

**swiTT**   
swiss technology transfer association

# swiTTreport 2014

SWISS TECHNOLOGY TRANSFER REPORT



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## IMPRESSUM

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## SWITT

swiTT, the Swiss Technology Transfer Association, is the association of the professionals in Switzerland dealing with the interaction between public research and industry. swiTT currently has more than 100 members from all parts of Switzerland. Most of them work in technology transfer at public research institutions, others are employed in the private sector. For further information about swiTT, please refer to [www.swiTT.ch](http://www.swiTT.ch).

Among other services, swiTT operates swiTTlist, a unique portal with current technology opportunities from Swiss public research institutions available for licensing and development by industry. For further information please refer to [www.swiTTlist.ch](http://www.swiTTlist.ch).

### SWITT MISSION

#### COOPERATION – DEVELOPMENT – SERVICES - DIALOGUE

- ▶ Facilitates and strengthens cooperation and technology transfer between Swiss public research institutions and the private sector; (COOPERATION)
- ▶ Offers professional development to its members and other practitioners involved in technology transfer within public institutions and the private sector; (DEVELOPMENT)
- ▶ Provides services of common interest to its members, their institutions and other stakeholders involved. (SERVICES)
- ▶ Maintains an active dialogue with research institutions, the private sector and the authorities to foster optimal processes and regulatory framework / regulations. (DIALOGUE)

## SUMMARY

The annual survey „swiTTreport“ is the most comprehensive analysis of the technology transfer activities of Swiss public research institutions. The report covers two main areas, a) research collaborations of the participating institutions with private or public partners, and b) the activities for the economic exploitation of research results from these institutions. The Swiss public research institutions interact very actively with partners in the economy. These activities are collectively designated in the report as “technology transfer” (TT) activities. With regard to scientific disciplines, the report mainly focuses on the areas of life sciences, natural sciences and engineering sciences.

Data on technology transfer activities from seven cantonal universities and the two Federal institutes of technology (collectively Universities), from five universities of applied sciences (UAS), and three research institutions of the ETH domain (RI) were available for this year's report. However, some of the data were incomplete or fragmentary, and the figures presented in this report clearly underestimate the real situation. Data from several institutions were not available or were too fragmentary to be included in the report. In most figures, the data for 2013 are compared with the data from previous years although the institutional basis is not always the same.

The respondents reported their results to swiTT voluntarily, and the data presented in the report are on an “as-reported” basis. For reasons of confidentiality, the report mainly contains aggregated numbers. However, some of the key parameters are presented on an individual basis but only for those institutions that agreed to do so. On account of the difference in mission, organization and objectives of the three types of institution (Universities, UAS, RI), their data are reported separately.

Overall, the respondents reported the following key figures on technology transfer activities in 2013:

3934 new research projects with economic partners were initiated

575 invention disclosures were registered

270 priority patent applications were filed

201 license and option agreements were executed

73 start-up companies were created, of which 45 were based on a license or transfer of IP and 28 on know-how from the institutions

A conservative extrapolation of the partial data received shows that the institutions covered in this report overall started more than 4'500 new research projects with external business partners in 2013. Larger companies (>250 employees) and public institutions are the most common cooperation partners of the Universities whereas the RI mainly cooperate with public institutions.

Universities account for most of the commercialization activities with about 90% of all patent applications filed and 83% of all licenses concluded. Commercialization occurs most frequently with SME, including start-ups (51%). In 34% of the cases the partner was a large company, in 15% it was another public institution.

Numerous international studies confirm the collaborative culture between academia and industry in Switzerland and the excellent technology transfer performance of Swiss universities and other public research institutions. Easy access to academic researchers and well defined technology transfer processes are important criteria for companies to relocate their business to Switzerland. Maintaining a system which is based on fair partnership between academia and industry together with the continuous optimization of processes will be important aspects to further strengthen Switzerland's leading position in the international context.

## RÉSUMÉ

L'enquête annuelle «swiTTreport» est l'analyse la plus complète des activités de transfert de technologies réalisées par les institutions de recherche publiques suisses. Le rapport couvre deux domaines majeurs: a) la collaboration en matière de recherche des institutions participantes avec des partenaires privés ou publics et b) les activités liées à la commercialisation des résultats de recherche obtenus par ces institutions. Les institutions de recherche publiques suisses coopèrent très activement avec des partenaires économiques dans ce que le rapport désigne collectivement sous le terme d'activités de «transfert de technologies» (TT). S'agissant des disciplines scientifiques, l'accent est mis principalement sur les sciences de la vie, les sciences naturelles et l'ingénierie.

Le rapport de cette année s'est appuyé sur les données relatives aux activités de transfert de technologies de sept universités cantonales et deux écoles polytechniques fédérales (ci-après collectivement les «universités»), de cinq universités de sciences appliquées («UAS») et de trois institutions de recherche dans le domaine EPF («RI»). Certaines données étaient toutefois incomplètes ou fragmentaires si bien que les chiffres présentés dans ce rapport sous-estiment clairement la situation réelle. Par ailleurs, les données de plusieurs institutions n'étaient pas disponibles ou étaient trop fragmentaires pour être incluses dans le rapport. Dans la plupart des cas, les chiffres de 2013 sont comparés avec les données des années précédentes, bien que la base institutionnelle ne soit pas toujours la même.

Les personnes interrogées ont communiqué volontairement à swiTT leurs résultats qui sont présentés dans ce rapport tels que rapportés. Pour des raisons de confidentialité, le rapport contient principalement des chiffres agrégés. Certains des paramètres clés sont toutefois présentés individuellement si les institutions ont donné leur accord. Compte tenu des différences de mission, d'organisation et d'objectifs des trois types d'institutions (universités, UAS, RI), leurs données sont présentées séparément.

Dans l'ensemble, les personnes interrogées ont communiqué les chiffres clés suivants sur les activités de transfert de technologies en 2013:

- 3934 nouveaux projets de recherche ont été lancés avec des partenaires économiques
- 575 annonces d'inventions ont été enregistrées
- 270 demandes de brevet prioritaires ont été déposées
- 201 contrats de licence et d'option ont été exécutés
- 73 start-up ont été créées dont 45 étaient fondées sur une licence ou un transfert de PI et 28 sur le savoir-faire des institutions

D'après une extrapolation conservatrice des données partielles reçues, les institutions couvertes dans ce rapport ont dans l'ensemble démarré plus de 4500 nouveaux projets de recherche avec des partenaires d'affaires externes l'an dernier. Les sociétés de taille plus grande (>250 employés) et les institutions publiques sont les partenaires de coopération les plus communs des universités. Dans le cas des RI, la majorité des partenaires sont des institutions publiques.

Les universités sont responsables de la plupart des activités de commercialisation rapportées (90% des demandes de brevet, 83% des contrats de licence). Dans 51 % des cas, leur partenaire était une PME ou une spin-off, dans environ 34% des cas, une grande société et dans 15% des cas, une autre institution publique.

D'innombrables études internationales confirment la culture de collaboration entre les milieux universitaires et économiques en Suisse et l'excellente performance des universités et autres institutions de recherche publiques suisses dans le domaine du transfert de technologies. La facilité d'accès aux chercheurs universitaires et l'existence de processus clairement définis en matière de transfert de technologies constituent des critères importants pour les entreprises envisageant de déménager leurs activités en Suisse. A cet égard, le maintien d'un système fondé sur un partenariat équitable entre les milieux universitaires et économiques, ainsi que l'optimisation continue des processus seront des aspects essentiels pour renforcer davantage la position de leader de la Suisse à l'échelle internationale.

## ZUSAMMENFASSUNG

Der jährlich publizierte «swiTTreport» ist die umfassendste Analyse der Aktivitäten der öffentlichen Forschungsinstitutionen (PRO) in der Schweiz in den Bereichen Zusammenarbeit mit der Wirtschaft und wirtschaftliche Umsetzung von Forschungsergebnissen. Diese Aktivitäten werden häufig auch unter dem Begriff «Technologietransfer» zusammengefasst. Der Bericht zeigt, dass die schweizerischen PRO sehr aktiv und erfolgreich mit der Wirtschaft interagieren. Die in der Analyse erhobenen Daten beziehen sich vorwiegend auf die Fachbereiche Life Sciences, Naturwissenschaften und Ingenieurwissenschaften.

Der Bericht umfasst die Aktivitäten von sieben kantonalen Universitäten und der beiden ETH's (zusammengefasst unter «Universitäten»), von fünf Fachhochschulen («UAS») und von drei Forschungsinstitutionen des ETH-Bereichs («RI»). Allerdings waren von einigen Institutionen nur Teildaten aus einzelnen Bereichen bzw. generell sehr fragmentarische Angaben verfügbar, so dass die effektiven Aktivitäten substanziell höher sind, als in diesem Bericht zusammengefasst. Daten einiger Institutionen waren so unvollständig, dass sie gar nicht berücksichtigt werden konnten. Dies führt dazu, dass die Daten mit jenen von früheren Jahren teilweise nur beschränkt vergleichbar sind.

Die teilnehmenden Institutionen rapportierten die Resultate an swiTT auf freiwilliger Basis und die Daten wurden wie berichtet verwendet. Aus Vertraulichkeitsgründen enthält der Bericht vorwiegend aggregierte Zahlen. Einige Kennzahlen werden jedoch zum ersten Mal auf individueller Basis publiziert, allerdings nur für jene Institutionen, die einer solchen Publikation zugestimmt haben. Die Daten der unterschiedlichen Arten von Institutionen (Universitäten, UAS, RI) werden im Bericht separat zusammengefasst.

Insgesamt rapportierten die teilnehmenden Institutionen die folgenden Kennzahlen über ihre Technologietransferaktivitäten im Jahr 2013:

- 3934 neue Forschungsprojekte mit Wirtschaftspartnern gestartet
- 575 Erfindungsmeldungen registriert
- 270 Prioritäts-Patentanmeldungen eingereicht
- 201 Lizenz- und Optionsverträge bzw. IP-Verkäufe abgeschlossen
- 73 Start-up Firmen wurden gegründet, 45 davon auf Basis einer Nutzungsvereinbarung für geistiges Eigentum mit der entsprechenden Institution und 28 basierend auf Know-how

Da die Daten verschiedener Institutionen unvollständig sind, kann bei einer konservativen Extrapolation davon ausgegangen werden, dass an den teilnehmenden Institutionen 2013 über 4500 neue Projekte mit Wirtschaftspartnern gestartet wurden. Grosse Firmen und andere öffentliche Institutionen sind die häufigsten Kooperationspartner der Universitäten, während es an den RI vor allem andere öffentliche Institutionen sind.

Die Universitäten sind für meisten Aktivitäten im Bereich der wirtschaftlichen Umsetzung von Forschungsergebnissen verantwortlich (90% der Patentanmeldungen, 83% der Lizenzen). Bei den Partnern in diesem Bereich handelt es sich mehrheitlich um KMU, inkl. Start-ups (51%). In 34% der Fälle waren es grössere Firmen und in 15% Institutionen aus dem öffentlichen Bereich.

Diverse internationale Untersuchungen bestätigen die kooperative Kultur zwischen Industrie und Hochschulen in der Schweiz und die ausgezeichneten Transferleistungen der öffentlichen Forschungsinstitutionen. Der einfache Zugang zu akademischer Forschung und gut etablierte Transferprozesse sind auch ein wichtiges Kriterium für den Standortentscheid von Firmen. Die weitere Stärkung des partnerschaftlichen Verhältnisses zwischen Hochschulen und Industrie und der entsprechenden Prozesse sind wichtig, um die führende Rolle der Schweiz in diesem Bereich auch künftig beibehalten zu können.

## 1. INSTITUTIONS PARTICIPATING AND DATA COLLECTION

Ten universities and the two Swiss Federal Institutes of Technology (collectively 'Universities'), seven Universities of Applied Sciences (UAS), and three research institutes (RI) in the ETH domain were contacted in spring of 2014 and asked to provide data on their technology transfer (TT) activities for the year 2013. The expression "technology transfer" used in this report covers the activities of these institutions with regard to research collaborations with partners from the economy and the commercialization of research results for the benefit of the economy and society overall.

The questionnaire was returned by nine Universities, individual departments of five UAS, and by three RI. However, the handling of research collaborations with economic partners and other technology transfer activities varies a lot among different institutions, and not all of them were able to provide comprehensive data in this field. **Thus, the data provided in this report are not complete and only summarize the figures reported, while the actual activities at the interface of academia and economy are considerably higher.** Table 1 on the next page shows the institutions that participated in the survey and comments on the comprehensiveness of the data provided.

Comments on data received by the different types of institutions:

**Universities:** At several Universities, contracts for collaborative research projects with economic partners need only to be signed by university management above a certain amount. Therefore, not all small projects were reported by such institutions. At some Universities, technology transfer offices (TTO) only handle a small part of the collaborative research projects with economic partners; and at some Universities, centralized TTO were created only recently. Activities in research and technology transfer at university hospitals are usually closely linked to the respective University, hence the services of these transfer offices are also available to researchers at the hospitals. Data from the hospitals are included in the report, but not all are complete. With several hospitals, especially clinical research activities are not included.

**UAS:** The management of technology transfer activities at the UAS varies widely. Some departments or schools have professionals working in centralized TTO (e.g. BFH and ZHAW) and are able to provide comprehensive data. At other departments or schools, no centralized support functions exist and data are fragmentary or are completely lacking.

**RI:** The research institutions that participated in the survey have centralized support functions providing technology transfer services for the researchers although the scope of services provided differ.

swiTTreport represents the most comprehensive study in Switzerland on technology transfer activities of academic and other public research institutions. The report mostly provides aggregate data for the three types of institutions covered in this survey. For those institutions that agreed to disclose individual data some key figures are listed on page 23.

**Table 1: Institutions contacted for the survey and comments on their data provided.**

Institution	Technology Transfer Office (TTO)	Comments on data provided
<b>Universities</b>	<b>(Total 10)</b>	
ETH Zürich	ETH transfer	Complete data, research agreements <50kCHF only partly
EPF Lausanne	TTO	Complete data, research agreements <50kCHF only partly
Universität Basel / Universitätsspital Basel	Unitecra	Complete data only for the Medical, Natural Sciences and Psychology Faculties, partial data for hospital
Universität Bern / Inselspital	Unitecra	Complete data only for the Medical, Vetsuisse and Nat.Science Faculties, no data for research agreements of other faculties
University of Fribourg	TTO	Partial data available
Université de Genève / Hôpitaux Universitaires de Genève	Unitec	Complete data for commercialization activities, research contracts only partly handled by TTO
Université de Lausanne / Centre Hospitalier Universitaire Vaudois Lausanne	PACTT	Complete data for commercialization activities, research contracts only partly handled by TTO
Université de Neuchâtel	TTO	Fragmentary data, research contracts only partly handled by TTO
University of St. Gallen	TTO	No data available
Universität Zürich / Universitätsspital	Unitecra	Complete data only for the Medical, Vetsuisse and Nat.Sciences Faculties, no data for research agreements of other faculties
<b>Universities of Applied Sciences</b>	<b>(Total 7)</b>	
Berner Fachhochschule	TTO	Complete Data (AHB,TI,WGS,HKB,HAFL)
Fachhochschule Nordwestschweiz (FHNW)	TTO	Data available from 4 departments
Fachhochschule Ostschweiz	TTO	No data available
Zürcher Fachhochschule	ZHAW TTO	Data only available from 'Zürcher Hochschule für Angewandte Wissenschaften' (ZHAW)
Hochschule Luzern	I Ressort aFuE/WTT HS LU	Partial data available
Haute Ecole Spécialisée de Suisse occidentale (HES-SO)	TTO	No data available
Scuola Universitaria Professionale della Svizzera Italiana (SUPSI) Università della Svizzera italiana	agire	Partial data available
<b>Research Institutes</b>	<b>(Total 3)</b>	
Paul Scherrer Institut	PSI TT - Office	Complete data on research projects
Empa, Swiss Federal Institute for Materials Science and Technology	Empa-Eawag TT-Office	Complete data
Eawag, Swiss Federal Institute of Aquatic Science and Technology	Empa-Eawag TT-Office	Complete data

## 2. INSTITUTIONAL RESOURCES FOR TECHNOLOGY TRANSFER

### 2.1 Services Provided

All TTO at the Universities are handling contracts for research collaborations. However, at several Universities, the finalization of research agreements by the central office is only voluntary. All TTO deal with the management and commercialization of intellectual property (IP), which includes the evaluation of the economic value of research results, the protection and management of IP, and the licensing or sale of IP to industrial partners. Eight of nine TTO at Universities also provided support for the coaching of start-up projects and at two Universities such support is available through an incubator associated with the institution. At a few Universities TT programs still are very small and focus on few services.

The participating UAS and RI all offer support for research collaborations and IP management and commercialization. Coaching of start-up projects is offered by four UAS and one RI.

### 2.2 Staffing

Staffing refers to the number of full-time equivalents (FTE) employed for TT activities at an institution. These are people such as Licensing Officers, Intellectual Property Managers, Technology Managers or Research Contract Officers, whose main occupation is in the area of technology transfer. Their activities cover the drafting and negotiating of research and cooperation agreements, intellectual property management, licensing and other commercialization activities, and the coaching of start-up projects. TT activities must account for at least 20% in this person's job description.

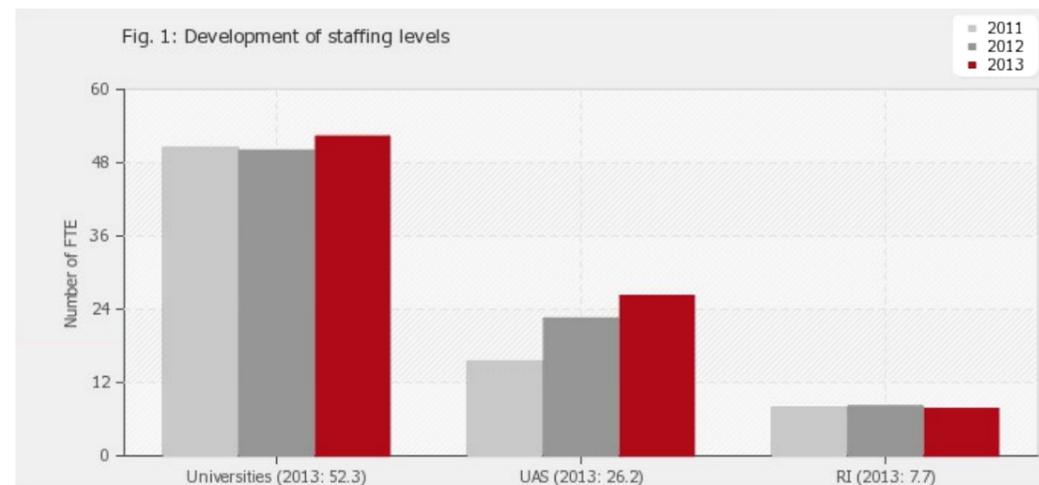


Fig. 1: Development of staffing levels.

The total number of FTE in technology transfer at the participating institutions was 86 compared to 80 in the previous year. The largest TTO had 14 FTE. The average size of the offices that responded is 4.3 FTE. Swiss TTO thus remain small in comparison to TTO in other countries if the size is normalized to the number of researchers. On the other hand, the Swiss TT professionals are on average better educated and possess more working experience in industry.

TTO usually collaborate with external patent attorneys in the drafting and filing of patent applications. Several TTO also outsource legal issues to external attorneys. At some institutions, start-up projects are handled by dedicated organizations such as a business incubators. Study agreements for sponsored clinical trials at university hospitals are dealt with by the legal departments in several institutions. Thus, the actual number of people supporting the transfer activities is larger than the number of FTE reported for the TTO.

## 3. RESEARCH COLLABORATIONS WITH PARTNERS FROM THE ECONOMY

### 3.1 Research Agreements Handled by the TTO

In 2013, the TTO handled contracts for a total number of 3934 research projects with economic partners. This number is higher than the number reported for the previous year (+11.8%). However, in view of the incomplete data provided by the institutions the comparison of such figures remains difficult.

For the Universities the number of new co-operative research projects increased slightly to 2360 (+1%). The RI reported 320 (-9%) projects the participating UAS 1254. A high percentage of UAS institutions have no central data available about their TT activities or are not willing to share the data. Therefore, the figure cannot be compared easily with previous years. The lack of data results in a significant underestimation of the real situation. The true number of collaborative research projects is a lot higher than reported here.

Research collaborations between academia and industry are a key aspect of TT, offering a multitude of potential benefits to both parties. They not only allow industry to access the know-how and infrastructure of academia, companies also gain access to young academic talents through such collaborations. At the same time, the academic partner can often take advantage of the know-how of the industrial partners. In addition, the funding of joint projects by industry and partners from the economy accounts for a significant part of the research budgets of public research institutions. In that perspective, research collaborations are the dominant and most attractive method of TT.

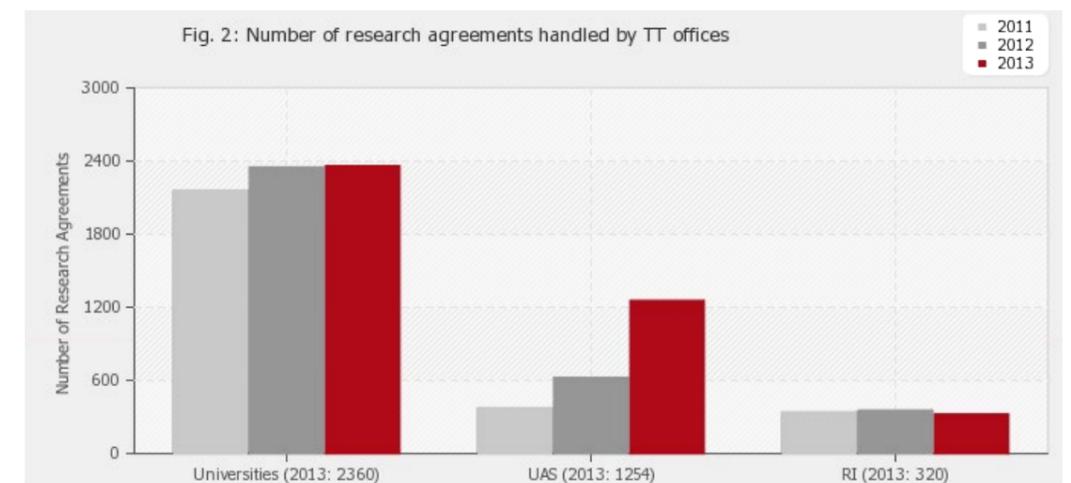


Fig. 2: Development of number of research agreements and EU contracts handled by the people responsible for TT.

For the collaborative research projects handled by the TTO, survey respondents reported total cash contributions from collaboration partners in 2013 of 401 mio CHF. The average cash contribution of the business partner per project is 102'000 CHF. Projects at UAS are typically rather small with average cash payments of 40'000 CHF per project. The average contribution per project at Universities was 127'000 CHF, and at RI's 162'000 CHF.

In addition to research collaborations, TTO handle other types of agreements which foster the cooperation between academia and economic partners, such as consulting agreements, material transfer agreements (MTA), and non-disclosure agreements (NDA). In 2013, the institutions reported altogether 2515 such other types of TT agreements.

### 3.2 Type of Collaboration Partners

With regard to the type of collaboration partner, the small- and medium-sized enterprises (SME), i.e. companies with fewer than 250 employees, account for 22% of total projects reported. A higher number (35%) of projects were performed with large companies, and 42% with public institutions. If one considers only collaborative projects with the private sector SME account for 39% of all industrial projects.

Both UAS and RI did not specify the type of partner for a high percentage of the projects.

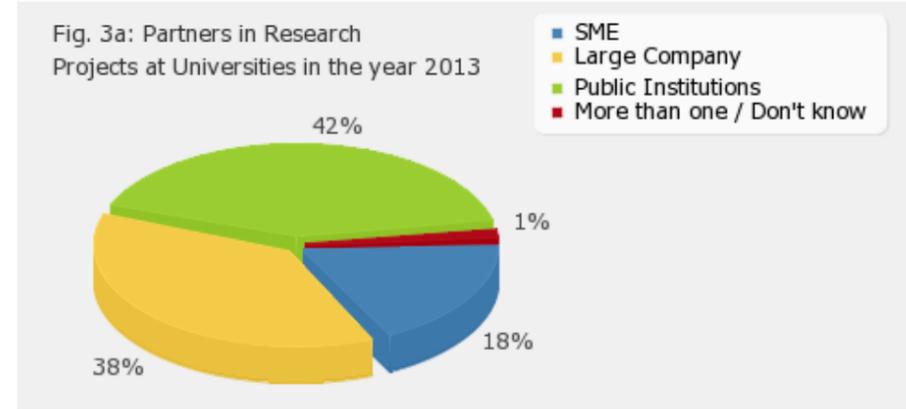


Fig. 3a: Partners in Research Projects at Universities

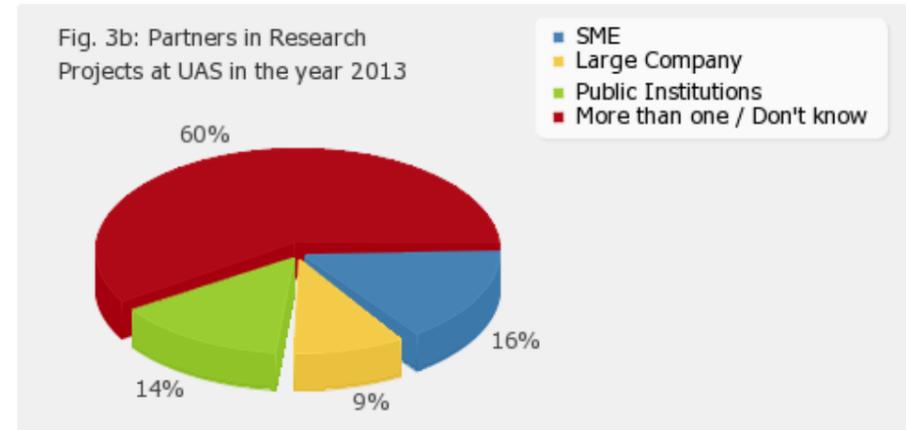


Fig. 3b: Partners in Research Projects at UAS

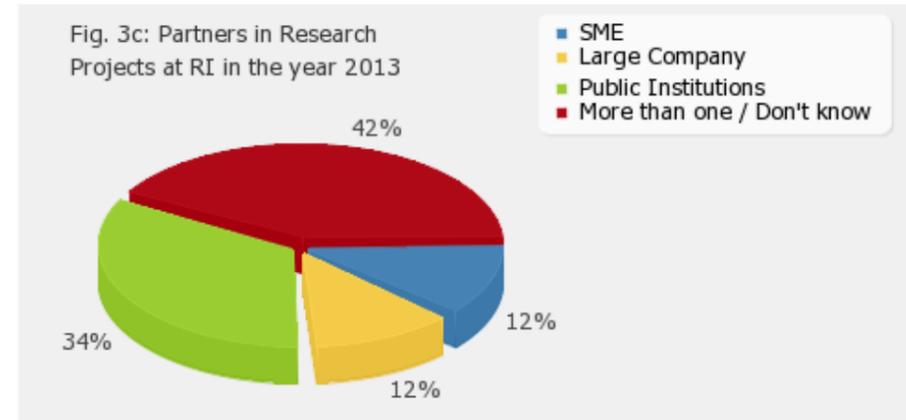


Fig. 3c: Partners in Research Projects at RI

### 4. COMMERCIALIZATION ACTIVITIES

Research results of Universities, UAS and RI often form the basis for innovative products which are developed and later commercialised by companies based on the work performed at public research institutions. The public institutions strive to make available research results with an economic potential to the private sector. Most frequently this is done through licensing of technologies to companies. Relevant research results need to be identified, screened and where applicable protected by patents or other suitable measures. Without a good protection of the intellectual property industrial or financial investors in many industrial sectors will not consider investing.

This whole process involves the following main steps: identification and evaluation of research results through invention disclosures, filing of patent applications, negotiating license agreements with existing companies or newly created start-up companies. At many institutions, the creation of such start-up companies is supported by various additional services. In Sections 4.1 - 4.4., the main activities of the institutions participating in this report are described.

#### KORING – A NEW SOLUTION FOR BOWEL OSTOMY

**Problem – Challenge**

*Approximately 300.000 patients receive a bowel ostomy every year worldwide. This surgical procedure is often necessary because of gastrointestinal cancer or infectious bowel disease. Every third patient develops a herniation of the ostomy during the first three years after the initial surgery. Due to the artificial hole in the abdominal wall and the continuous intra-abdominal pressure the abdominal wall is weakened particularly in the area of stoma formation. That leads to a relaxation of the abdominal wall and formation of a parastomal hernia.*

*A parastomal hernia has the risk of several complications: pain, skin irritation, bowel obstruction, surgical re-intervention, stoma prolapse, cosmetic and social problems.*

NORMAL BOWEL OSTOMY

IMPLANTED KORING

PARASTOMAL HERNIA

CASE

### 4.1 Invention Disclosures

A total number of 575 invention disclosures were reported for 2013 which is substantially more than in the previous year. The vast majority of invention disclosures were reported by Universities (79.7%). The three RI accounted for 6.4% of the invention disclosures, the UAS for 13.9%. Many UAS do not have a formal process for the protection of the research results. In addition, UAS often transfer the rights to research results created in the scope of collaborations to the industrial partner.

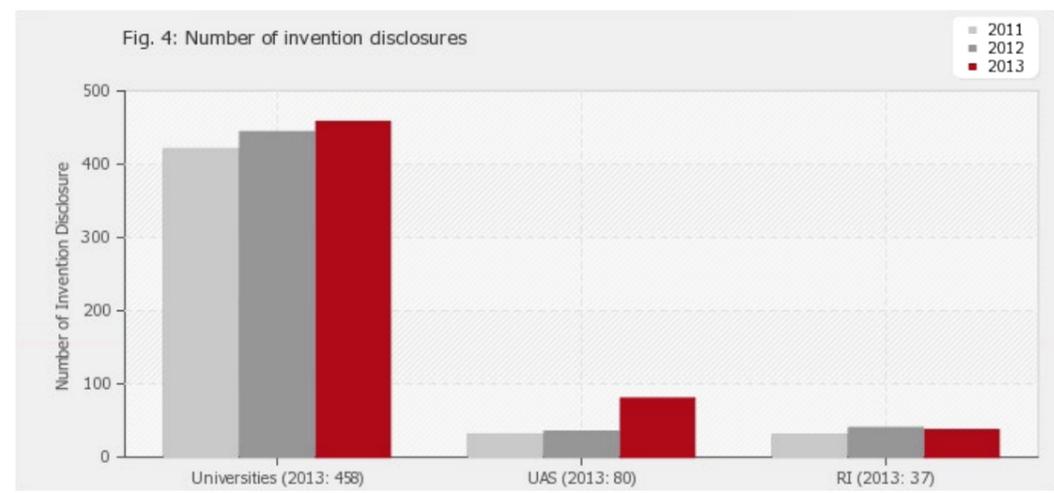


Fig. 4: Number of invention disclosures.

### 4.2 Patenting Activities

#### 4.2.1 Priority Patent Applications

In 2013 the institutions reported 270 new priority patent applications. The majority of these applications were again filed by Universities (90.4%), followed by the RI (8.9 %) and the UAS (0.7%). In total 79 % of all patent applications were filed by the three TTO's; ETH Transfer, the TTO of EPFL and by Unitectra.

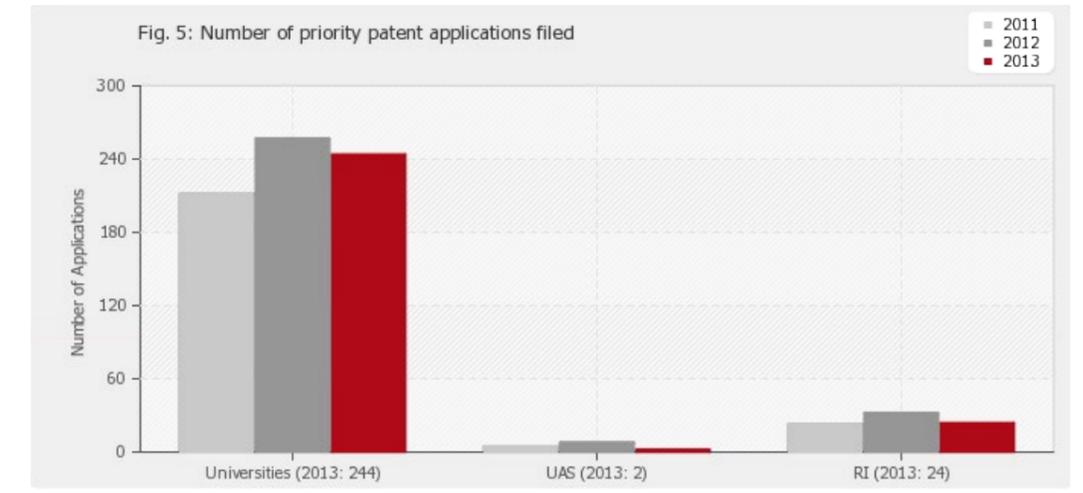


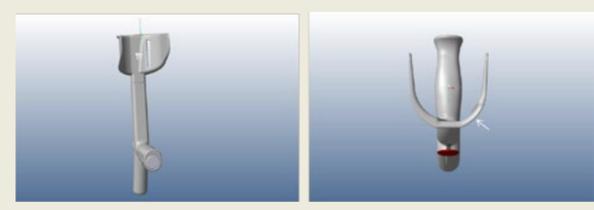
Fig. 5: Number of priority patent applications filed.

### ULNAR PRO® - ANATOMIC FOREARM CRUTCH SHELL



#### Problem - Challenge

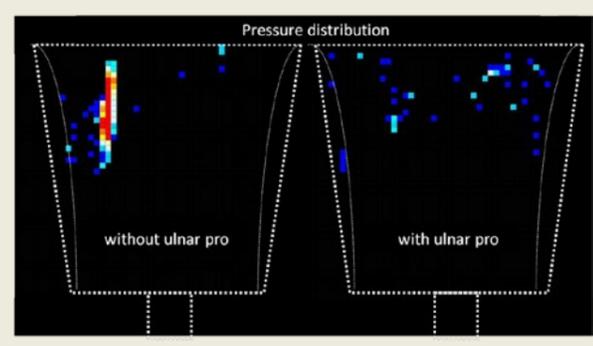
Demographic changes result in a higher prevalence of aged people. Therefore, degenerative musculoskeletal diseases are an increasing health burden. The number of individuals requiring permanent medical walking aids such as crutches will increase substantially in the near future. Current available crutches are cheap and highly functional. The focus of conventional crutches purely is on function, they are not designed for long term use. In the case of permanent use, forearm crutches can lead to skin bruises, pain and possibly nerve compression over the ulna bone or elbow of the forearm. This is due to the prominent anatomic position of the ulna bone, which has no surrounding soft tissue cushioning. Subsequently, a decrease of mobility, a higher risk of falling and a reduced quality of life is reported by the patients.



#### Solution

The University Hospital Basel developed walking aids that allow long term use of crutches. The patented "Ulnar protection" (UlnarPro®) technology preserves the ulnar bone, leading to less bruises and less pain. This is accomplished by vertical recess in the cuff that is designed to receive the ulna bone of the forearm. This minimizes the pressure that acts on the ulna bone by the cuff and redirects it to other sites with more muscle and connective tissue, as evidenced by clinical trials.

The UlnarPro® technology is licensed to Rebotec, the European market leader for crutches. The UlnarPro® cuff sold by Rebotec can easily be fitted on any underarm crutch



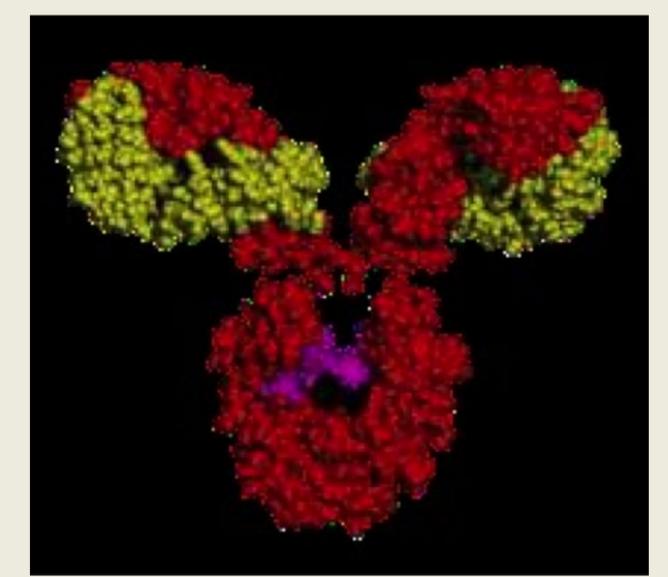
CASE

### GLYCOMAB®



Based on an ETH Zurich technology invented in the late 90ies; licensed and developed by Glycart which was acquired by Roche; the first product based on this technology was launched on the market in 2013.

It all started with an idea of adding human-like sugars to monoclonal antibodies (Mabs) in order to create more potent antibody drugs. This theory could be proven in the biotech lab at ETH Zurich and led to a Nature Biotechnology publication in 1999 and the filing of a patent application. Further validation of the so-called GlycoMab® technology was brought forward, the first recombinant chimeric anti-CD20 Mab was developed and the ETH spin-off Glycart Biotechnology was founded in 2001. In 2005 Glycart was acquired by Roche for 235 million CHF and the GlycoMab® technology was further developed by the team of experts. It took the scientists about fifteen years from invention to market launch of the first product, which is an unusual fast track in the pharmaceutical field. This was possible due to Glycart's focus on clinically validated targets as starting point of the development: transforming excellent antibody binders into potential drugs without spending time and money on costly discovery of new targets. In the lab it



was proven that GlycoMab® increased potency of approved monoclonal antibodies by a factor 100 to 1000. The first product based on the GlycoMab® technology was approved by the U.S. Food and Drug Administration (FDA) in Nov. 2013.

CASE

The protection of intellectual property in the form of patents is of great importance in many industrial sectors. This is particularly true for industries with high product development costs and long product life-cycles, e.g. biotech and pharma. The TTO at public research institutions must decide at an early stage about filing patent applications because patenting of an invention is no longer possible after the results have been published in scientific journals or through other channels.

Moreover, many companies will not consider evaluating a new technology if it is not protected by a patent. Thus, patenting activities of public research institutions can be a prerequisite for entering into a partnership with an industrial partner.

#### 4.2.2 Patent Portfolio - Active Patent Cases End of 2013

At the end of 2013, the institutions participating in the survey reported 1951 active patent cases which were either licensed to a company or for which they were searching for a licensee. Marketing of such technology opportunities is done by the research institutions through various channels. The existing contacts of researchers are often used to approach companies. To support the research institutions in this promotion and to provide a quick and easy overview of current technology opportunities for industry, the association swiTT established the national portal **swiTTlist (www.swittlist.ch)**. Through their TTO, the Swiss public research institutions list technologies on this portal which have an economic potential and which are available for licensing and development by industry. With the help of an automatic alert system, company representatives are informed immediately each time a new technology is available in their field of interest.

### INFRASTRUCTURE MANAGEMENT IN SWISS MUNICIPALITIES



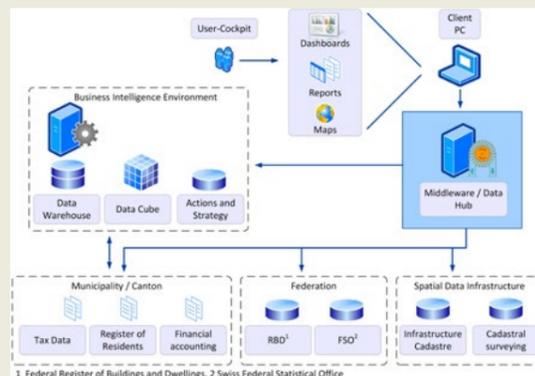
#### Challenge

Swiss municipalities own about half of the existing public infrastructure in the country (e.g. roads, sewerage systems, electricity and water supplies), worth over 460 billion CHF. They face enormous challenges, not only in operating and maintaining the infrastructure, but also in planning and future investments. Crucial problems are long life cycles of infrastructure components, divided responsibilities, lack of knowledge on the part of decision makers and insufficient information.

Major parts of the entire infrastructure have to be replaced over the next decades, because they were built in the second half of the 20th century and are now nearing the end of their life cycle. This will increase the demand for investment in infrastructure even more.

What municipalities need in order to meet this challenge are suitable processes based on tailored infrastructure management strategies.

Typical management instruments support these processes and help to plan, coordinate and make decisions based on key facts and figures.



#### Solution

An interdisciplinary team from the Bern University of Applied Sciences works together with several industry partners, three municipalities (Wohlen bei Bern, Moosseedorf and Bonaduz) and the wastewater management authority Abwasser Uri to develop a specialized instrument that supports the efficient and coordinated management of municipal infrastructure. A service-oriented system architecture (see figure) allows to integrate numerous data sources. The combination of different data sets and the possibility to relate this data to particular geographical locations provides new valuable information. Key features include: planning of long-term infrastructure investment, coordinating the planned actions and visualizing relevant management information for both administrative and executive needs (dashboard).

Apart from the system's technical capabilities, appropriate management processes have to be established. Infrastructure strategies will be defined, in close collaboration with the municipalities, from which specific goals and actions are derived. Such a fact based management instrument aligned to an objective-driven management process, will be able to support long-term sustainable development in municipalities.

Further information:  
[www.ictm.ti.bfh.ch](http://www.ictm.ti.bfh.ch)  
[www.gemeindecockpit.ch](http://www.gemeindecockpit.ch)

CASE

### 4.3 Licensing

#### 4.3.1 Licenses and Sales of Intellectual Property (IP)

The number of reported IP agreements, usually licenses, was slightly higher than in the previous year. Overall 201 deals were reported, 83% of them by Universities, 7.5% by RI and 9.5% by UAS. In a few cases the agreements involved a sale of the IP rather than a license. In total 71% of all agreements were handled by three TTO's; EPFL, ETHZ and Unictetra.

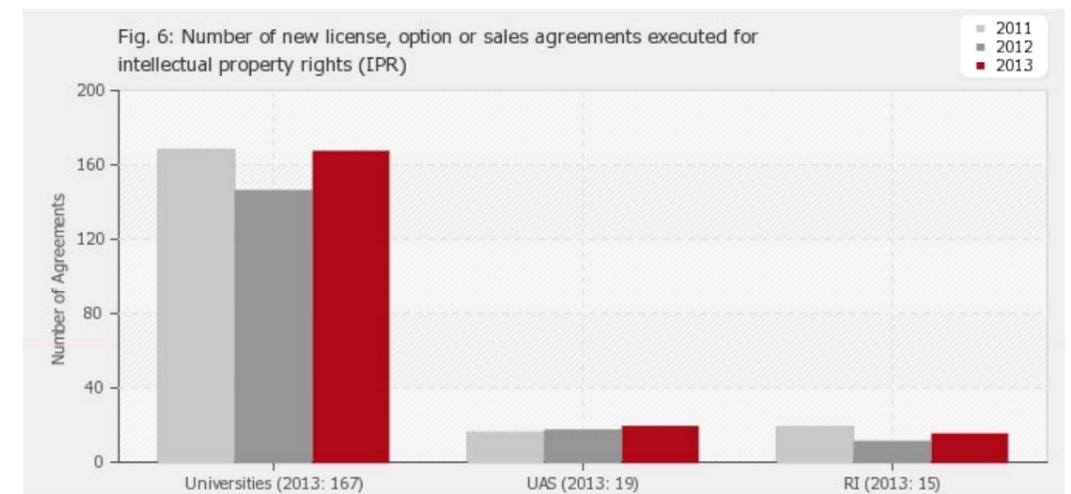


Fig. 6: Number of new license, option or sales agreements executed for intellectual property rights (IPR).

### 4.3.2 Type of Licensing Partners

As in previous years the majority of the licenses granted in 2013 went to SME (51%). This is mainly due to two reasons. On one hand, SME are often more interested in and more flexible to in-licensing and developing technologies from academia. Large companies have their own R&D programs and will only in-license technologies which will complement their existing portfolio.

On the other hand, public research institutions regularly license technologies to their start-up companies. Thus, start-up companies play an important role in developing university technologies. Depending on the industry segment and on the particular product these companies will either market the final products themselves or will sublicense the technologies to larger companies that have the necessary know-how and resources to bring the product successfully on to the market.

### 4.3.3 License Portfolio and License Income

The number of active licenses under management at the end of 2013 was reported as 1351 cases, slightly higher than the previous year. Thereof, 89.8% of active licenses were handled by the Universities, 8.9% by the RI and 1.4% by the UAS.

Of these active licenses 386 cases resulted in license income to the institutions and the researchers involved. In 191 cases such license income came from product sales. This figure has increased continuously in the past years in line with the growing number of products sold on the market that are based on research results of public research institutions. In the other cases income resulted from other type of license fees, e.g. license issue fees or milestone payments for products still in the development process.

These figures reflect the typical situation of licenses granted to industry by public research institutions. Many of the licensed technologies are at an early stage and require extensive development by the licensee. It often takes several years until a product reaches the market. Moreover, due to the early stage, the development risk is often high, and a significant number of projects are stopped before a marketable product is ready. Further, the figures are also typical for a still rather young license portfolio because many of the Swiss TTO have only been in operation for a relatively short period of time.

Data on license income are incomplete and were reported only by about half of the institutions participating in this survey. The total license income of these institutions amounted to 14.8 mio CHF more than 11% higher than in the previous year.

Mainly when licensing to start-up companies, some institutions may accept equity in such companies as a partial compensation for the licensing of technology. Such equity transactions usually replace down-payments or early milestone payments in order to avoid any cash drain from the start-up through license fee payments at the early stage of development. For the institutions, this results in a deferral of license revenues from such licenses until the shares in such start-up companies are sold by the institutions. In 2013, the institutions reported equity transactions for 19 of the 45 new start-up companies created that involved a license (see Section 4.4). In the past years more institutions started to accept equity as part of their license deals.

### 4.4 Start-up Companies

The number of newly created start-up companies from public research institutions remains at a high level. In 2013 the institutions reported a total of 73 new start-up companies, whereby 45 of these companies relied on a license or a contractual transfer of intellectual property from a public research institution. The remaining 28 companies were created on the basis of know-how developed at the research institutions, but without a formal license.

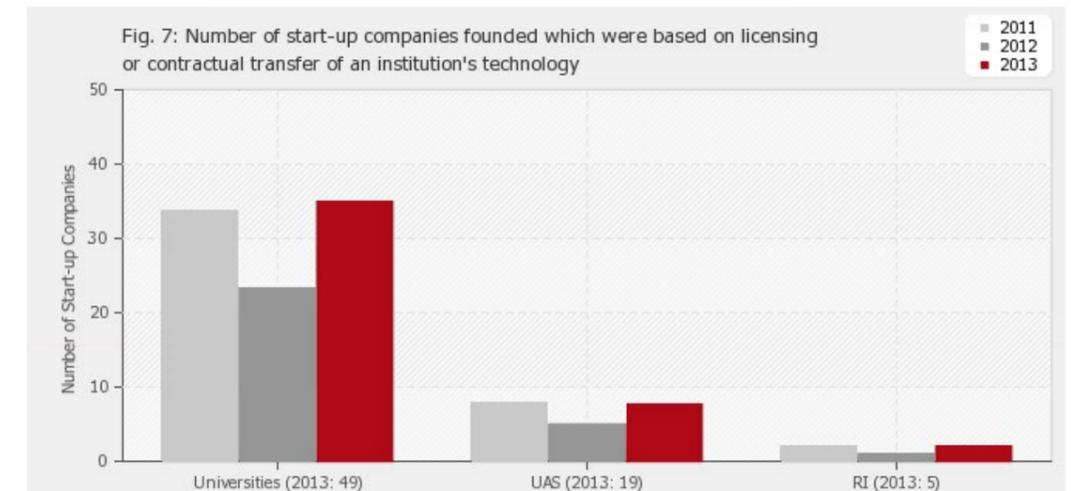


Fig. 7: Number of start-up companies founded which were based on licensing or contractual transfer of an institution's technology.

## APPENDIX 1 – DETAILED DATA 2010-2013

Note: The number of institutions that participated in the survey varies between years.

All respondents	2010	2011	2012	2013
Full-time equivalents (FTE)	64	74	81	86
Research contracts (incl. EU contracts)	3035	2872	3323	3934
Invention disclosures	470	482	519	575
Priority patent applications	224	240	297	270
Active patent cases end of the year	1573	1606	1818	1951
License agreements	196	203	174	201
Active license agreements end of the year	1237	1249	1307	1351
kCHF of net licensing revenues	8533	7665	13303	14776
License agreements with revenues in respective year	288	299	308	386
New start-ups (on basis of formal license)	44	43	62 (29)	73 (45)

Universities	2010	2011	2012	2013
Full-time equivalents (FTE)	45	50.5	50	52.3
Research contracts (incl. EU contracts)	2285	2158	2349	2360
Invention disclosures	421	421	444	458
Priority patent applications	187	212	257	244
Active patent cases end of the year	1356	1459	1664	1779
License agreements	159	168	146	167
Active license agreements end of the year	1135	1131	1167	1213
kCHF of net licensing revenues	7829	7029	10519	9713
License agreements with revenues in respective year	258	257	270	337
New start-ups (on basis of formal license)	34	33	43 (23)	49 (35)

RI	2009	2010	2011	2013
Full-time equivalents (FTE)	6	8	8	7.7
Research contracts (incl. EU contracts)	293	340	353	320
Invention disclosures	28	30	40	37
Priority patent applications	21	23	32	24
Active patent cases end of the year	141	112	112	133
License agreements	23	19	11	15
Active license agreements end of the year	90	103	123	119
kCHF of net licensing revenues	190	170	2217	4463
License agreements with revenues in respective year	17	19	21	31
New start-ups (on basis of formal license)	0	2	5 (1)	5 (2)

UAS	2009	2010	2011	2013
Full-time equivalents (FTE)	13	15.5	23	26.1
Research contracts (incl. EU contracts)	457	374	621	1254
Invention disclosures	21	31	35	80
Priority patent applications	16	5	8	2
Active patent cases end of the year	56	35	42	39
License agreements	14	16	17	19
Active license agreements end of the year	12	15	17	19
kCHF of net licensing revenues	514	466	567	600
License agreements with revenues in respective year	13	23	17	18
New start-ups (on basis of formal license)	9	8	14 (5)	19 (8)

## APPENDIX 2 – KEY PARAMETERS FOR INDIVIDUAL INSTITUTIONS

This table lists individual data of those institutions that agreed to publish them.

Institution	Name TTO	Start TTO	3.2 TTO FTE	4.1 Total # of research contracts	5.1 # of invention disclosures	5.2 # of priority applications	7.1 # of IP agreements
<b>Universities</b>							
EPFL	EPFL-TTO	1993	10.1	204*	103	66	41
ETH	Transfer	1995	14.4	657	171	103	38
Uni Geneva	Unitec	1998	7.3	80	42	18	16
Uni Lausanne	PACTT	2000	7	163	27	8	6
<b>RI</b>							
Empa/Eawag TT	TT Office	2005	4.5	175	27	14	10
<b>UAS</b>							
BFH	TT Office	1999	13.2	346	30	0	3
HSL Ressort aFuE/WTT	WTT HS LU	1998	2	556	0	1	0
ZHAW TTO	TT Office	2000	2	150	0	0	15

\* excluding EU contracts

## GLOSSARY

swiTT	Swiss Technology Transfer Association
Universities	Cantonal Universities and Swiss Federal Institutes of Technology
UAS	Universities of Applied Sciences
RI	Swiss Federal Research Institutions in the ETH domain
TT	Technology Transfer
TTO	Technology Transfer Office(s)
FTE	Full Time Equivalent (for the number of employees)
IP	Intellectual Property
SME	Small- and Medium-sized Enterprises (<250 employees)
Start-up	Newly established company founded or co-founded by researchers from the respective institution and which either relies on a formal license of IP or on know-how developed at the institution

## APPENDIX 3 – THE QUESTIONNAIRE

swiTT Technology Transfer Survey 2013 (online survey)

### Preliminary Notes:

- All questions refer to the calendar year 2013. Please make your statements accordingly.
- If no answer is available for certain questions, please indicate with n.a. Questions for which your office or your institution does not collect data should be left open (n.a.) and should not be answered by giving an estimate.

1. Confidentiality	
Do you agree to the publication of the individual data collected in the questions marked *[pub] under your institution's name? All other data will only be published in the aggregated format by type of institution?  <i>All other data will only be published in the aggregated format by type of institution.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Background Information	
2.1 Name of the academic institution/s	
2.2 Is your institution associated with an university hospital? <i>(If yes, please note that all figures given below should include the numbers of the hospital, too.)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No
2.3 Does your institution have a dedicated office / responsible person for TT activities (TTO)?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, which year did the TT program start?	[pub]
2.4 Name of responsible for TT program	
Name of responsible for survey data	
2.5 TTO address and contact information	
Office Name	Telephone
Street	e-mail
City	Postal code
3. Activities and FTEs	
3.1 What are the activities of your TTO?	
(A) Research contracts (drafting, negotiating, controlling)	<input type="checkbox"/> Yes <input type="checkbox"/> No
(B) Evaluation, protection and management of IP	<input type="checkbox"/> Yes <input type="checkbox"/> No
(C) Commercialisation of IP (licensing, marketing)	<input type="checkbox"/> Yes <input type="checkbox"/> No
(D) Coaching of start-up projects	<input type="checkbox"/> Yes <input type="checkbox"/> No
(F) Financial administration of research projects	<input type="checkbox"/> Yes <input type="checkbox"/> No
3.2 How many full time equivalents FTE were employed in your TTO on December 31st 2011? <i>(Do NOT include researchers working as project managers in transfer projects in this number)</i>	FTE [pub]
3.3 Of these FTE, how many were employed to work on	
(A) Technology transfer activities <i>(Staff with main occupations (&gt; 20%) in the area of technology transfer, such as 'Licensing Officers', 'Intellectual Property Managers', 'Technology Managers' or 'Research Contract Officers'. Do NOT include project managers carrying out transfer projects)</i>	FTE
(B) Administration and general management	
Comments to 3.1 - 3.3 <i>(e.g. if additional people outside your TTO but inside your institution are also working in technology transfer activities according to 3.1, special organisation with specific faculties, centralized/decentralized organisations)</i>	FTE
4. Research and Development	
4.1 Total number of new research contracts handled by your TTO <i>(Collaboration agreements, service agreements, clinical trial agreements, CTI complementary and EU agreements, NO MTA, NO NDA or other TT contracts (see 4.3) and NO SNSF contracts)</i>	[pub]
Of these research contracts, how many were executed with small and medium enterprises (SME), how many with large companies and how many with public partners? <i>(Definition: SME are companies with 250 or less employees.)</i>	A) SME: B) Large Company C) Public Institutions: <i>(Sum shall equal 4.1!)</i>
4.2 Amount of cash payments due to your institution from research contracts that were handled by your TTO according to 4.1 <i>(Please give the amount of cash due to your institution, NO material asset e.g. for machinery and NOT the total amount of Research Project, e.g. if an EU project adds up to 3 Mio. EUR but your institution gets only 200'000 thereof, the latter shall be given. Do not split the amount, if the contract is covering several years but report the full amount in the year the contract is signed.)</i>	CHF
4.3 Number of other technology transfer contracts handled by your TTO <i>(Non Disclosure Agreements (NDA), Material Transfer Agreements (MTA), consulting contracts, inter-institutional contracts, sponsoring, donations, but NO licenses, options, sales)</i>	

Comments to 4.1 – 4.3 <i>(e.g. restrictions/regulations at your institution, knowledge of ALL contracts or only contracts above a certain amount)</i>	
5. Patent-Related Activity	
5.1 How many invention disclosures were received by your TTO?	[pub]
5.2 How many priority applications were filed by your TTO? <i>(Priority application being the very first application for a new technology in any patent office of the world.)</i>	[pub]
(A) Of these, how many are based on research significantly funded by SNSF.	
5.3 What was the overall number of active patent cases at the end of 2011 managed by your TTO? <i>(Active patents cases are pending or granted patents on a technically unique invention (patent family). Applications in various countries on ONE technically unique invention count as ONE patent case.)</i>	
6. Patenting Costs and Legal Fees	
6.1 Amount spent by your TTO/institution on patenting costs and external legal fees? <i>(Including all external costs for patent filing, prosecution, maintenance, litigation expenses or costs for drafting or support in negotiation of contracts.)</i>	CHF
6.2 Amount of patenting costs and legal fees invoiced to commercialization partners? <i>(Does NOT include patenting costs or legal fees paid DIRECTLY to the patent attorney or other service providers by licensees or external partners.)</i>	CHF
7. License, Option and Sales Agreements	
7.1 How many licenses/options/sales of protected or unprotected IP did your TTO execute? <i>(Count only the agreements for different technologies, i.e. 30 licenses for the same software library count as ONE. If a license agreement is combined with a research agreement (e.g. advanced sale of the results of a research project), this contract shall count only as research contract and NOT be included in this question unless the invention/software that is licensed/sold, exists already at the execution date of the research contract.)</i>	[pub]
Of these licenses/options/sales, how many were licensed to SME, how many to large companies or public institutions? <i>(Definition: SME are companies with 250 or fewer employees)</i>	(A) SME: (B) Large Company: (C) Public Institutions: <i>(Sum shall equal 7.1!)</i>
(D) Of these licenses/options/sales how many are based on research significantly funded by SNSF?	
7.2 How many licenses/options/sales included equity? <i>(Equity meaning the ownership of interest in a company such as shares, options, warrants, etc. in consideration for granting a license or sale of IP.)</i>	
7.3 How many licenses/options were active as of December 31, 2011?	
Comments to 7.1 – 7.3 <i>(e.g. large variations to previous years, special situations, i.e. with free software licenses OpenBSD, etc)</i>	
8. License Income	
8.1 What was the total number of licenses/options/sales yielding revenue?	
8.2 How many licenses/options/sales yielded running royalties? <i>(Running royalties are based on product sales and are only due after the launch of a product in the market)</i>	
8.3 What was the total amount of license/option/sales revenue received at your institution? <i>(WITHOUT patent cost and fees invoiced in 6.2.)</i>	CHF
9. Start-up Companies	
9.1 Total number of start-up companies formed at your institution	
(A) Of these start-up companies, how many are dependent on licensing or transfer of your institutions technology?	
(B) Of these start-up companies, how many are dependent on unprotected know-how or technology of your institution (without license agreement)?	
(C) Of these start-up companies, how many are based on research significantly funded by SNSF?	
9.2 In how many of the new start-up companies does your institution hold equity?	
10. Post-Licensing Activities	
10.1 Did one or more of your institution's licensed technologies become available for consumer or commercial use in 2011?	<input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, how many?	
10.2 Information about the launched products <i>(Please give a short title of each product success story and the e-mail of the contact person for additional information.)</i>	[Title, Contact Person]
Comments	
<i>(If you want to bring any additional comments or suggestions to the attention of the team of the swiTTreport, please post them here)</i>	

Thank you for your input!

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