approved in 2017: project costs

In 2017 the partners from industry paid on average 52% of the project costs.

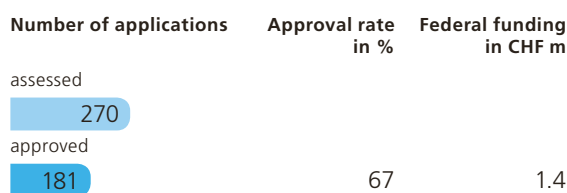
in CHF m



* not incl. SATW Transferkolleg CHF 0.2m, innovation cheque CHF 1.4m

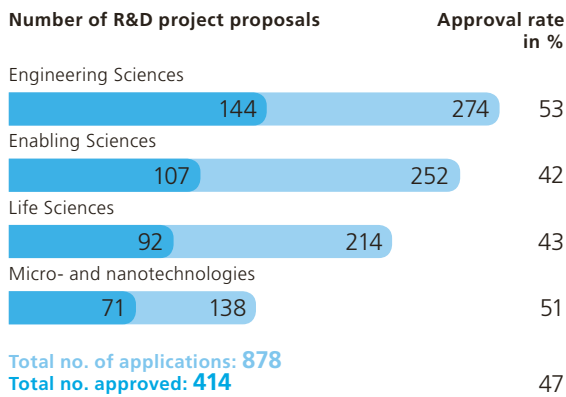
Innovation cheque funding applications in 2017

An innovation cheque allows SMEs to commission preliminary studies from public research institutions (research and development). A cheque is worth a maximum of CHF 7,500.



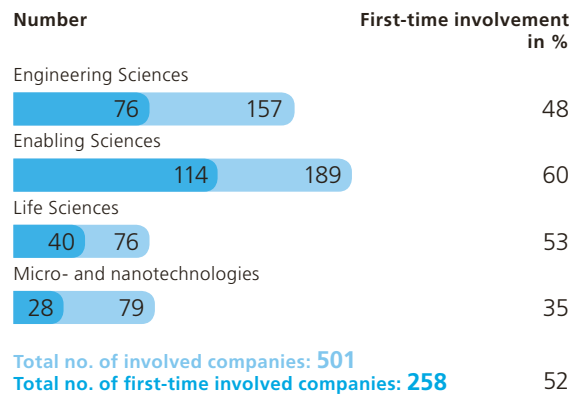
The figures include standard R&D projects and overhead contributions.

Applications assessed and approved by funding area in 2017

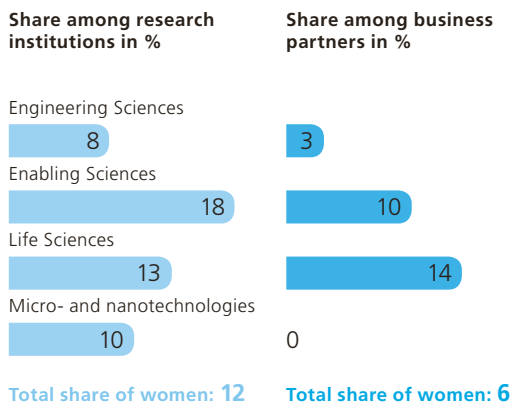


Companies involved in R&D projects by funding area in 2017

A total of 52% of the companies had a CTI project approved for the first time in 2017.



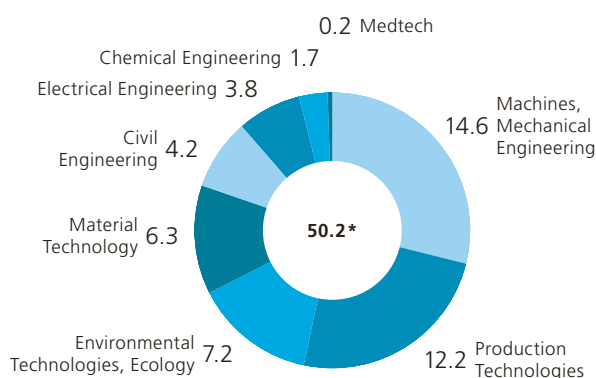
Share of women involved in approved R&D projects in 2017



The figures include standard R&D projects and overhead contributions.

Engineering Sciences in 2017

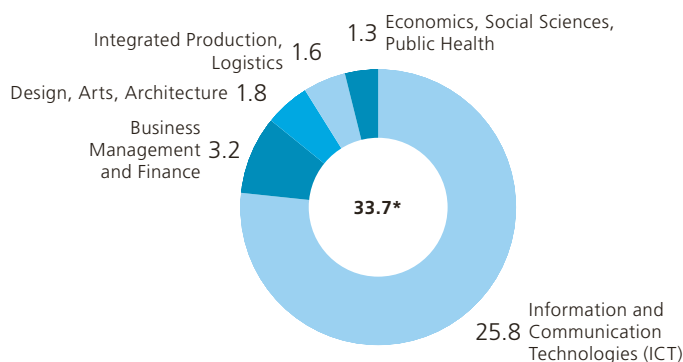
Federal funding in CHF m



* Share of overhead contributions: CHF 5.8 million

Enabling Sciences in 2017

Federal funding in CHF m



* Share of overhead contributions: CHF 4.2 million

Applications assessed and approved

Number of R&D project proposals	Approval rate in %
Machines, Mechanical Engineering 41 / 90	46
Production Technologies 32 / 52	62
Environmental Technologies, Ecology 20 / 30	67
Material Technology 19 / 36	53
Civil Engineering 14 / 21	67
Electrical Engineering 12 / 33	36
Chemical Engineering 5 / 11	45
Medtech 1 / 1	100
Total no. of applications: 274 Total no. approved: 144	53

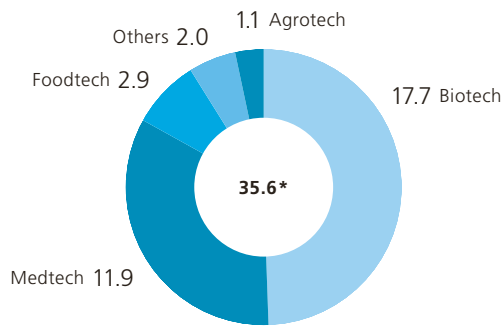
Applications assessed and approved

Number of R&D project proposals	Approval rate in %
Information and Communication Technologies (ICT) 77 / 164	47
Business Management and Finance 12 / 44	27
Design, Arts, Architecture 7 / 11	64
Integrated Production, Logistics 5 / 9	56
Economics, Social Sciences, Public Health 6 / 17	35
Public Management, Tourism, Urban Planning 7 / 7	0
Total no. of applications: 252 Total no. approved: 107	42

The figures include standard R&D projects and overhead contributions.

Life Sciences in 2017

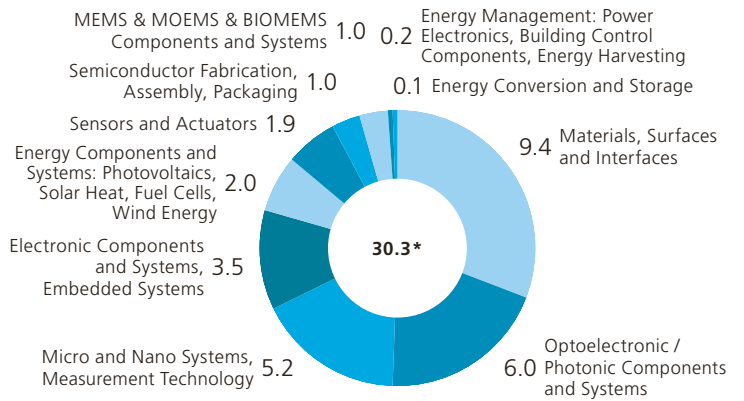
Federal funding in CHF m



* Share of overhead contributions: CHF 4.1 million

Micro- and nanotechnologies in 2017

Federal funding in CHF m



* Share of overhead contributions: CHF 3.6 million

Applications assessed and approved

Category	Number of R&D project proposals	Approval rate in %
Biotech	41 / 87	47
Medtech	35 / 89	39
Foodtech	7 / 16	44
Others	5 / 11	45
Agrotech	4 / 11	36
Total	214 / 92	43

Total no. of applications: 214
Total no. approved: 92

Applications assessed and approved

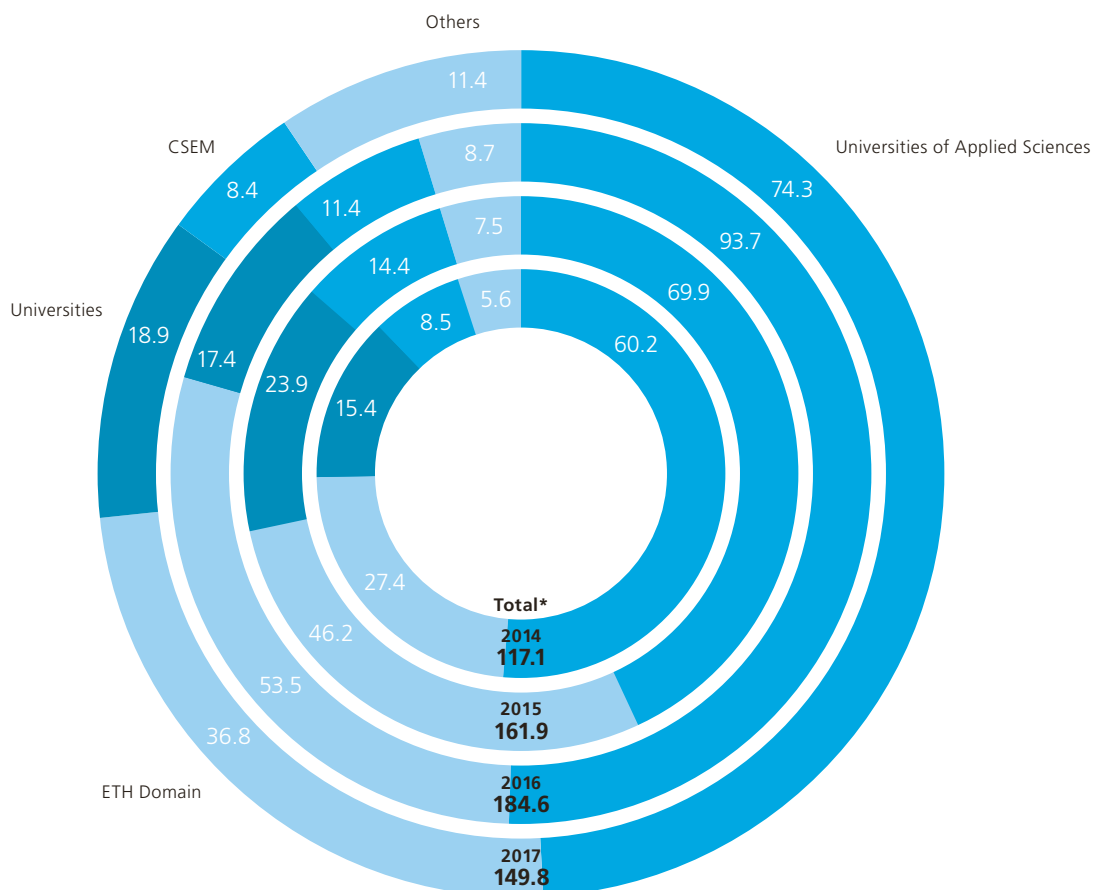
Category	Number of R&D project proposals	Approval rate in %
Materials, Surfaces and Interfaces	20 / 35	57
Optoelectronic / Photonic Components and Systems	11 / 20	55
Micro and Nano Systems, Measurement Technology	12 / 24	50
Electronic Components and Systems, Embedded Systems	11 / 21	52
Energy Components and Systems: Photovoltaics, Solar Heat, Fuel Cells, Wind Energy	4 / 9	44
Sensors and Actuators	6 / 16	38
Semiconductor Fabrication, Assembly, Packaging	2 / 5	40
MEMS & MOEMS & BIOMEMS Components and Systems	3 / 4	75
Energy Management: Power Electronics, Building Control Components, Energy Harvesting	1 / 2	50
Energy Conversion and Storage	1 / 2	50
Total	138 / 71	51

Total no. of applications: 138
Total no. approved: 71

The figures include standard R&D projects and overhead contributions.

Federal funding by research institution in 2014–2017

in CHF m

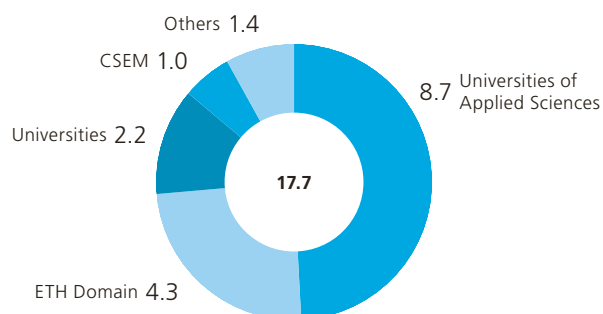


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2016: including federal contributions for special measures to compensate for the strong Swiss franc amounting to CHF 82.7 million

2017: including overhead contributions of CHF 17.7 million (see adjacent diagram)

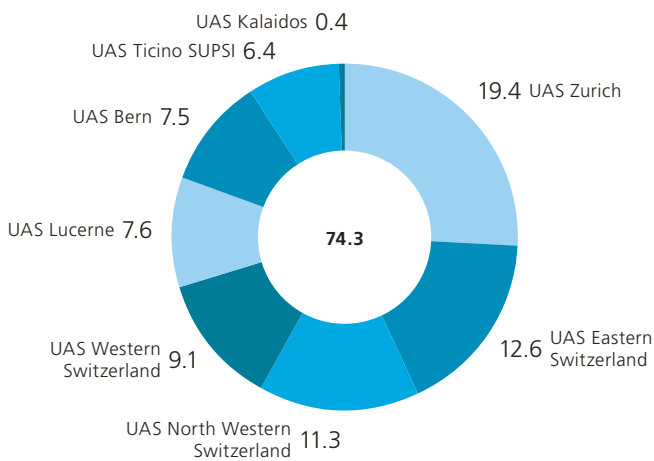
Share of overhead contributions by type of research institution in 2017 in CHF m



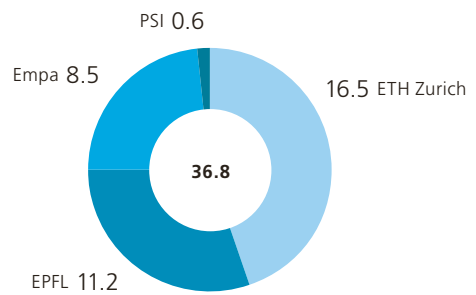
The figures include standard R&D projects and overhead contributions.

Federal funding in CHF m by research institution in 2017

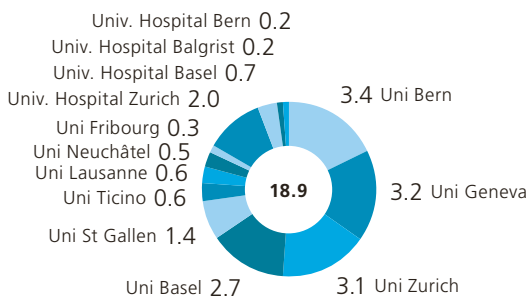
Universities of Applied Sciences



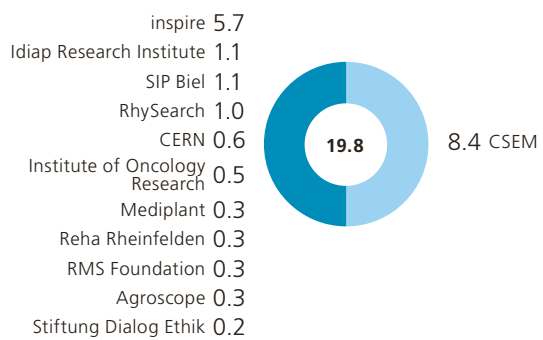
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Universities



CSEM and other research institutions



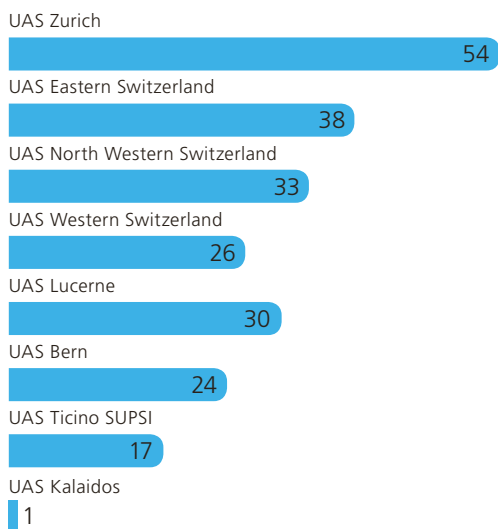
Total: 149.8

The figures include standard R&D projects and overhead contributions.

Number of approved projects by research institution in 2017

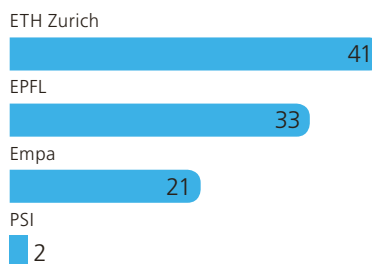
Universities of applied sciences were the main research partner in 54% of approved R&D projects.

Universities of Applied Sciences



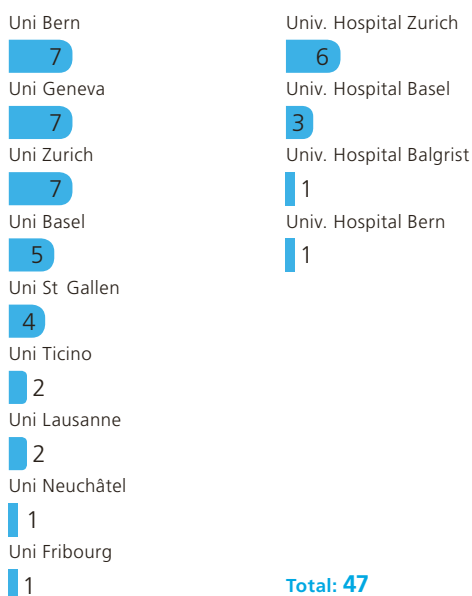
Total: 223

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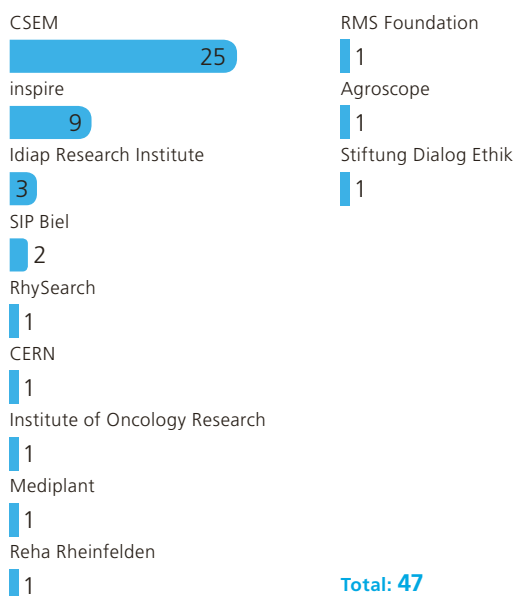
Total: 97

Universities



Total: 47

CSEM and other research institutions



Total: 47

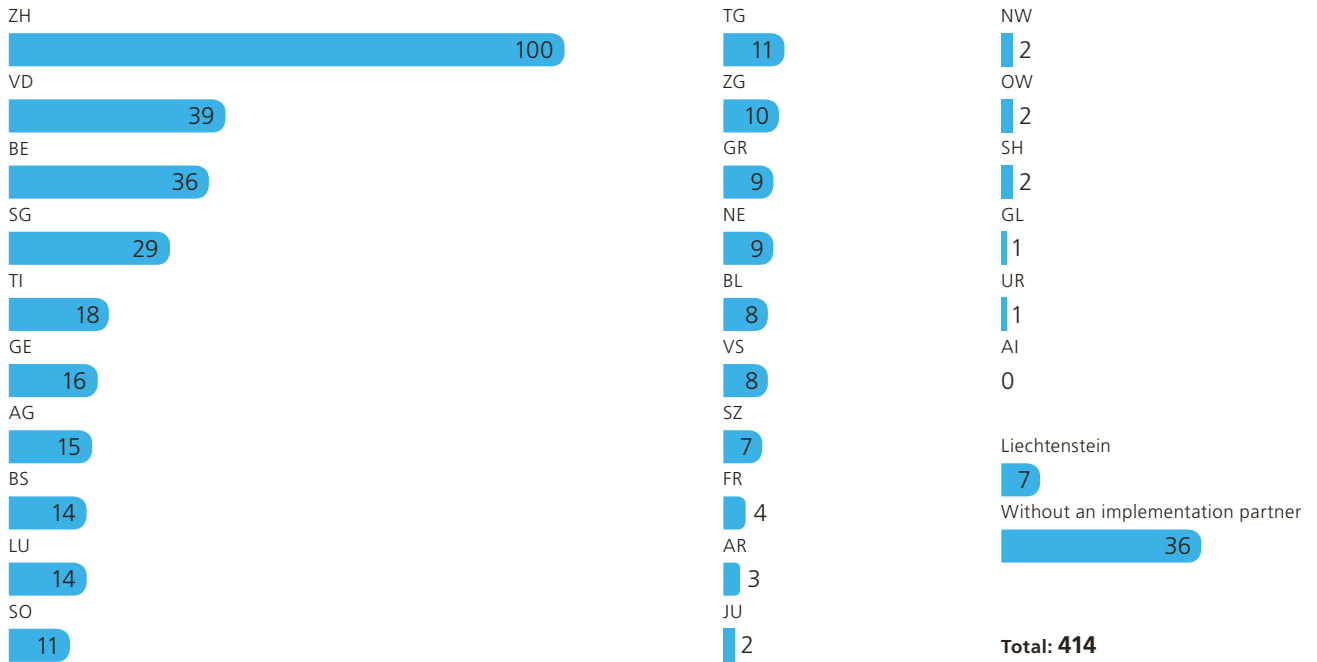
Total: 414

The figures include standard R&D projects and overhead contributions.

Main implementation partners by canton 2017

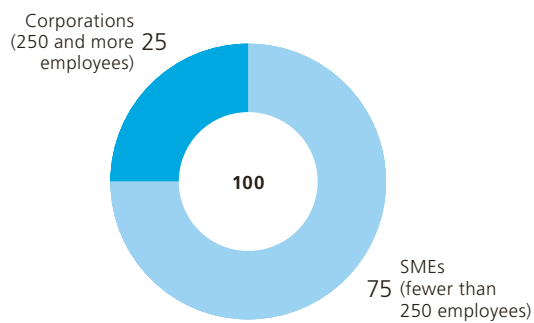
On the basis of an agreement, in 2017 the CTI funded projects for the first time where the main implementation partners were based in Liechtenstein.

Number of approved R&D project proposals



Companies participating in R&D projects in 2017*

in %



* Figures based on feedback on company size from 77% of participating companies



Success story: R&D Funding / Engineering Sciences

An efficient technology for modern timber construction

Until now the horizontal and vertical elements of wooden buildings have been connected together with steel components. The timber construction company Häring, which is based in the canton of Basel-Landschaft, and the ETH Zurich have collaborated to develop a technology that uses prefabricated wooden frames for these connections. This allows multi-storey buildings to be constructed in wood.

Wood is a sustainable and locally available construction material. However, for a long time it has only been possible to produce rigid joints in the areas where wooden beams cross using complex steel structures. In 2010 the timber construction company Häring & Co. AG and the Institute of Structural Engineering at the ETH Zurich developed a prototype pre-tensioned wooden frame for multi-storey buildings as part of one student's master's dissertation.

"We became aware that pre-tensioned structures were being used in New Zealand," says Dr Andrea Frangi, professor of timber structures at the ETH Zurich. There the vertical supports and the horizontal beams in wooden structures are connected by a steel cable. When the cable is tensioned, the rigidity of the structure increases, which provides the required stability. However, while steel components are needed for the node zones in New Zealand, the ETH prototype uses hardwood to reinforce the soft-wood supports.

Prefabricated elements and dry construction methods are more cost-effective

The prototype was successful, not only from the perspective of structural engineering, but also because the high level of prefabrication allowed for a rapid assembly process. This is a significant advantage when compared with

concrete or steel. “Wood is improving the logistics of the construction process,” says Christoph Häring, chairman of the board of Häring, which is a family-owned company. The dry construction method means that no time is wasted waiting for concrete to dry. The result is savings in both time and money.

With the support of the CTI, Frangi and Häring are preparing the innovative technology for a market launch. Following a meeting with the business partners, Martin Riediker, head of the Engineering Sciences funding area at the CTI, believes that the technology has good prospects. The project partners are also involved in the National Research Programme “Resource Wood” (NRP66), which Riediker is president of, and are developing new types of supporting elements made from beech wood.

A PhD student is carrying out experiments and simulations to investigate a number of different parameters of pre-tensioned wooden frames. These include vertical loads, horizontal forces and the effect of earthquakes. The loss of tension in different climatic conditions will be analysed during the course of long-term tests. The results have so far been positive. The wooden frame structure meets expectations in all types of conditions. “And during the course of the project we have contributed to the education of a very capable PhD student,” says Frangi.

Technology used in modern wooden building at the ETH

The ETH Zurich has provided proof of the feasibility of the technology in its “House of Natural Resources”. The supports and beams of the wooden building, which contains offices and labs, were prefabricated by Häring and the elements were pre-tensioned on site. No metal joining components are used in the structure, apart from the tensioning cables. A dense network of sensors measures the behaviour of the building during construction and use, while optical systems record its expansion.

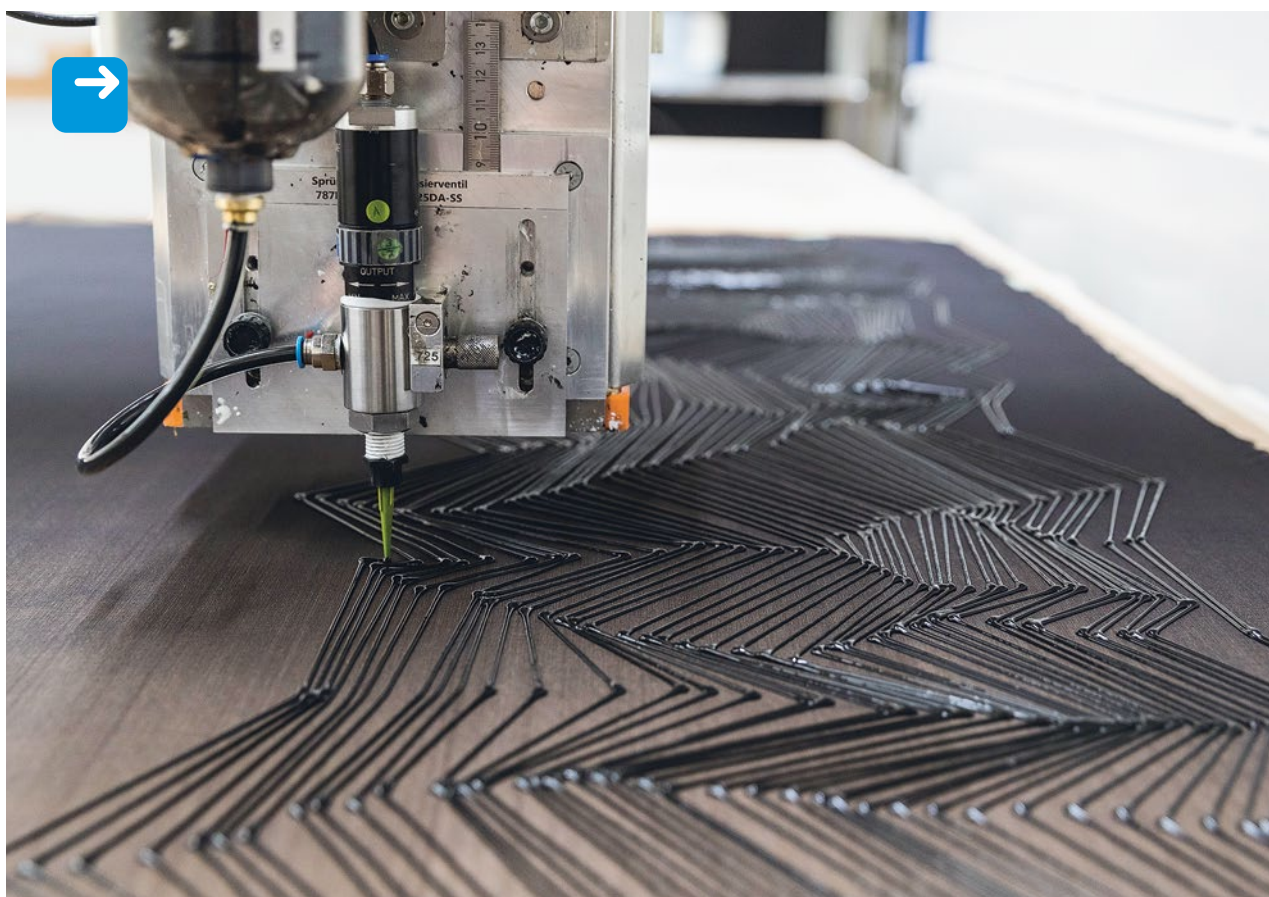
Support from the CTI

- Co-financing of an R&D project
- Networking with the National Research Programme “Resource Wood” (NRP66)



“And during the course of the project we have contributed to the education of a very capable PhD student.”

Dr Andrea Frangi, professor of timber structures at the ETH Zurich.



Success story: R&D Funding / Enabling Sciences

A digital interpretation of St Gallen lace

In the luxury fashion sector, constant innovation is a must. In three projects funded by the CTI, several partners from the fields of research and business under the leadership of the Lucerne School of Art and Design developed a technology for the 3D application of dye on textiles which has given Jakob Schlaepfer AG a completely new aesthetic.

It all began with the vision of creating a new aesthetic and feel for printed textiles. Companies in the luxury segment of haute couture, some of which are the customers of Jakob Schlaepfer AG, are constantly looking for new and exciting fabrics. This is why creative director Martin Leuthold was immediately interested when he was contacted by Andrea Weber Marin, head of products and textiles at the Lucerne School of Art and Design. She had the idea of applying dye to fabric so that you could feel it with

your hands. This would allow for a new type of surface design and would be controlled using a digital process.

Both Marin and Leuthold are fascinated by 3D printing. They began a series of tests involving specialist companies to develop a dye that could be applied in three dimensions. Because the embroidery machine would need an attachment with a spray system, a machine manufacturer was also brought on board. In two of the projects funded by the CTI, the feasibility of the proposal was demonstrated and a prototype was developed that allows a dye in paste form to be applied to textiles.

Similar material to anti-slip socks

In the third project supported by the CTI, the project partners developed two nozzles for the 3D application of silicone-based pastes similar to the material used for anti-



slip socks. CHT Switzerland AG provided the dye for the pastes and modified it chemically to allow it to be applied to textiles. "It was a challenge to apply the viscous silicone paste using a nozzle in a controlled fashion," says Karl-Heinz Selbmann, head of the Institute of Printing Technology at Bern University of Applied Sciences (BFH). Cartridges had to be filled with the paste without allowing any air to enter, in order to ensure that continuous lines could be produced when it was sprayed on. Selbmann and his team developed the hardware and software for the application procedure, defined the process and coordinated the printing parameters with the hardware, the material and the design.

Innovative aesthetic proves popular with customers

"At the start of the project, we experts advised taking things gradually, identified the BFH as a suitable research partner and helped the organisations involved in the project to keep to their highly interdisciplinary and transdisciplinary approach," explains CTI commission member and interior designer Marianne Daepf, who supported the project over several years.

In order to test customers' reactions, Jakob Schlaepfer AG deliberately designed the first two collections exclusively in black. The innovative 3D dye received a positive response and now white, red, gold and transparent versions have found their way into the collection. This completely new textile aesthetic led to the project partners being awarded the Design Prize Switzerland. They have also patented the innovative technology, which has potential outside the field of haute couture.

"We experts identified the BFH as a suitable research partner and helped the organisations involved in the project to keep to their highly interdisciplinary and transdisciplinary approach."

Marianne Daepf, CTI commission member and interior designer

Support from the CTI

- Co-financing of three R&D projects



Success story: R&D Funding / Life Sciences

A bracelet that identifies women's ovulation status overnight

In two of the projects funded by the CTI, Ava AG, a Zurich-based company, and the CSEM developed a bracelet that helps women to become pregnant or avoid pregnancy. On the basis of a variety of parameters, an app identifies the days when women are fertile using data that has been collected overnight.

The temperature method is a natural method that women can use to avoid conception or increase the likelihood of becoming pregnant. If the measurements show that the woman's basal temperature has been higher than normal for at least three days, then ovulation occurred shortly before this. The infertile phase begins at the end of the three days. This is a laborious method.

Two start-up entrepreneurs, Pascal König and Peter Stein, thought that there must be a simpler way of doing things. König is a smartwatch pioneer, who developed the Limmex emergency watch for elderly people, while Stein is an expert in the field of sensors. Research showed that in addition to their temperature a number of other parameters change during women's cycles, including their pulse rate.

König approached the CSEM, which has the necessary technologies, and also Christophe Verjus, a specialist in measuring physiological parameters using wearable computer systems. Ava AG was founded. The current level of scientific knowledge was assessed with the help of physiologists from the Swiss Federal Laboratories for Materials Science and Technology (Empa). Then Ava worked with the

CSEM to develop an algorithm and a prototype bracelet to be worn at night which would make the measurements. A clinical study at the University Hospital Zurich (USZ) showed that the time of ovulation could be determined in advance, which would allow the woman's non-fertile days to be identified.

Clinical study with up to 430 subjects

Ava and the CSEM constantly improved the software and hardware for the bracelet and the signals were validated in a sleep laboratory. In a second clinical study with up to 430 subjects, an algorithm was tested which allows the time of ovulation to be determined more accurately in advance. This is crucial for women who want to become pregnant. "The idea of developing a modern, practical device for identifying a woman's fertile days really impressed me," says Prof. Brigitte Leeners, head consultant in the department of reproductive endocrinology at the USZ.

The bracelet is already on sale

Before the end of the second clinical study the Ava bracelet was on sale at a price of CHF 249. Ava has attracted 12 million dollars of venture capital. In the USA, where the bracelet was launched in 2016, the first Ava baby was born in August 2017. "The CTI opened a lot of doors for us," says Ava co-founder and research director Peter Stein. "Without their help we would not be where we are today."

At the start of the project, CTI expert Urs Moser was sceptical because of the technical obstacles that had to be overcome. Today he is very pleased about the company's success in resolving errors. "Ava took a very professional approach with everything from the literature research and the design of the original concept through to the clinical trials and the marketing."

Support from the CTI

- Start-up coaching and the CTI Start-up Label
- Co-financing of two R&D projects



"The CTI opened a lot of doors for us. Without their help we would not be where we are today."

Peter Stein, co-founder and research director of Ava



Success story: R&D Funding / Micro- and nanotechnology

A customised laser for manufacturing pacemakers

A new generation of lasers from the USA promised benefits for the production of pacemakers, but tests carried out by the medtech company Medtronic also highlighted disadvantages. Together with Empa, the company is now optimising the new type of laser for worldwide use as part of a project supported by the CTI.

Medtronic, a company based in Tolochenaz in the Swiss canton of Vaud, manufactures one in every five pacemakers and one in every four implantable defibrillators in use all over the world. The electronic systems are enclosed in titanium housings, which are hermetically welded with a solid state laser at the US corporation's Swiss site. The lasers require a high level of maintenance and often cause irregularities. They also need water cooling and take up a large amount of space.

New type of laser brings problems for implants

In 2015 the US company IPG Photonics launched a new type of laser. Instead of being water-cooled, the fibre laser has an energy-efficient air cooling system. It also requires less maintenance, operates more consistently and is more compact. Medtronic tested the laser, but the weld seams had a black edge that looks like embedded soot, which is a major problem in the case of implants.

Research engineer Dr Sébastien Favre approached Prof. Patrik Hoffmann and Dr Marc Leparoux, two well-known materials specialists at Empa in Thun. A project was planned to evaluate how the new type of laser could function without compromising on quality. The initial application was rejected by the CTI because the commercial risks were not adequately covered and certain information about the latest technology was missing. "With our help and some tips

from the National Thematic Network Swissphotonics, the applicants were able to turn their essentially good idea into an application that was approved,” says CTI commission member Prof. Marcus Textor.

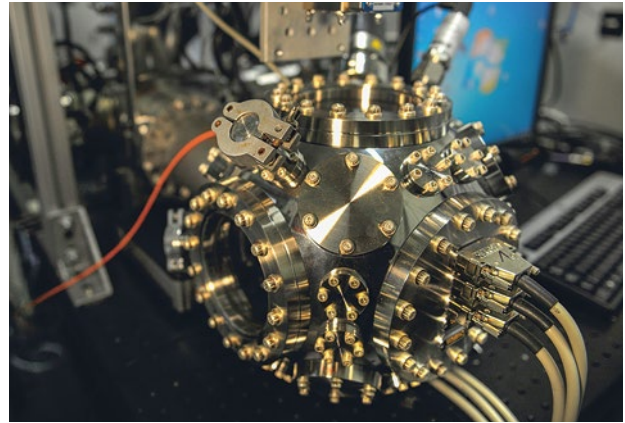
Laser wavelength influences production quality

In order to analyse the behaviour of the new and the old lasers in a controlled environment, Empa constructed a reactor that simulated the production process at Medtronic. Tests showed that the new fibre laser interacted with titanium vapour and caused problems with the process. The black edge was made up of titanium nanoparticles. Further analyses indicated that adjusting the wavelength of the laser would resolve the problem. At the request of Medtronic, the laser manufacturer IPG Photonics constructed a customised fibre laser to the specification drawn up by Empa and made it available for test purposes free of charge. The tests confirmed the influence of the wavelength on production quality.

Today Medtronic, Empa and IPG Photonics have a joint patent for the optimised fibre laser. Medtronic has the benefits of a production process that has been improved in terms of both quantity and quality and has also reduced its costs. The Swiss subsidiary has reinforced its technology leadership within the large US corporation. The special lasers developed in Switzerland are now in use in Medtronic plants in Puerto Rico, Singapore and the USA. Medtronic research engineer Sébastien Favre sums up the situation as follows: “The CTI has enabled us and Empa to develop an innovative technology in Switzerland that is now in use worldwide.”

Support from the CTI

- Help from the NTN Swissphotonics in formulating the project application
- Co-financing of an R&D project



“The CTI has enabled us and Empa to develop an innovative technology in Switzerland that is now in use worldwide.”

Dr Sébastien Favre, research engineer at Medtronic

Start-up and Entrepreneurship

**New coaches
contribute knowledge
and experience.**



Increasing the impact on the start-up community



Prof. Lutz P. Nolte
Head of the Start-up and Entrepreneurship funding area

The Commission for Technology and Innovation (CTI) was set up in 1996 and remained in existence until the end of 2017. It began by providing targeted support for young technology and science-based companies in the form of long-term business coaching.

In 2017 the demand for coaching and the quality of the service provided were still satisfyingly high. The new companies that we had coached performed extremely well in financing rounds and in competitions for start-ups. Over the course of 22 years a total of 1181 start-ups have taken part in the programme and 418 have been certified with the CTI Start-up Label.

We have made our team even stronger by appointing 16 new coaches. We have succeeded in attracting well-known figures from the Swiss start-up scene, who will be able to contribute their knowledge and experience. At the same time we have increased our skills in new areas, such as digital marketing and fintech. The coaches working for the CTI will continue to work for Innosuisse during 2018. During the course of the year an accreditation process will take place for the subsequent years. From now on, start-ups will choose one or more coaches who meet their needs from the pool of accredited coaches.

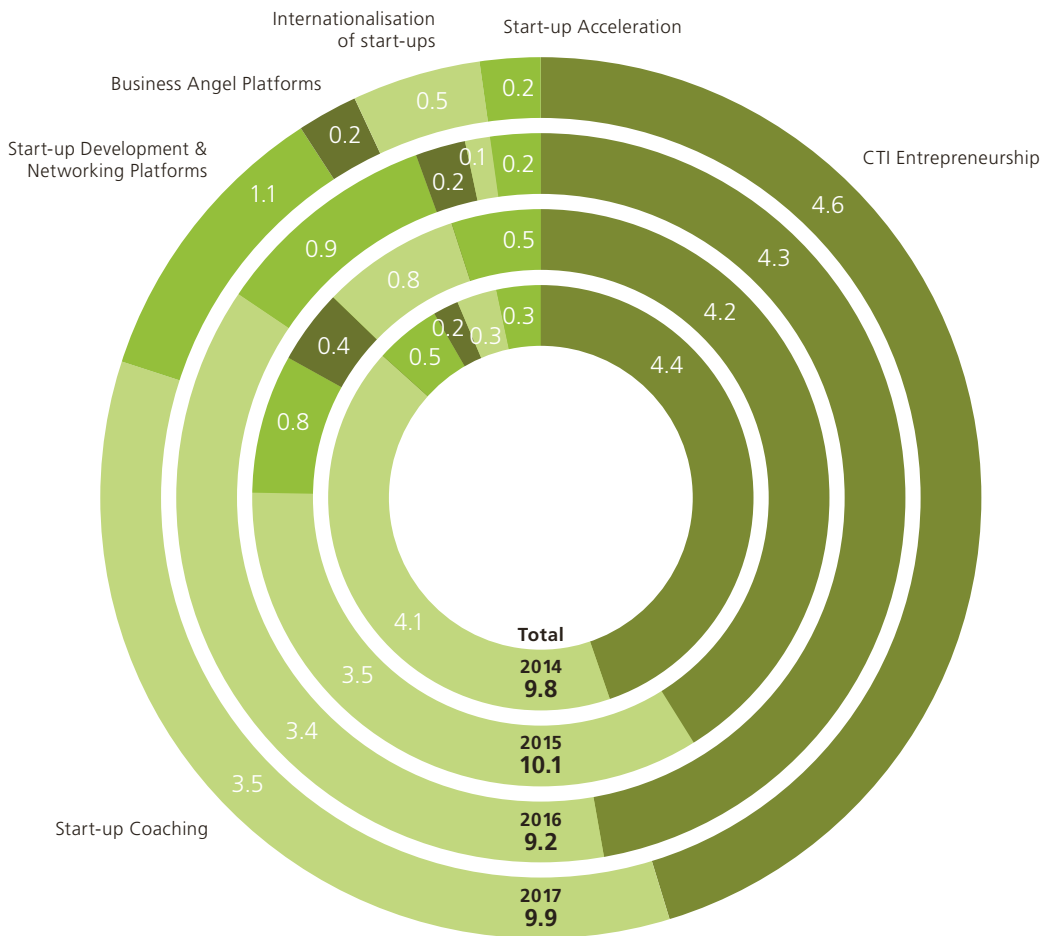
We have helped young companies to enter international markets with our tailor-made, flexible and modular programmes. We have expanded the number of key markets that we cover, in particular with our first internationalisation camp in Brazil. These camps will be extended to other foreign markets based on the level of interest shown and their relevance for the start-ups being coached now and in future.

In 2017 the entrepreneurship courses offered by our various partners continued to be very popular. Almost 45,000 students and researchers have taken part in the motivational training provided by modules 1 to 4 since they were first introduced. While modules 1 (Business Ideas) and 2 (Business Concept) will remain unchanged under Innosuisse, courses 3 (Business Creation) and 4 (Business Growth) will take a new industry-specific approach from 1 January 2018, rather than their previous regional focus.

We have once again been able to support a number of initiatives, platforms and events. Our increased presence at third-party activities has helped to improve our visibility. These included the Swiss Startup DAYS, the Swiss Innovation Forum, the global start-up events Slush and Start JLM and various trade fairs, such as the World Mobile Congress, CEBIT and the Hannover Messe.

Federal funding for Start-up and Entrepreneurship in 2014–2017

in CHF m



CTI Entrepreneurship: awareness-raising and training modules 1–4, Social Entrepreneurship

Start-up Coaching: coaching and coaching support for start-ups

Start-up Development & Networking Platforms: roundtables, support for start-ups participating in trade fairs and congresses, startupticker

Business Angel Platforms, CTI Invest (until 2015): funding platform for hightech start-ups

Internationalisation of start-ups: fact-finding consultations, CTI Market Validation Camps, CTI Market Entry Camps, swissnex

Start-up Acceleration: incubators and other institutions to promote science-based start-ups

Participants in the CTI Entrepreneurship modules

Since 2004, a total of 43,500 people have attended the four CTI Entrepreneurship modules.

Number 2016	Number 2017	Change in %
Module 1: Business Ideas 2733	2815	3
Module 2: Business Concept 578	675	17
Module 3: Business Creation 352	352	0
Module 4: Business Growth 119	130	9
Total: 3782	Total: 3972	5

From idea to start-up

Module 1: Business Ideas

Awareness-raising events for students and start-ups ½ day

Module 2: Business Concept

Courses for students with business ideas 1 semester

Module 3: Business Creation

Preparation course for founding a business 5 days

Module 4: Business Growth

Training for start-ups with growth objectives 5 days

Number of courses per module

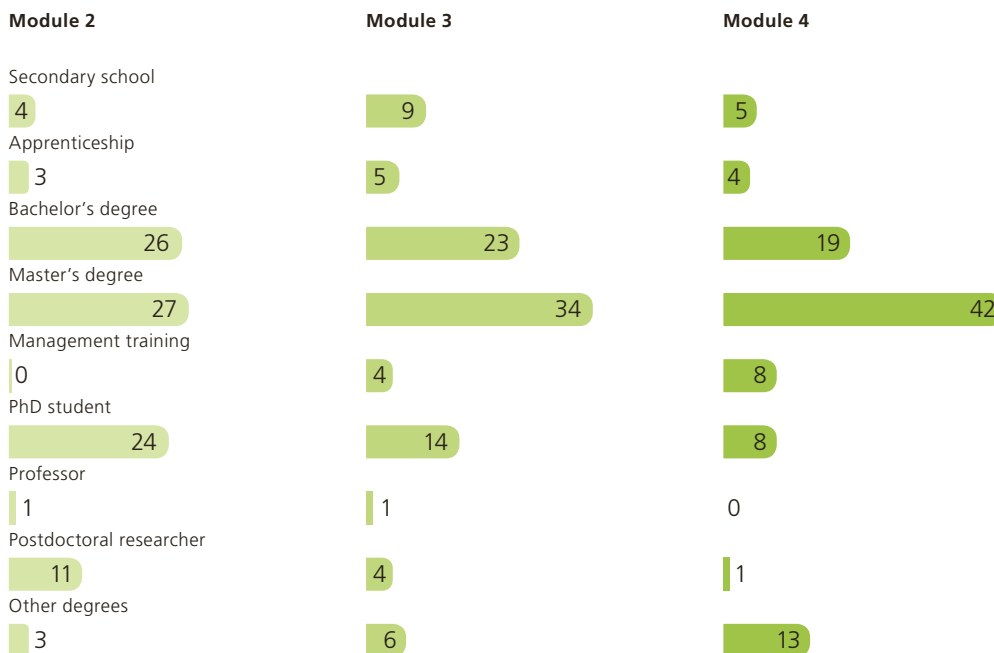
In 2017 the CTI funded 84 awareness-raising and training courses for people interested in or preparing to set up their own company. These were held at the regional consortia organised by higher education institutions.

Number 2016	Number 2017
Module 1: Business Ideas 24	24
Module 2: Business Concept 21	23
Module 3: Business Creation 24	25
Module 4: Business Growth 11	12
Total: 80	Total: 84

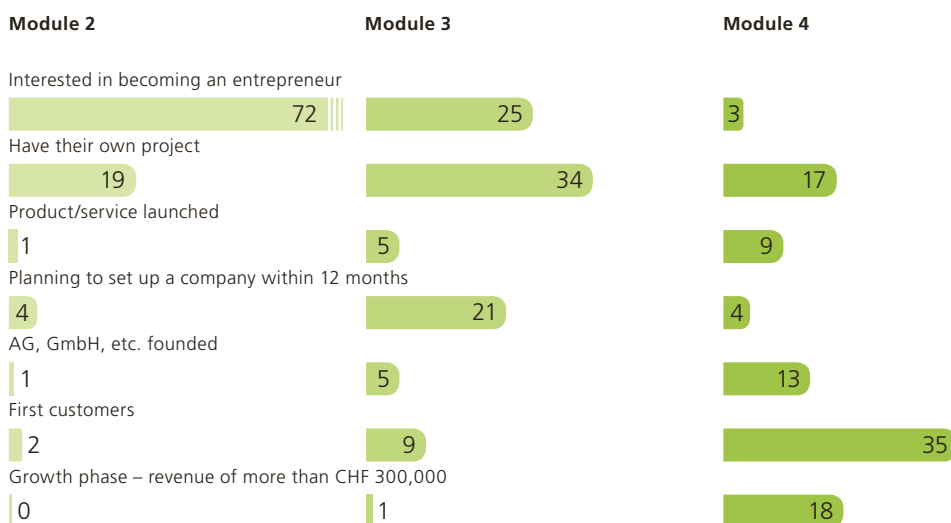
Details of participants in modules 2, 3 and 4 in 2017

Educational background in %

In module 2, 51% of the participants had a master's degree or were PhD students. In module 4, more than 59% of the participants had a master's degree or higher.



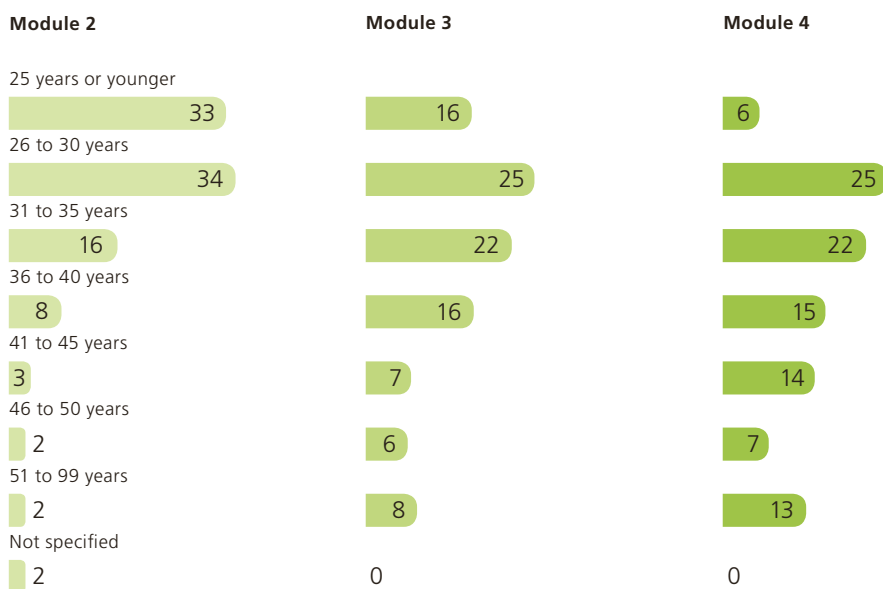
Development status of the companies in %



Details of participants in modules 2, 3 and 4 in 2017

Age groups in %

The ages of those taking part in the various modules vary. In module 2, 67% of the participants were 30 or younger. In module 3, 60% of the participants were over 30, while in module 4 this figure was 71%.

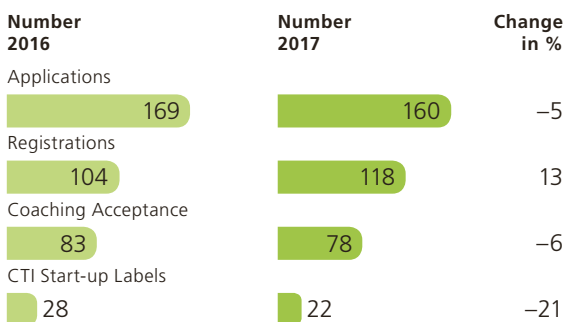


Share of women in %

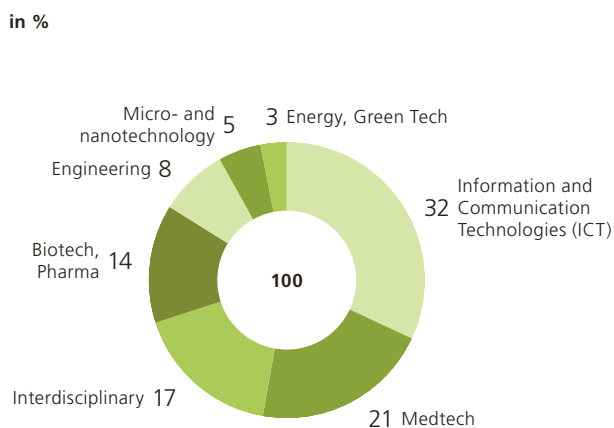
More than 30% of the participants in training module 2 were women. In module 4, the proportion of women was only 12%.

Companies recently admitted to the CTI Start-up programme, phases 1 to 4

In 2017 the number of start-ups with coaching acceptance was on the same high level as the previous year.

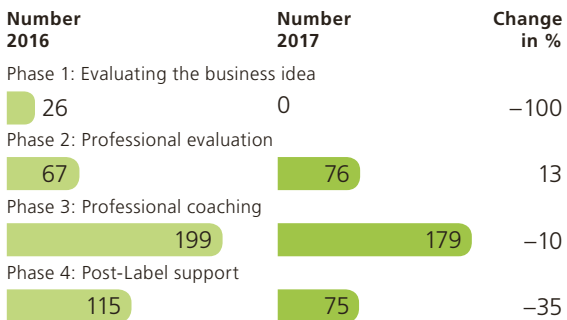


Number of companies having received Coaching Acceptance by industry sector 2017

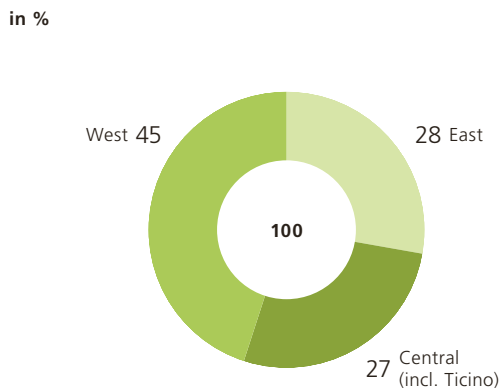


Companies in CTI Start-up, phases 1 to 4

The move to Innosuisse and the related change in the legislation meant that applications received in 2017 had to be approved in 2017. For this reason there were no start-ups in phase 1 at the end of 2017.



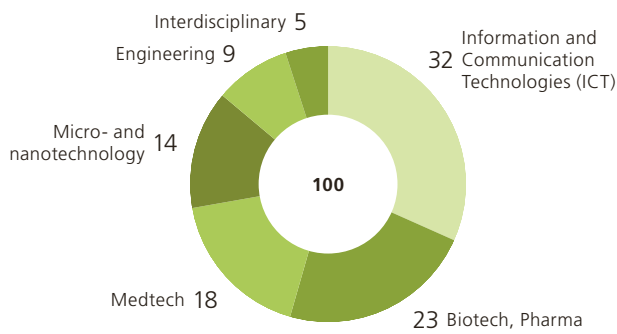
Regional distribution of companies having received Coaching Acceptance in 2017



Number of companies with CTI Start-up Label by industry sector 2017

418 companies have received the CTI Start-up Label since 1996.

in %



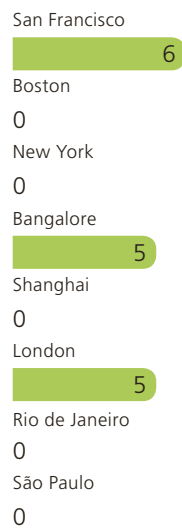
Share of women in management team of companies awarded CTI Start-up Label in 2017

The management of the start-ups receiving the CTI Start-up Label in 2017 comprised 14% women. This was 5% more than in the previous year.

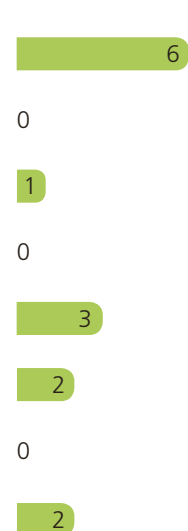
Internationalisation of technology- and science-based start-ups in 2017

As in the previous year, San Francisco was the most popular destination in 2017. For the first time camps were held in Rio de Janeiro and São Paulo.

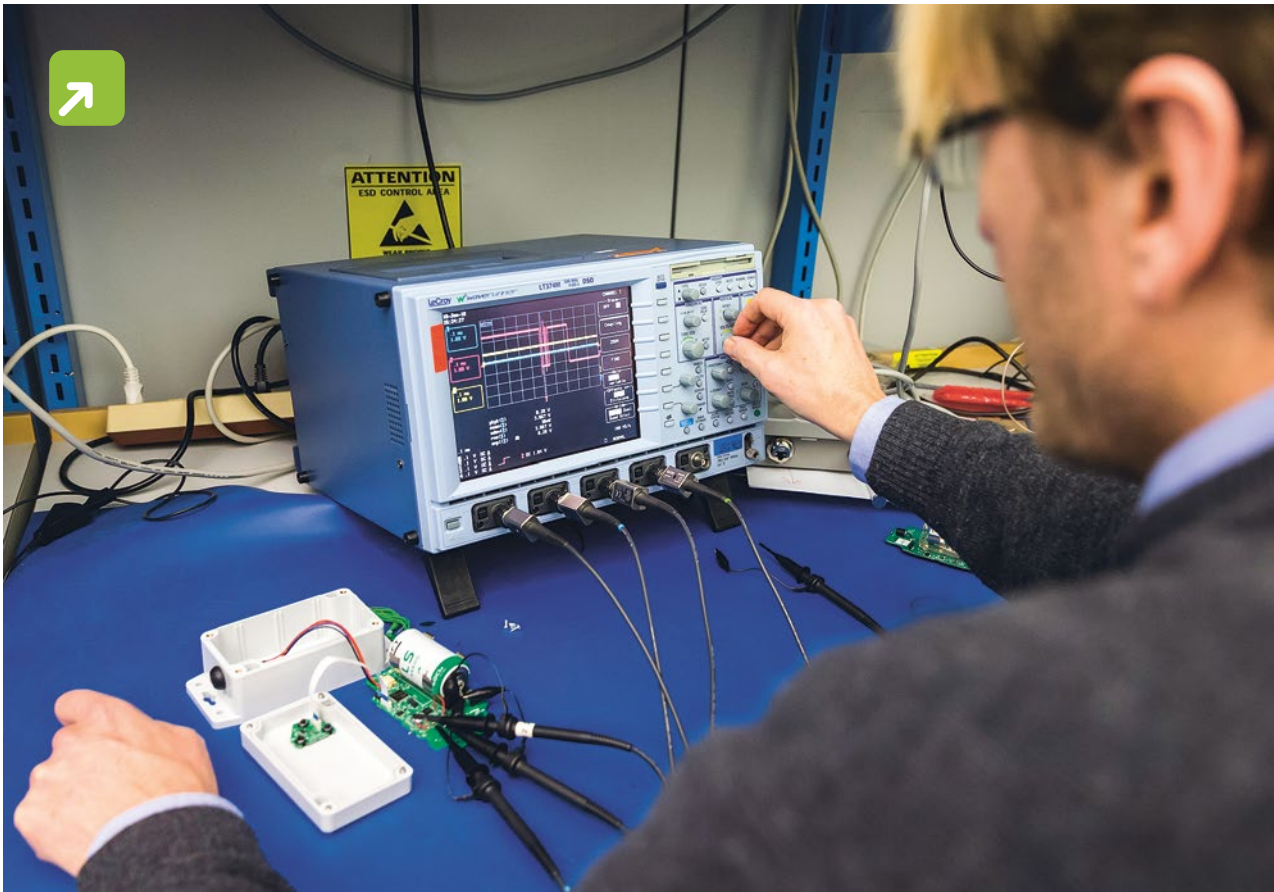
Number of Market Validation Camps*



Number of Market Entry Camps*



* Only start-ups receiving funding in the CTI Coaching programme are shown



Success story: Start-up and Entrepreneurship / CTI Start-up

Smart networks for the Internet of Things

The city of Geneva continuously measures noise levels on its streets and the quality of its drinking water. More than 1000 sensors send the data to a central office via a network supplied by Orbiwise, a start-up that has been coached by the CTI. In India, the company is developing the world's largest network for the Internet of Things.

Is the Internet of Things mere hype or is it the beginning of something big? This was the question that Domenico Arpaia and five colleagues asked themselves in 2013 when they were looking at the direction that the telecoms market would go in. They are experienced wireless communications specialists and for a long time had worked in Geneva for the joint venture ST-Ericsson, which has now been dissolved. They came to the conclusion that the Internet of Things would become a widespread phenomenon as soon

as the costs were reduced and the technology improved. They believed that there were two key factors involved: end devices with a low energy consumption and a network with a long range.

The LoRa (long range) wireless technology seemed to be the ideal solution and the six specialists began to experiment with it. In early 2014 they founded Orbiwise SA and their network software immediately aroused the interest of some large corporations. The software makes it possible to run a Low Power Wide Area Network. Networks of this kind link low-energy devices, such as battery-powered sensors, via base stations with a network server. The server evaluates the data that the sensors collect. The network has a long range and the energy consumption of the end devices and the operating costs are low.

“Orbiwise mainly needed help in searching for investors and building up a suitable network.”

Antonio Gambardella, CTI coach

Successful presentation to investors

Unlike the young founders of many start-ups, CEO Domenico Arpaia and his colleagues were experienced enough to know what a business plan should look like. “Orbiwise mainly needed help in searching for investors and building up a suitable network,” says Antonio Gambardella, a CTI coach with extensive experience of working with venture capital and a director of the Geneva incubator Fongit. The coach was able to show the Orbiwise team how to make a successful presentation to investors, among other things. This paid off and now Orbiwise has now acquired a number of investors.

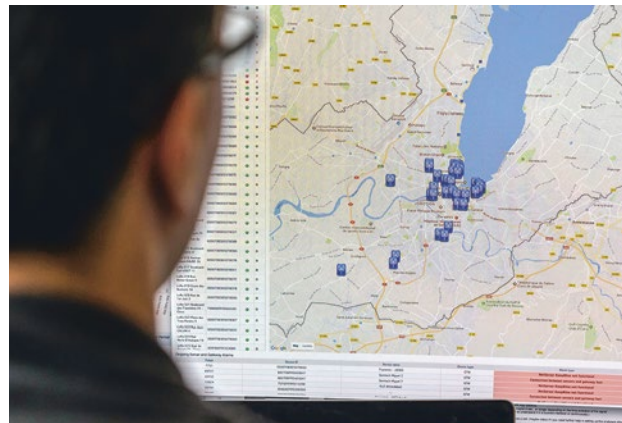
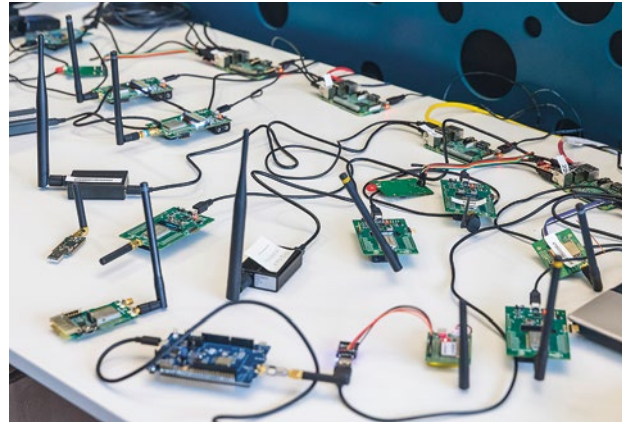
Technology helps to achieve environmental goals

The city of Geneva is relying on OrbiWAN technology to help it to become a smart city. More than 800 sensors with microphones in small boxes continuously measure the noise in the streets and send the data via a Bluetooth connection to a base station. From here it is passed on to a central server, which creates a real-time map of noise pollution. A second application for the utility company Services Industriels de Genève (SIG) continuously measures the quality of the drinking water. These are just two of many possible uses for the Orbiwise technology, which range from smart parking and waste management to monitoring production processes.

Orbiwise is developing the world’s largest network for the Internet of Things in India on behalf of the multinational Tata corporation. Around 20,000 base stations and 100 million end devices throughout the country will collect data in 40 different categories for smart street lighting, smart metering of energy and other smart city services.

Support from the CTI

- Start-up coaching and the CTI Start-up Label





Success story: Start-up and Entrepreneurship / CTI Start-up

Simulators for surgical interventions

Surgeons can be trained using robots with the VirtaMed surgery simulators. These Swiss training devices are being used by hospitals and medtech companies throughout the world. In ten years a small start-up has become an SME employing 100 people.

Trainee pilots practise on flight simulators. In a similar way, it is very beneficial for surgeons to practise on virtual systems before operating on real patients. VirtaMed AG, a company based in Schlieren in the Swiss canton of Zurich, manufactures surgical simulators that allow trainee doctors to gain virtual experience of operations. Their products have proved to be highly successful. The company was founded in 2007 and now has an annual turnover of almost CHF 20 million.

The founders met during the course of a project run by the Swiss National Science Foundation (SNSF) as part of the “Co-Me” National Centre of Competence in Research, which involved 16 PhD students. They developed a prototype simulator for removing tumours from the womb which aroused great interest in medical circles. Six members of the project team then founded a start-up to evaluate the commercial potential of the research results. But how do researchers become entrepreneurs?

Successful search for investors

The start-up submitted an application for coaching to the CTI. Dr Martin Horst, CTI coach and managing director of the consultancy company Accelerex, advised them to focus on the big picture when defining their objectives and

“We worked on the business plan until it was comprehensible and concrete.”

Dr Martin Horst, CTI coach

vision, but to make realistic plans. “We worked on the business plan until it was comprehensible and concrete,” says Horst. In 2008 VirtaMed was awarded the CTI Start-up Label, won the privately financed Venture Kick prize and successfully found its first investors in the form of business angels from the StartAngels network and the Zürcher Kantonalbank.

Moving to new markets

VirtaMed began by developing simulators for different applications, including one for arthroscopies, the minimally invasive procedures used to repair joint damage. For surgeons the simulator creates a virtual reality that comes very close to real life. As a result, VirtaMed won the CTI Swiss Medtech Best Poster Award. Today every orthopaedic specialist in Switzerland is tested on the ArthroS simulator and it is also used to provide training throughout the world.

VirtaMed has also developed simulators for medtech companies. Tailor-made simulators have to be developed quickly and in small numbers for this industrial sector. The medtech companies use them worldwide to train medical staff and employees.

VirtaMed has now sold around 800 simulators to more than 300 customers on all continents. The company has been making a profit since 2011 and because of the successful early development of the business it has been able to expand using its own resources and without additional financing rounds. The products are made in Schlieren in the canton of Zurich and between 95 and 98 per cent of them are exported. The company currently employs 100 people from 21 countries and plans to increase its workforce to 250 in the near future.

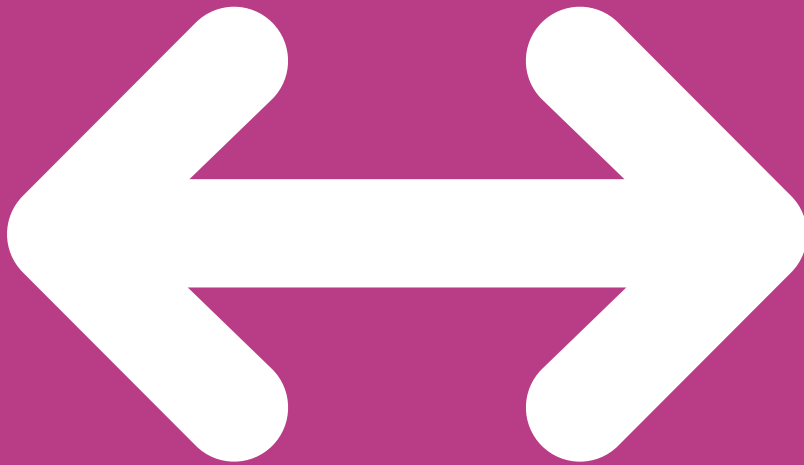
Support from the CTI

- Start-up coaching and the CTI Start-up Label
- CTI Swiss Medtech Best Poster Award 2010 and 2013
- Co-financing of five R&D projects (2009 to 2018)



KTT Support

Growing demand for mentoring.



Successful launch of new networks



Dr Myriam Meyer
Head of the KTT Support funding area

The decision made by KTT Support in 2013 to focus on three funding instruments has proved its worth in 2017, because the individual funding opportunities have remained extremely attractive. There was considerable demand in 2017 for project support from innovation mentors (IMs) and for cooperation with a National Thematic Network (NTN). A total of 37 per cent of the R&D projects were supported by an innovation mentor and 14 per cent by an NTN.

The NTNs bring partners from the worlds of research and business together. Eight of the eleven networks are in their second funding period, which means that the majority are in a growth phase. They need to consolidate their activities

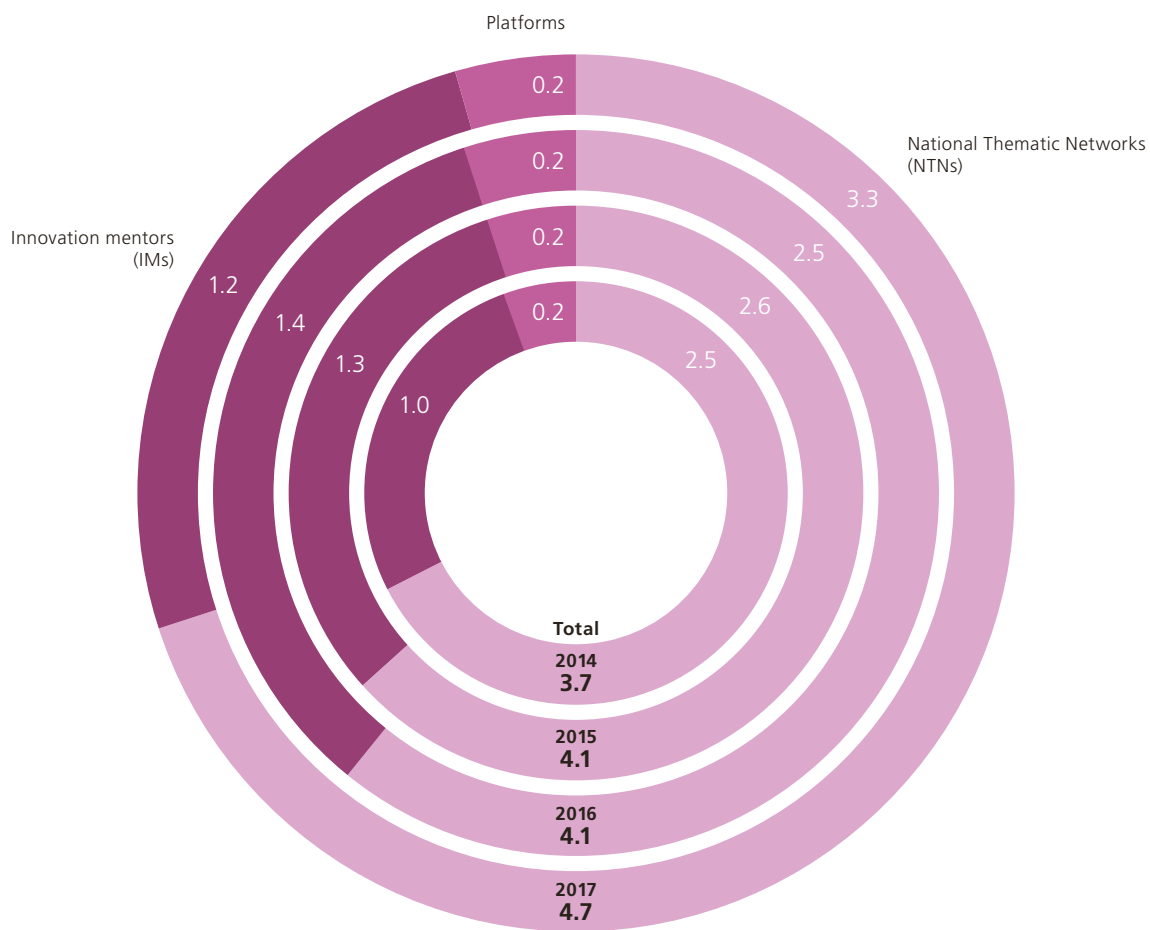
under the aegis of Innosuisse over the next one to three years. The goal is for the NTNs to provide services without the support of Innosuisse after 2020. The three new networks (the AM-Network, data + service and Virtual Switzerland) have successfully completed the first year of their set-up phase. They are faced with the challenge of increasing and consolidating their attractiveness to the business and research communities over the years to come.

Innovation mentors provide SMEs with information about funding opportunities and coordinate the initial phase of the cooperation between companies and public research institutions. There is still considerable demand among companies for support from IMs for innovation projects. Since the funding instrument was launched in 2013, the IMs have visited 2000 companies. The number of SMEs supported by IMs that have had a project approved by the CTI has increased more than fivefold since 2013. Innosuisse offers SMEs with fewer than 250 employees the opportunity to apply for four new types of vouchers for innovation mentoring and to choose their own mentors.

The specialised thematic events bring together representatives of industry and academia around a specific innovation subject. In 2017 more than twice as many applications were submitted and approved as in 2016. This confirms that this funding instrument meets an important need for a platform for dialogue between researchers and companies that supports organisations in specific areas of technology and helps with the development of areas of innovation relevant to the fields of services and health. Examples include the Swiss Symposium on Lab Automation in Rapperswil and the Medtech Innovation Event in Biel.

Federal funding for KTT Support in 2014–2017

in CHF m



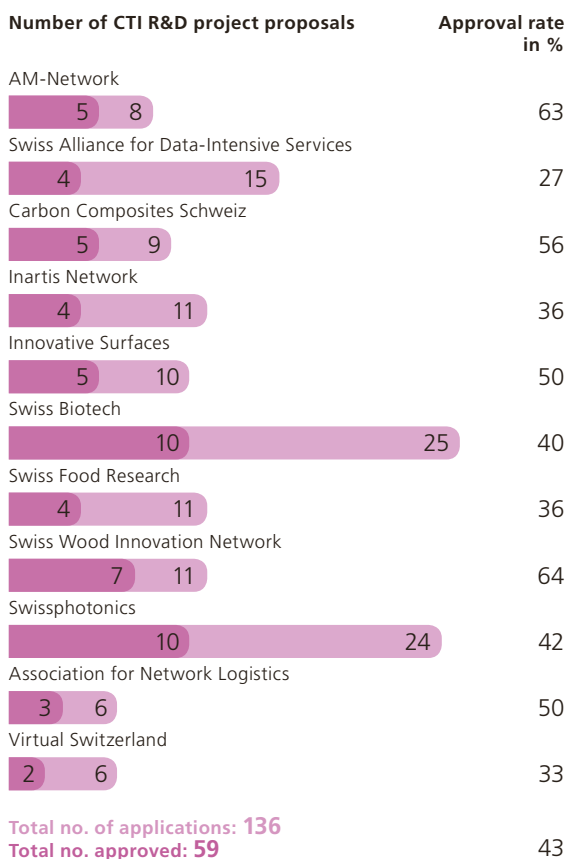
NTNs: 11 National Thematic Networks
 IMs: 3 head innovation mentors, 11 innovation mentors
 Platforms: web-based innovation map (until 2016),
 8 supported thematic platforms

The figures include standard R&D projects and overhead contributions.

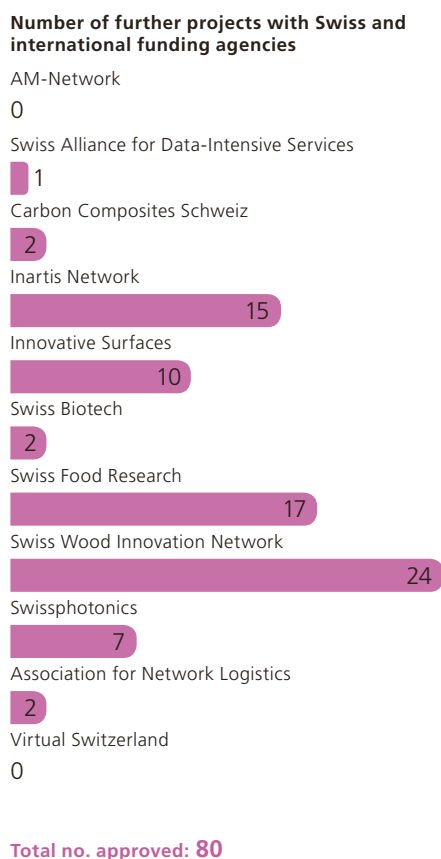
National Thematic Networks (NTNs) in 2017

Applications assessed and approved

14% of the R&D project proposals approved by the CTI are being launched by the eleven National Thematic Networks.



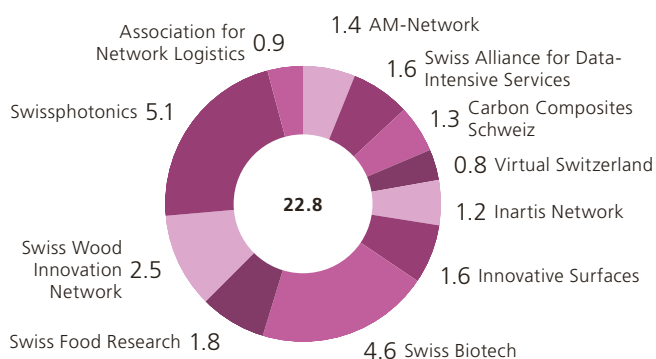
Approvals



The figures include standard R&D projects and overhead contributions.

CTI R&D projects submitted by NTN and approved in 2017

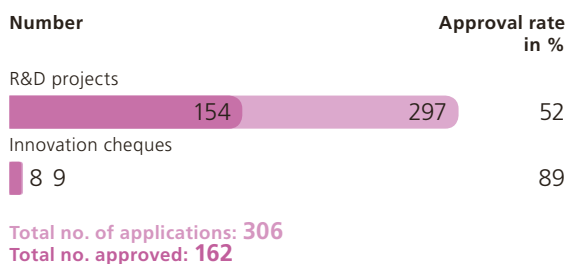
Federal funding in CHF m



CTI R&D projects supported by IMs in 2017

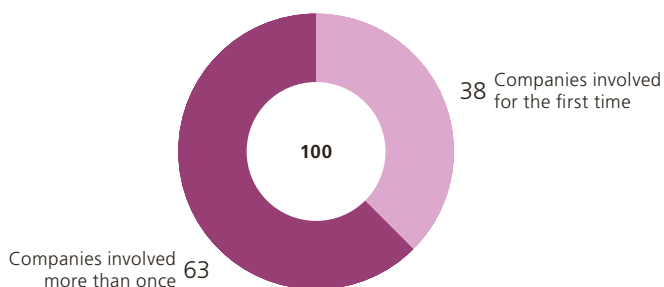
The 14 innovation mentors helped companies to submit around 300 applications for R&D projects and innovation cheques to the CTI.

Applications and approvals



Companies involved in CTI R&D projects submitted by NTNs in 2017

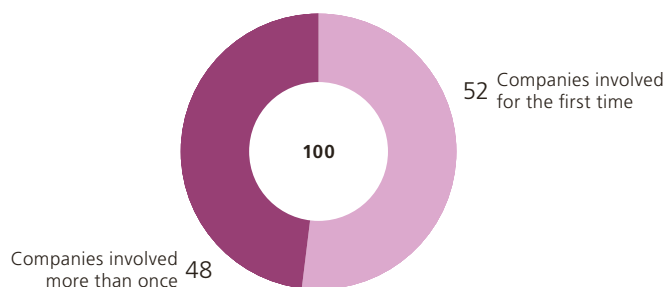
in %



Companies involved in CTI R&D projects generated by IMs in 2017

Around half of the companies supported by an IM carried out a project with the CTI for the first time in 2017.

in %





Success story: KTT Support / National Thematic Networks

Drug research by a network of experts

A small team of experienced researchers came up with the idea of a drug to combat rare autoimmune diseases. What they were lacking was laboratories and investors, so the team approached the NTN Swiss Biotech. With its support, a group consisting of several universities was able to come together and achieve one milestone after another.

Posterior uveitis is responsible for 10 per cent of the avoidable blindness in the western world. Until now there have been no cures for rare autoimmune diseases of this kind. The Basel-based start-up AlloCyte Pharmaceuticals AG aimed to develop a chemically manufactured molecule that would make it possible for cells to be created to provide protection against these diseases.

Because the team that founded the company did not have the resources for this type of project, it approached the National Thematic Network (NTN) Swiss Biotech. The team's contact was the former president Prof. Daniel Gygax, a lecturer at the Institute for Chemistry and Bioanalytics at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW). The early support provided by the NTN allowed the team to carry out preliminary studies that played a crucial role in their subsequent success.

Universities contribute different skill sets

"They had no labs and no financial support from investors, but they did have a good idea and extensive experience of drug development," says Gygax, who is now co-director of the NTN. Experts with specific skills were brought into the

project, including Prof. Gisbert Schneider, specialist in computer-assisted drug design at the Institute of Pharmaceutical Sciences at the ETH Zurich; Prof. Stephan Krähenbühl, head consultant in clinical pharmacology at the University Hospital Basel; and Prof. Marianne Hürzeler, chemist at the Institute for Chemistry and Bioanalytics at the FHNW School of Life Sciences. They were joined by several highly motivated students who were working on their bachelor's, master's and PhD dissertations as part of three CTI projects. Research assistants looking for additional research experience also became involved.

But the team needed to identify the right molecule among the millions that were commercially available. A computer-based screening process that simulated the bonding of the molecules to the drug's point of attack produced several hundred suggestions. Researchers in medicinal chemistry selected the 60 molecules with a high potential for further development.

Test 59 out of 60 produced the hoped-for result

Using a small amount of start-up funding from the NTN, AlloCyte was able to buy the 60 potentially effective molecules and carry out initial biochemical experiments. Number 59 proved to be suitable. The selected molecule was modified chemically in such a way that it was pharmacologically effective, well tolerated by the human body and also patentable. Finally the molecule was tested on animals.

"Without the CTI we would not have got as far as we have today," says Dr Gabriele Weitz-Schmidt, one of the six founders of AlloCyte. "As well as the financial contribution to the project costs, the reviews and the opportunities for interdisciplinary networking were essential for us."

Support from the CTI

- Start-up financing and advice from the NTN
- Co-financing for three R&D projects



"Without the CTI we would not have got as far as we have today. As well as the financial contribution to the project costs, the reviews and the opportunities for interdisciplinary networking were essential for us."

Dr Gabriele Weitz-Schmidt, Chief Scientific Officer of AlloCyte Pharmaceuticals AG



Success story: KTT Support / Innovation mentors

Laser technology prevents drug counterfeiting

Individual disposable syringes containing medicines cannot be traced back to the manufacturer. In a CTI-funded project, nano4U and the FHNW developed a read/write unit that allows the glass flange of syringes to be individually coded and identified.

In the production of medicines, traceability is of great importance for safety reasons. However, in the case of disposable syringes only so-called nests of 100 or 160 items are coded, but the individual syringes are not. This leads to a serious risk of intermixing and counterfeiting.

nano4U AG is a company working in the field of production security. It was approached by a pharmaceutical manufacturer looking for a solution to this problem, because a system developed by nano4U for coding individual blister

packs was already in use in the industry. Dr Alexander Stuck, Director Products and Solutions, investigated the problem and identified the possibility of applying a code to the glass flange of every syringe from above using a laser. This is the only way that the syringes can be labelled in the nest without slowing down the production process or running the risk of contamination.

A preliminary study carried out by the Institute of Product and Production Engineering at the University of Applied Sciences Northwestern Switzerland (FHNW) under the leadership of Prof. Ronald Holtz, head of the 3D laser team, showed that it is possible to label the flange. In order to investigate the feasibility of the process in detail, nano4U commissioned the FHNW to build a prototype. This comprehensive test also produced positive results.

Value chain is a tough nut to crack

With the support of the CTI both partners aimed to develop the read/write technology in order to label individual syringes using an ultrashort pulse laser and to authenticate them at potential trouble spots in the supply chain. CTI innovation mentor and business IT specialist Dr Gabriele Schwarz helped the project partners to formulate their application. The value chain proved to be a sticking point, because nano4U only wanted as many people as absolutely necessary to be involved in the project. "I insisted that we looked at the entire value chain, despite the delicate ongoing negotiations about patents," says Schwarz. "We needed to bring partners on board who were prepared to integrate the new technology into their machines and start the first test runs as soon as possible." Now two Swiss suppliers to the pharmaceutical industry have become involved in the project, which is resulting in genuine customer-driven innovation.

Reading the codes with a smartphone

A new technology has been developed and is being tested in a production environment that will apply a 3D code within 100 milliseconds. The flange is coded directly under the surface of the glass and because this done before the syringe is filled, the laser beam cannot affect the medicine, which is essential in the case of expensive medical products. Every end user, from doctors and carers to retailers, can read the code with a small and inexpensive lens attachment for a smartphone without being connected to a database. This prevents mix-ups and counterfeiting from occurring.

Together Schwarz and Stuck are working on the details of a business model involving licences, among other things, which promises a long-term income stream and provides the greatest possible protection against imitation. In the meanwhile, nano4U has been involved in discussions with a number of potential end customers.

Support from the CTI

- Co-financing of an R&D project
- Project support from an innovation mentor



"I insisted that we looked at the entire value chain, despite the delicate ongoing negotiations about patents, and brought on board partners for initial test runs."

Dr Gabriele Schwarz, CTI innovation mentor and business IT specialist



Joint activities: Joining forces on projects

A focused approach for a greater impact

The Federal Council is increasing the pace of knowledge-based innovation in order to achieve its goal of gradually transforming the Swiss energy system by 2050. In 2014 eight competence centres were set up in seven action areas of energy research. During the first funding period from 2013 to 2016, these Swiss Competence Centres for Energy Research (SCCER) laid firm foundations for the future and achieved an important interim objective. They succeeded in creating a nationwide research network. In the past energy research teams at federal institutes of technology (ETHs), universities and research institutions tended to work in parallel with one another. Now they are working together. The SCCERs have now successfully launched their second phase and are focusing on selected areas to achieve a greater impact.

Promoting knowledge and technology transfer

In their second funding period the SCCERs are covering the entire innovation chain on the technology readiness scale. This ranges from exploring innovative approaches to handing over solutions to market forces. However the focus will be on implementation and industrialisation. Projects with a high level of technology readiness will increasingly be transferred to businesses. For this purpose each SCCER has drawn up a knowledge and technology transfer (KTT) concept or if a concept was already in existence has revised it. To ensure that as many findings as possible make their way into society, the world of politics and the market, every SCCER now has an employee who is responsible for KTT. In order to obtain an external perspective, the impact of this will be evaluated and analysed by external contractors. The resulting recommendations will go to the SCCER steering committee to allow it to provide further support for the KTT activities of the competence centres.

Developing interdisciplinary cooperation

One new focus area consists of six projects across the SCCERs, which are known as the joint activities. They were launched in 2017 and are intended to extend interdisciplinary cooperation in order to increase the overall impact of the competence centres. In some of the joint activities, such as the scenario and modelling initiative to develop coherent, robust scenarios, all the SCCERs are pooling

their strengths. Others involve the bilateral or multilateral cooperation of individual SCCERs. By standardising and linking together the data from measurements and experiments, it will be possible to achieve synergies, in the same way as when the competence centres cooperate to construct demonstrators.

As part of one of the joint activities, researchers from the five SCCERs involved are collecting and analysing the available knowledge about converting excess energy into products such as fuel and summarising the information in an overview paper. In another joint activity, two SCCERs are carrying out a socio-economic analysis of the evolution of personal mobility and using this as the basis for proposals for the design of a future mobility system. A third joint activity involves SCCER researchers drawing up guidelines for planning multi-energy networks and assessing the long-term added value provided by corresponding business models for consumers, energy-producing consumers, operators of distribution and transmission networks and other players.

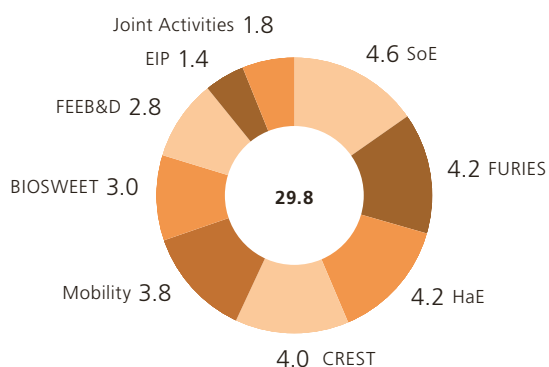
The focus of funding in the efficiency action area

In 2017 the CTI evaluated 91 applications for energy projects in the seven action areas of the Energy funding programme. Of these, 33 projects were approved with an overall federal contribution of CHF 11.2 million. The approval rate was 36 per cent. A total of 28 of the 33 approved projects come from the field of engineering sciences. The majority of the approved projects fall into the efficiency action area (see the graphics on page 57).

CTI funding for SCCERs* in 2017

As part of its Energy funding programme, the CTI provided CHF 29.8 million to finance the SCCERs and the newly started joint activities. Further funding came from higher education institutions, industry partners and from public tenders.

Federal funding in CHF m

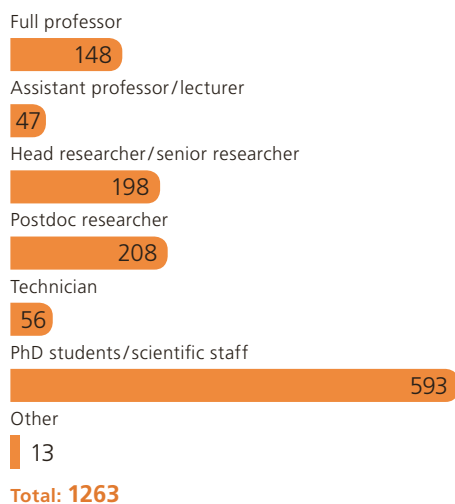


* The complete names of the institutions involved in the SCCERs can be found on pages 79 and 80.

Researchers involved in SCCERs in 2017

A total of 1263 researchers were involved in the SCCERs and the joint activities in 2017 (in 2016: 1152). About 47% of these were PhD students and research assistants.

Number of employees by position



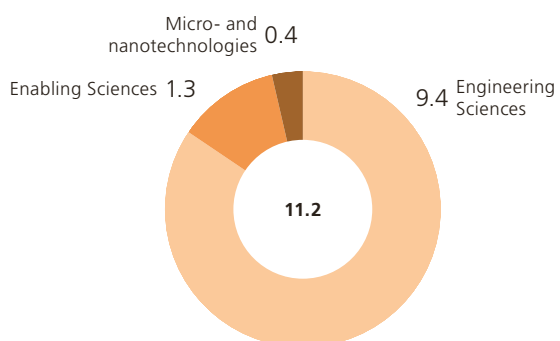
SCCER overview of funding

The proportion of third-party funds (competitive federal funding and industry funding) rose steadily during the first SCCER funding period. In 2017 it amounted to 38%.

2015 in CHF m	2016 in CHF m	2017 in CHF m	Change 2016/2017 in %
CTI contribution to SCCERs/Joint Activities	26.4	29.8	+11
Own funds	33.4	32.7	-2
Competitive federal funding	20.5	21.4	+4
Funding from industry and other	14.5	17.4	+16
Total: 81.8	Total: 94.8	Total: 101.3	+6

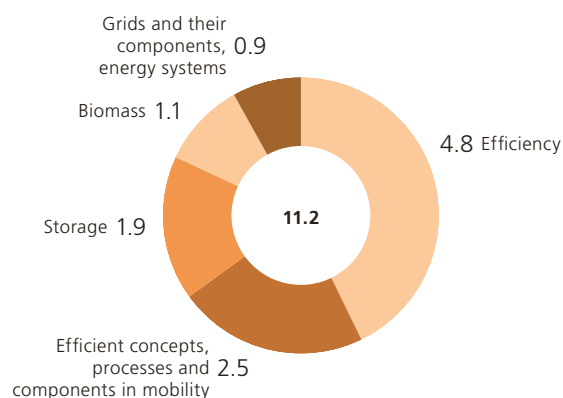
R&D projects in Energy funding programme by funding area 2017

Federal funding in CHF m



R&D projects in Energy funding programme by action area* 2017

Federal funding in CHF m



Applications assessed and approved

Number of R&D project proposals	Approval rate in %
Engineering Sciences 28	71 39
Enabling Sciences 4 10	40
Life Sciences 1	0
Micro- and nanotechnologies 1 9	11
Total no. of applications: 91	36
Total no. approved: 33	

Applications assessed and approved

Number of R&D project proposals	Approval rate in %
Efficiency 14 41	34
Efficient concepts, processes and components in mobility 6 15	40
Storage 6 13	46
Biomass 3 3	100
Grids and their components, energy systems 4 13	31
Power supply 5	0
Economy, environment, law, behaviour 1	0
Total no. of applications: 91	36
Total no. approved: 33	

* 7 action areas, 2 SCCERs in Efficiency



Success story: Energy funding programme

A heat pump for the hot water in the bathroom

Three universities and the Bern-based company Swissframe have developed a decentralised system for producing hot water in the bathroom. It uses the residual heat from the home ventilation system as an energy source for a mini heat pump and is an ideal solution for renovation projects.

In newer apartment blocks in Switzerland it is normal for the hot water to be produced centrally and distributed to the individual apartments via a network of pipes. This results in high heat and energy losses, which often amount to more than half of the hot water consumption. The taller the building, the greater the inefficiency.

Another alternative is an electric boiler in each apartment to heat the water. Many older buildings have decentralised

systems of this kind. However, the boilers consume large amounts of electricity and will need to be replaced in the medium to long term. Switching to a centralised system would result in the losses that have already been mentioned. In addition, the retrospective installation of hot water pipes is very costly.

System uses air as a heat source

In a CTI project an energy-efficient solution was developed that is also suitable for new buildings. It consists of a ready-made front-wall unit containing the entire bathroom system, which uses very little energy. The manufacturer is Swissframe AG, a company based in the Swiss town of Münchenbuchsee. Together with the Laboratory for Photovoltaic Systems at Bern University of Applied Sciences (BFH), the Institute for Solar Technology at the University of

“Together we looked for a more energy-efficient, cost-effective solution and identified new milestones.”

Felix Kunz, CTI head innovation mentor

Applied Sciences in Rapperswil (HSR) and the Institute for Energy Systems at the NTB Interstate University of Applied Sciences and Technology Buchs (NTB), Swissframe managing director Balz Hegg developed a system that uses the exhaust air from the home ventilation system as a heat source and heats water in a tank with a small, highly efficient heat pump.

Restricted spaces require special solutions

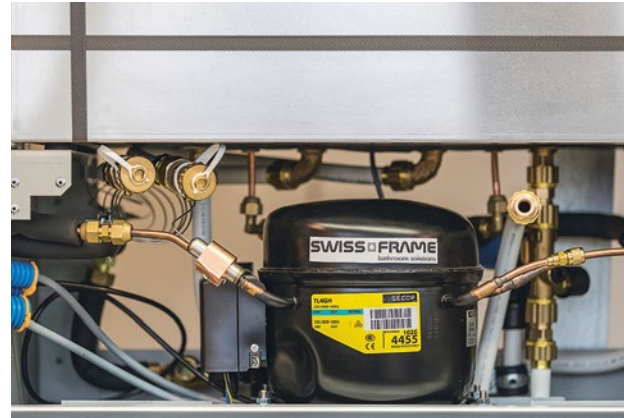
The restricted space in the cavity, which is only 30 cm wide, presented a major challenge for the production of the prototypes of the individual components in the front-wall unit. The water tank was designed as a flat cube with an innovative vacuum insulation system. The heat pump is very small and operates almost continuously, but uses very little power.

Swissframe and Urs Muntwyler, professor of photovoltaics at the BFH, originally had the idea of producing the hot water using a flow heater, which would be powered by solar energy generated on the facades of apartment blocks. The CTI rejected this application, but CTI head innovation mentor Felix Kunz encouraged the applicants to submit a second one. “Together we looked for a more energy-efficient, cost-effective solution and identified new milestones.” The second application involving the use of a heat pump was approved.

Today Swissframe is mass producing the front-wall unit. The new system was first installed in a block with 30 apartments. Five units were monitored and tested as part of a pilot and demonstration project by the Swiss Federal Office of Energy.

Support from the CTI

- Innovation cheque for the feasibility of a solar hot water system
- Co-financing of an R&D project





Success story: Energy funding programme

An app promotes environmentally friendly mobility

SUPSI, a university in the canton of Ticino, and the city of Bellinzona are working with interested citizens and Pro Velo Ticino to develop an app to encourage environmentally friendly mobility. The project, which is known as Bellidea, is supported by the Mobility SCCER.

The city of Bellinzona has been developing cycle routes, 30km/h zones and improved bus and train connections for some time in order to reduce the number of vehicles on its roads and improve the energy efficiency of its transport systems. Its efforts have been largely unsuccessful and the car continues to play a dominant role.

Now Bellinzona is investing in new technologies. The city has invited the University of Applied Sciences and Arts of

Southern Switzerland (SUPSI) to develop an app that will analyse and influence mobility behaviour. The university had already worked with the Mobility SCCER to develop a similar digital platform known as GoEco! For SUPSI the request to create another app came at the right time, because it is taking part in the European SmarterLabs project. This involves developing and testing IT solutions for urban problems with the help of people, public bodies and researchers in real-life environments. SUPSI is the link between the two projects. Now the Bellidea project means that Bellinzona is one of four European SmarterLabs cities.

Development with residents encourages acceptance

The city, SUPSI and Pro Velo Ticino invited residents to attend six workshops. Around 40 people came along and developed an app on paper which awards points for envi-

“By developing an app together with the residents we can help it to become more widely accepted.”

Francesca Cellina, SUPSI project leader

ronmentally friendly transport choices. Individual and group competitions have been held to encourage people to become involved, with the possibility of winning the prize of a discount on public transport season tickets. SUPSI project leader Francesca Cellina believes that public involvement has one big advantage: “By developing an app together with the residents we can help it to become more widely accepted.” The people involved can encourage their families and friends to install the app, which means it will not only be used by residents who are already environmentally aware.

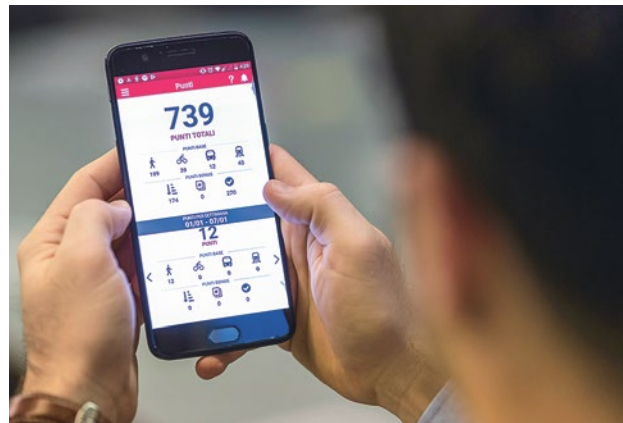
Automatic recording of the type of transport

The Bellidea app records all the routes travelled in real time. Artificial intelligence experts at SUPSI have developed mathematical models that process the data and identify the means of transport. During an initial two-week phase, anyone who uses the app must confirm manually the type of transport that has been identified. After this the app records the information automatically, with the exception of a few special cases.

It has yet to be seen whether the app will succeed in influencing residents’ behaviour sufficiently to bring about a change in the dominant role played by cars in Bellinzona.

Support from the CTI

The CTI, together with the Swiss National Science Foundation (SNSF), manages eight networked competence centres for energy research across different universities, which it is also responsible for co-funding. One of these is the Mobility SCCER, where SUPSI, the university in Ticino, is one of the ten research partners. The project leader Francesca Cellina is involved in research within the SCCER to discover whether IT tools could help to increase people’s environmental awareness and influence their transport choices. Bellidea is one of the projects that she manages under the umbrella of the SCCER.



BRIDGE

**Significant interest in
the new programme from
the SNSF and the CTI.**

Exploiting the full potential of basic research

BRIDGE is a programme run jointly by Innosuisse and the Swiss National Science Foundation (SNSF). It creates new funding opportunities at the interface between basic research and science-based innovation and accelerates the transfer of research findings into the private and public sector.

In the pilot phase from 2017 to 2020 the programme consists of two funding opportunities, Proof of Concept and Discovery, and has a budget of CHF 70 million. Both of these schemes were successfully launched in 2017 and both have access to an evaluation panel made up of well-known experts.

For young researchers

The Proof of Concept offering is aimed at young researchers who want to develop an application or service on the basis of their research results and bring it to market with a partner from the private or public sector. The projects can involve innovations of all kinds from any area of research. A project to establish a sustainable value chain for shoes is just as valid as one to develop nano-filtration membranes for recovering phosphorus from sewage sludge. Researchers must submit their applications as individuals and invest 100 per cent of their working time in the project, which will last for 12 months, with the option of an additional six-month period.

In 2017, a total of 226 project proposals were assessed following four calls for proposals and 32 of them were approved. The majority of applications came from the field of life sciences. This was followed by enabling sciences and engineering sciences. Micro- and nanotechnologies lagged behind slightly, but had the highest approval rate of

21 per cent. Almost half of the applications that were approved were submitted by researchers from institutions in the ETH domain and almost one third came from universities.

A total of CHF 3.9 million of funding was promised to applicants. The fifth Proof of Concept call for proposals was held at the end of 2017.

For experienced researchers

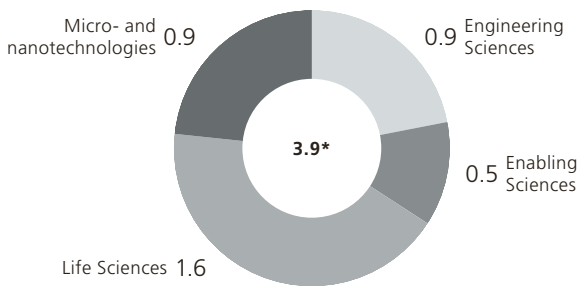
The Discovery funding opportunity offers financial support to experienced researchers who are currently working on both basic and applied research, to help them to realise the innovation potential of their research findings. In contrast to the Proof of Concept scheme, only those technological innovations are funded which have a powerful social and economic impact, for example in robotics or battery technology. Discovery projects can be submitted by individuals or small consortiums of up to three applicants. The projects last for up to four years.

Only one call for proposals takes place every year. Applications for a total of 190 projects were received following the first call for proposals in 2017. Of these 190 projects, 119 were submitted by consortiums. More than one third of the applications came from the area of life sciences. Engineering sciences and micro- and nanotechnologies were also heavily represented. The majority of the applications that were approved came from the ETH domain and from universities.

Funding of CHF 9.4 million was granted for eight excellent projects with a total of 17 applicants. The second call for proposals for Discovery began in December 2017.

Proof of Concept in 2017

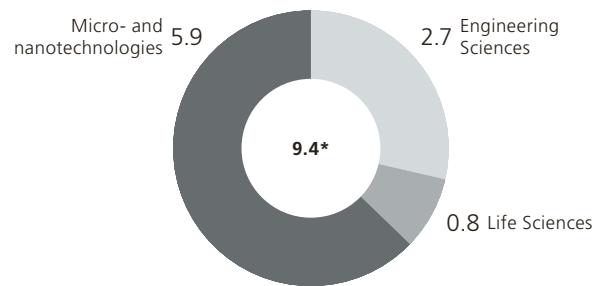
Federal funding in CHF m



* Total funding from SNSF and CTI

Discovery in 2017

Federal funding in CHF m



* Total funding from SNSF and CTI

Applications assessed and approved

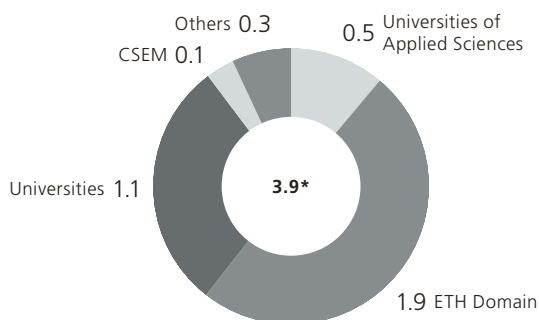
Field	Number of projects	Approval rate in %
Engineering Sciences	7 / 49	14
Enabling Sciences	4 / 49	8
Life Sciences	14 / 89	16
Micro- and nanotechnologies	7 / 33	21
Total	220 / 320	15

Applications assessed and approved

Field	Number of projects	Approval rate in %
Engineering Sciences	2 / 55	4
Enabling Sciences	23 / 23	0
Life Sciences	1 / 67	1
Micro- and nanotechnologies	5 / 44	11
Total	189 / 189	4

Proof of Concept by type of research institution in 2017

Federal funding in CHF m



* Total funding from SNSF and CTI

Discovery by type of research institution in 2017

Applicants

Each application can have up to 3 applicants. Each applicant is equally important to the project.

Type of research institution	Number of applicants	Approval rate in %
Universities of Applied Sciences	1	99
ETH Domain	7	130
Universities	6	110
CSEM	3	22
Others	9	0
Total applicants	370	
Total applicants with approved applications	17	5

Applications assessed and approved

Type of research institution	Number of projects	Approval rate in %
Universities of Applied Sciences	4	44
ETH Domain	15	97
Universities	10	64
CSEM	1	5
Others	2	10
Total no. of applications:	220	
Total no. approved:	32	15



Business Support on Your Doorstep

Successful takeover of strategic management.

Promoting innovation by SMEs in a European network

The Enterprise Europe Network (EEN) helps small and medium-sized enterprises (SMEs) and start-ups to establish partnerships in countries both inside and outside Europe, to implement innovation and research projects and to move into new markets. It is made up of more than 600 member organisations from over 60 countries. The EEN offers advice on funding and financing opportunities on a European level and on legal and regulatory requirements in new markets. It helps companies to search for international partners in the fields of research and business with an online tool consisting of more than 2500 technology profiles.

Last year the CTI took over the strategic management of EEN Switzerland. The strategy it adopted was passed on to a steering committee made up of representatives from the State Secretariat for Education, Research and Innovation (SERI), the State Secretariat for Economic Affairs (SECO) and the CTI, which give the committee its mandate. Six people work at Euresearch and one at Switzerland Global Enterprise on behalf of the EEN consortium. They are responsible for the commercial aspects of the EEN services. In 2017 EEN Switzerland organised five partnering events which were open to SMEs from inside and outside Switzerland.

The EEN strategy in 2017 focused on micro- and nanotechnologies, ICT, bio- and medtech, materials, smart energy and food and agriculture. The organisation put the emphasis on developing the coordination and cooperation with regional support activities and, in particular, with the Regional Innovation Systems (RISs) organised by SECO. The RISs have the critical mass to provide effective and efficient services and at the same time are close to the SMEs. They generally cover more than one canton and sometimes operate across national borders. At EEN Switzerland every

RIS has a contact person and this has already led to a number of useful partnerships. The RIS partners very much value the bilateral discussions, the regular exchange of ideas and information and the specific point of contact at EEN Switzerland.

The results for 2017 show that the Swiss EEN team has achieved the objectives that it agreed in the previous year with its supervisory body, the EU's Executive Agency for Small and Medium-sized Enterprises (EASME). In particular the 19 long-term cooperations (partnership agreements or PAs) resulting from the EEN's activities and services significantly exceed the objective of 10 cooperations set. The goal for 2018 has been increased to 15 PAs. The ratio of PAs to full-time employees makes EEN Switzerland one of the most efficient European EEN consortiums. Therefore it is expected at least to maintain or even to improve its position.

As Switzerland has once again been a fully associated member of the European Horizon 2020 research programme since January 2017, the Swiss EEN consortium took on new tasks in this area. The SME programme of Horizon 2020 is aimed at companies with a radical new idea with considerable potential which are aiming to bring to market products or services on the basis of a well-thought-out business plan. In 2017 a total of 14 Swiss companies qualified for the programme. The EEN provided them with a requirements analysis and with coaching, among other things. In December 2017 another 22 Swiss companies were nominated and they will benefit from the SME programme this year. This means that Switzerland is receiving a disproportionately large amount of the total EEN funding.



Annex

Annual financial statement for 2017

in CHF	Budgetary credit	Revenue
Expenditure		
Other revenue (reimbursements from R&D projects)	1,080,000	* 1,310,140

* Unlike in the state financial statements, reimbursements appear as a separate account in the Activity Report (gross presentation).

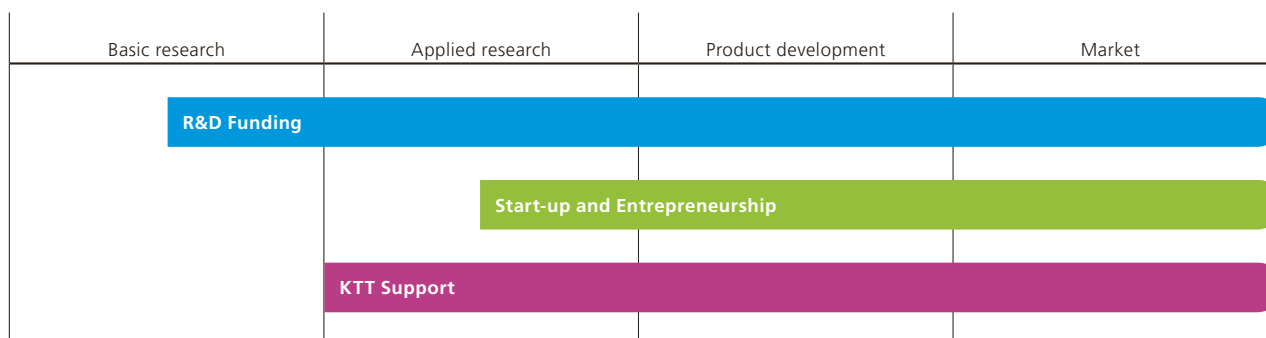
in CHF	Budgetary credit	Expenses
Technology and Innovation Promotion CTI		
R&D Funding		157,346,443
Payment of indirect research costs (overhead costs)		5,354,856
Swiss Competence Centers for Energy Research (SCCER)		29,844,199
Knowledge and Technology Transfer		4,744,632
Start-up and Entrepreneurship		9,944,784
BRIDGE funding programme		3,700,000
Dissemination of information		558,351
Total	217,000,000	211,493,265

in CHF	Budgetary credit	Expenses
Annual financial statement of the Secretariat		
Salaries and employer's contributions	6,696,700	5,745,793
Other staff expenses	92,300	204,467
Rent expense	536,500	646,255
IT equipment*	6,271,200	5,507,221
Consultation fees	7,587,917	6,648,373
Other operating expenses	242,718	385,228
Total	21,427,335	19,137,338

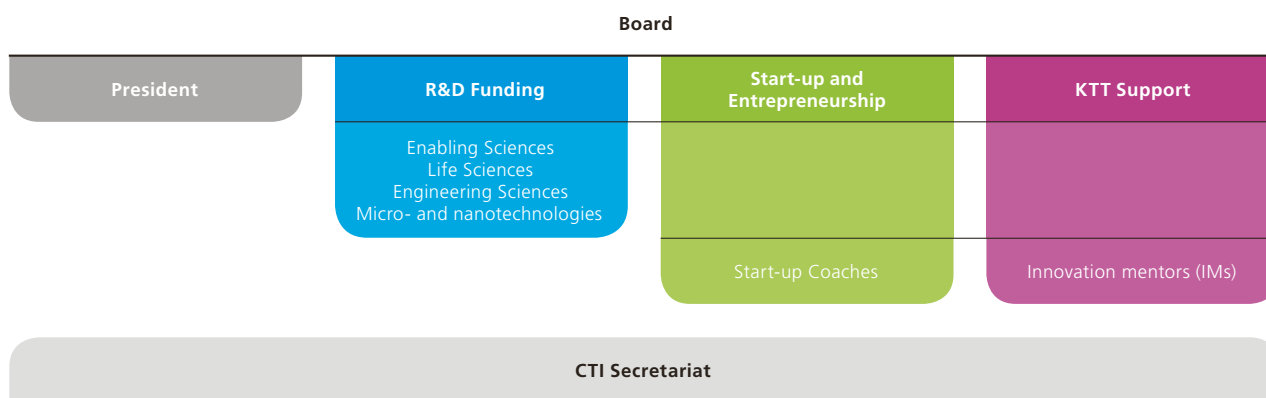
* Including IT services and information technology projects

in CHF	Expenses
Provisions for employee benefits	
Contribution to provisions for accumulated staff overtime	36,876
Liabilities 2017 Provisions for employee benefits	-385,191

CTI instruments in the innovation chain



CTI Organisation Chart



CTI Secretariat Staff

	End of 2016	End of 2017
No. of staff	42	40
Full-time equivalents	34.3	33.0
Male	15	14
Female	27	26
German-speaking	37	36
French-speaking	2	2
Italian-speaking	3	1
Romansh-speaking	1	1
Management (incl. Communications)	7	8
Full-time equivalents	5.9	6.4
R&D Funding	9	8
Full-time equivalents	6.7	6.1
KTT Support	4	3
Full-time equivalents	2.6	2.1
Start-up and Entrepreneurship	6	5
Full-time equivalents	4.8	4.1
Energy funding programme	3	3
Full-time equivalents	2.4	2.4
Resource management	11	11
Full-time equivalents	9.9	9.9
IT	2	2
Full-time equivalents	2.0	2.0
Interns	1	0
Apprentices	0	0
Temporary positions of less than 12 months	4	5
Full-time equivalents	* 3.3	* 4.8

	End of 2016	End of 2017
No. of elected Commission members	72	69
of which on Executive Board	7	7
No. of coaches	67	72
No. of innovation mentors	15	14

* Incl. temporary increase in employment levels

CTI Board

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Walter Steinlin, Bern

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Prof. Martina Hirayama, Nussbaumen (up to 28.2.2017)

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Dr Martin Riediker, Seltisberg

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Dr Myriam Meyer, Birchwil

Prof. Lutz-P. Nolte, Bern

Head of Diversity Management

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Directory R&D Funding

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* elected by the Board

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 Marco Rüedi, Lausanne (LS)
 Robert Schier, Perroy (LS/MD)
 Andrea Boris Schlapbach, Baar (ICT, Eng.)
 Dr Andreas Schulze, Basel (LS/MD)
 Dr Michael Sidler, Kirchdorf (LS/MD)
 Daniel Staehelin, Embrach (ICT)
 Jürg Steiger, Winterthur (ICT)
 Michael Stucki, Zurich (LS)
 Jan Vichr, Zurich (ICT)
 Dr Heiko Visarius, Hasle bei Burgdorf (LS/MD)
 Paul-André Vogel, Sion (Eng./Intd.)
 Michael Wacker, Unterengstringen (LS)
 Beat Walther, Zurich (ICT)
 Lukas Weder, Zurich (ICT)
 Jean-Marc Wismer, Lausanne (LS/MD)
 Dr Claudia Wohlfahrtsstätter, Kirchberg ZH (Eng.)
 Christian Wolf, Vaduz (Eng./Intd.)

CTI Entrepreneurship course providers

Awareness-raising events (module 1)

IFJ Institut für Jungunternehmen

Zurich-East Region Consortium (modules 2, 3 and 4)

Head

ZHAW School of Management and Law (Modul 2)

TECHNOPARK® Zurich (modules 3 and 4)

Partners

TECHNOPARK® Zurich

ZHAW School of Management and Law

TECHNOPARK® Winterthur

STARTFELD

University of St Gallen

FHS St. Gallen University of Applied Sciences

Empa

University of Liechtenstein

HTW Chur Hochschule für Technik und Wirtschaft

ETH Zurich

University of Zurich

ETH Zurich, TIM Group, Chair of Technology and Innovation Management

ZHdK Zurich University of the Arts

seif

Impact Hub Zurich

Central Region Consortium (modules 2, 3 and 4)

Head

University of Bern (module 2)

FHNW University of Applied Sciences Northwestern Switzerland
(modules 3 and 4)

Partners

BFH Bern University of Applied Sciences

University of Bern

HSLU Lucerne University of Applied Sciences and Arts

be-advanced

FHNW University of Applied Sciences Northwestern Switzerland

Region West consortium (modules 2, 3 and 4)

Head

EPFL Innovation Park

Partners

EPFL Swiss Federal Institute of Technology in Lausanne

EHL École hôtelière de Lausanne

Genilem

University of Lausanne

University of Geneva

University of Neuchâtel

University of Fribourg

CSEM

HES-SO University of Applied Sciences and Arts in Western Switzerland

Ticino

Head

Centro Promozione Start-up

Partners

Università della Svizzera italiana

SUPSI University of Applied Sciences and Arts of Southern Switzerland

Special courses on Social Entrepreneurship

seif Social Entrepreneurship Initiative & Foundation

KTT Support directory

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Prof. Rudolf Minsch, Zurich

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Markus Kottmann, Rapperswil

Head innovation mentors

André Droux, Granges

Dr Markus Ehrat, Magden

Felix Kunz, Solothurn

Innovation mentors

Dr Walter J. Ammann, Davos

Jürg Attinger, Stein am Rhein

Dr Hanspeter Bär, Wald-Schönengrund

Brendan Hughes, Bättwil

Nicola Mona, Mendrisio

Daniel Portmann, Horw

Dr Gaby Schwarz, Uetikon am See

Dr Pedro Torres, Neuchâtel

Dr Robert van Kommer, Lausanne

Andréas von Kaenel, Vufflens-la-Ville

Dr Jean-François Willemin, Hinwil

The eleven National Thematic Networks (NTNs)

AM-Network

This National Thematic Network (NTN) is promoting the introduction of additive manufacturing (AM) in Swiss industry. The technology, which is also known as professional 3D printing, allows components to be manufactured directly from digital 3D models. Because of the way it differs from traditional production processes, it opens up new applications that have not been available until now. The AM-Network's objective is to make the major innovation and differentiation potential of professional 3D printing available to Swiss businesses.

www.amnetwork.ch

Carbon Composites Schweiz

The focus of the NTN Carbon Composites Schweiz is to help high-performance fibre reinforced composites to make a breakthrough in Swiss industry. The development of composite technologies is to be a driver of innovation for the whole country. By bringing together expert knowledge from across the entire value-added chain, competencies in these key technologies can be applied to benefit the Swiss economy. The aim is also to improve access to export markets in Europe and worldwide.

www.cc-schweiz.ch

Inartis Network

Innovations made in Switzerland: the mission of the Inartis Network is to create economic value and new jobs in Switzerland by means of innovation in the field of life sciences. Since 2013 it has supported more than 90 projects involving Swiss companies and research institutions. The Inartis Network offers innovative organisations access to transdisciplinary networks of experts covering different industries. The network regularly brings together leading players at conferences, workshops and trade fairs.

www.inartis-network.ch

Innovative Surfaces

Modern surface technologies play an important role in solving challenges across various fields. The NTN Innovative Surfaces helps the Swiss economy to use the fast-growing potential for innovation in surface technologies. It creates opportunities for knowledge-intensive, future-oriented innovation projects. The NTN's cooperation platforms make surface technologies, which can be used in numerous fields, accessible in a wide range of applications.

www.innovativesurfaces.ch

Swiss Alliance for Data-Intensive Services (data+service)

Digitisation is changing everything and, in particular, the way we do business. The Swiss Alliance for Data-Intensive Services is making a significant contribution towards transforming Switzerland into an internationally recognised hub for data-driven value creation. This NTN focuses on cooperation within an interdisciplinary expert network of innovative companies and universities with the aim of pooling knowledge from a variety of different areas, including information technology, artificial intelligence, business and psychology, in order to produce market-ready products and services.

www.data-service-alliance.ch

Swiss Biotech

Switzerland's biotech and pharmaceutical industry is a major sector of the economy, and will be further strengthened by the merger of biotechnet and the Swiss Biotech Association (SBA). In joining forces, SMEs in the professional association SBA and the research network biotechnet can address their specific needs with greater impact and efficiency.

www.swissbiotech.org

Swiss Food Research

The Swiss food industry has been subject to intense pressure on prices for several years. The reasons for this include high costs, the relatively small internal market, increasing pressure from imports, increasing numbers of people crossing borders to go shopping, and the price war in retail. Additionally, new requirements regarding food safety, health and the environment are continuously introduced. The NTN Swiss Food Research is the only national structure which promotes research-based innovation in this field, thereby helping companies to be more competitive.

www.swissfoodresearch.ch

Swissphotonics

The NTN Swissphotonics is run by SLN (Verein Schweizer Laser und Photonik Netz). Photonics will have a significant impact on the competitiveness of European industry over the coming decade. National platforms will provide businesses with easy access to research institutes and international programmes and networks.

www.swissphotonics.net

Swiss Wood Innovation Network

The NTN Swiss Wood Innovation Network is the result of a merger between the Swiss Association for Wood Research SAH and the R&D project consortium WoodWisdom-Net+. It covers the forest/wood value-added chain in the following areas: raw materials supply, use of chemicals, energy use, components and materials, supporting structures and buildings, and stock flow. The members create a highly competent alliance, and support the innovative, intelligent, customer-oriented supply and use of wood.

www.s-win.ch

VNL (Association for Network Logistics)

In light of the increasing globalisation of value-added chains and greater dynamism in sales and procurement markets, logistics is a very high priority in Switzerland. It is a key element in the economy's competitiveness. The NTN VNL (Association for Network Logistics) brings businesses, research institutions, technology transfer centres and logistics providers together, thereby helping to generate innovation and synergies in logistics.

www.vnl.ch

Virtual Switzerland

Virtual Switzerland aims to promote technology transfers between academic institutions and the world of business in the field of virtual and augmented reality. The core areas of this NTN include medtech, construction and architecture, manufacturing, tourism and culture, because these are areas where virtual and augmented reality has significant potential. Virtual Switzerland provides its members with concrete support for the implementation of their ideas by means of networking, workshops and advice.

www.virtualswitzerland.org

SCCER directory

Steering Committee

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Prof. Bernhard Eschermann (CTI), Switzerland

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Prof. Barbara Lenz, Germany

Prof. em. Hans-Rudolf Schalcher, Switzerland

Prof. Philippe Thalmann, Switzerland

Prof. Eberhard Umbach, Germany

Institutions participating in SCCERs

FEED&D – Future Energy Efficient Buildings & Districts

Leading House

Empa

Participating institutions

ETH Zurich

EPFL Swiss Federal Institute of Technology in Lausanne

HSLU Lucerne University of Applied Sciences and Arts

University of Geneva

FHNW University of Applied Sciences Northwestern Switzerland*

EIP – Efficiency of Industrial Processes

Leading House

ETH Zurich

Participating institutions

EPFL Swiss Federal Institute of Technology in Lausanne

HSR Hochschule für Technik Rapperswil

HSLU Lucerne University of Applied Sciences and Arts

NTB Interstate University of Applied Sciences of Technology Buchs

University of Geneva

FHNW University of Applied Sciences Northwestern Switzerland

Eawag

FURIES – Future Swiss Electrical Infrastructure

Leading House

EPFL Swiss Federal Institute of Technology in Lausanne

Participating institutions

ETH Zurich

Università della Svizzera italiana

HES-SO University of Applied Sciences and Arts in Western Switzerland

SUPSI University of Applied Sciences and Arts of Southern Switzerland

ZHAW Zurich University of Applied Sciences

FHNW University of Applied Sciences Northwestern Switzerland

BFH Bern University of Applied Sciences

HSR Hochschule für Technik Rapperswil

HSLU Lucerne University of Applied Sciences and Arts

University of Basel*

CSEM*

* Universities participating in the SCCER that are not funding recipients

HaE – Heat & Electricity Storage: Materials, Systems, Modelling

Leading House

PSI Paul Scherrer Institute

Participating institutions

Empa

EPFL Swiss Federal Institute of Technology in Lausanne

ETH Zurich

HSR Hochschule für Technik Rapperswil

University of Fribourg

HSLU Lucerne University of Applied Sciences and Arts

BFH Bern University of Applied Sciences

University of Geneva

University of Bern

FHNW University of Applied Sciences Northwestern Switzerland*

SUPSI University of Applied Sciences and Arts of Southern Switzerland

ZHAW Zurich University of Applied Sciences*

HES-SO University of Applied Sciences and Arts in Western Switzerland*

HEIG-VD School of Management and Engineering in canton Vaud*

NTB Interstate University of Applied Sciences of Technology Buchs*

SoE – Supply of Electricity

Leading House

ETH Zurich

Participating institutions

EPFL Swiss Federal Institute of Technology in Lausanne

University of Bern

University of Lausanne

University of Geneva

University of Neuchâtel

Università della Svizzera italiana

PSI Paul Scherrer Institute

WSL Swiss Federal Institute for Forest, Snow and Landscape Research

Eawag

HES-SO University of Applied Sciences and Arts in Western Switzerland

HSLU Lucerne University of Applied Sciences and Arts

HSR Hochschule für Technik Rapperswil

University of Basel*

CREST – Competence Center for Research in Energy, Society and Transition

Leading House

University of Basel

Participating institutions

ZHAW Zurich University of Applied Sciences

University of St Gallen

ETH Zurich

University of Lucerne

University of Geneva

University of Neuchâtel

EPFL Swiss Federal Institute of Technology in Lausanne

HES-SO University of Applied Sciences and Arts in Western Switzerland

Mobility – Efficient Technologies and Systems for Mobility

Leading House

ETH Zurich

Participating institutions

BFH Bern University of Applied Sciences

Empa

EPFL Swiss Federal Institute of Technology in Lausanne

NTB Interstate University of Applied Sciences of Technology Buchs

PSI Paul Scherrer Institute

ZHAW Zurich University of Applied Sciences

SUPSI University of Applied Sciences and Arts of Southern Switzerland

FHNW University of Applied Sciences Northwestern Switzerland

University of St Gallen

* Universities participating in the SCCER that are not funding recipients

Directory BRIDGE

BIOSWEET – BIOMass for SWiss EnErgy fuTure

Leading House

PSI Paul Scherrer Institute

Participating institutions

BFH Bern University of Applied Sciences

FHNW University of Applied Sciences Northwestern Switzerland

SUPSI University of Applied Sciences and Arts of Southern Switzerland*

ZHAW Zurich University of Applied Sciences

ETH Zurich*

HES-SO University of Applied Sciences and Arts in Western Switzerland

EPFL Swiss Federal Institute of Technology in Lausanne

WSL Swiss Federal Institute for Forest, Snow and Landscape Research

HSLU Lucerne University of Applied Sciences and Arts

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* Universities participating in the SCCER that are not funding recipients

Frequently used abbreviations/acronyms

CEO	Chief Executive Officer
CFO	Chief Financial Officer
CHF	Swiss franc
CSEM	Swiss Centre for Electronics and Microtechnology
CTI	Commission for Technology and Innovation
Eng./Intd.	Engineering/Inderdisciplinary
EPFL	Federal Institute of Technology Lausanne
ERI	Education, Research and Innovation
ICT	Information and Communication Technologies
KTT	Knowledge and Technology Transfer
LS/MD	Life Sciences/Medical Devices
NTN	National Thematic Networks
R&D	Research and Development
SCCER	Swiss Competence Center for Energy Research
SME	Small and medium sized enterprises
SNSF	Swiss National Science Foundation
SUPSI	University of Applied Sciences and Arts of Southern Switzerland
UAS	University of Applied Sciences
ZHAW	Zurich University of Applied Sciences

Publication details

Published by

Commission for Technology and Innovation CTI /
Innosuisse – Swiss Innovation Agency

© CTI/Innosuisse, April 2018

Concept and Design

Weissgrund, Zurich

Edited by

Eliane Kersten, CTI/Innosuisse

Weissgrund, Zurich

Statistics

Adrian Berwert, CTI/Innosuisse

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Photography by

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all photos, unless otherwise stated

Jakob Schlaepfer AG: Page 28, right side

Wale Pfäffli, Burgdorf: Page 32, top

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