



EDUCATION AND RESEARCH

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For a country like Switzerland with few natural resources, a well-educated workforce and constant innovation are its most important capital. Swiss education and research policy is designed accordingly. Switzerland's public schools, universities, postgraduate studies and international private and boarding schools are famous worldwide for their quality. The country's federal structure also ensures both high quality and proximity of the business world and research institutions to the educational system. One special feature of Swiss education is the dual training system: Students have a choice between the traditional educational path at high schools and universities or, on the other hand, industrial vocations and careers in the service sector, where they receive hands-on training on the job.

12.1 EDUCATION AND VOCATIONAL TRAINING

Switzerland's dual vocational training system is unique worldwide and provides the country with a highly-qualified and innovative workforce and thus a leading position in the global economy.

Under the Swiss system, the cantons are responsible for the quality and type of education (basic education, universities, universities of applied sciences) within their territory. Only the Swiss Federal Institutes of Technology (ETH/EPFL) are under federal direction. Various coordinatory bodies ensure that the educational and training plans are harmonized between cantons.

www.edk.ch
Swiss Conference of Cantonal Ministers of Education (EDK)
Languages: German, English, French, Italian

www.educa.ch
Swiss education server
Languages: German, English, French, Italian

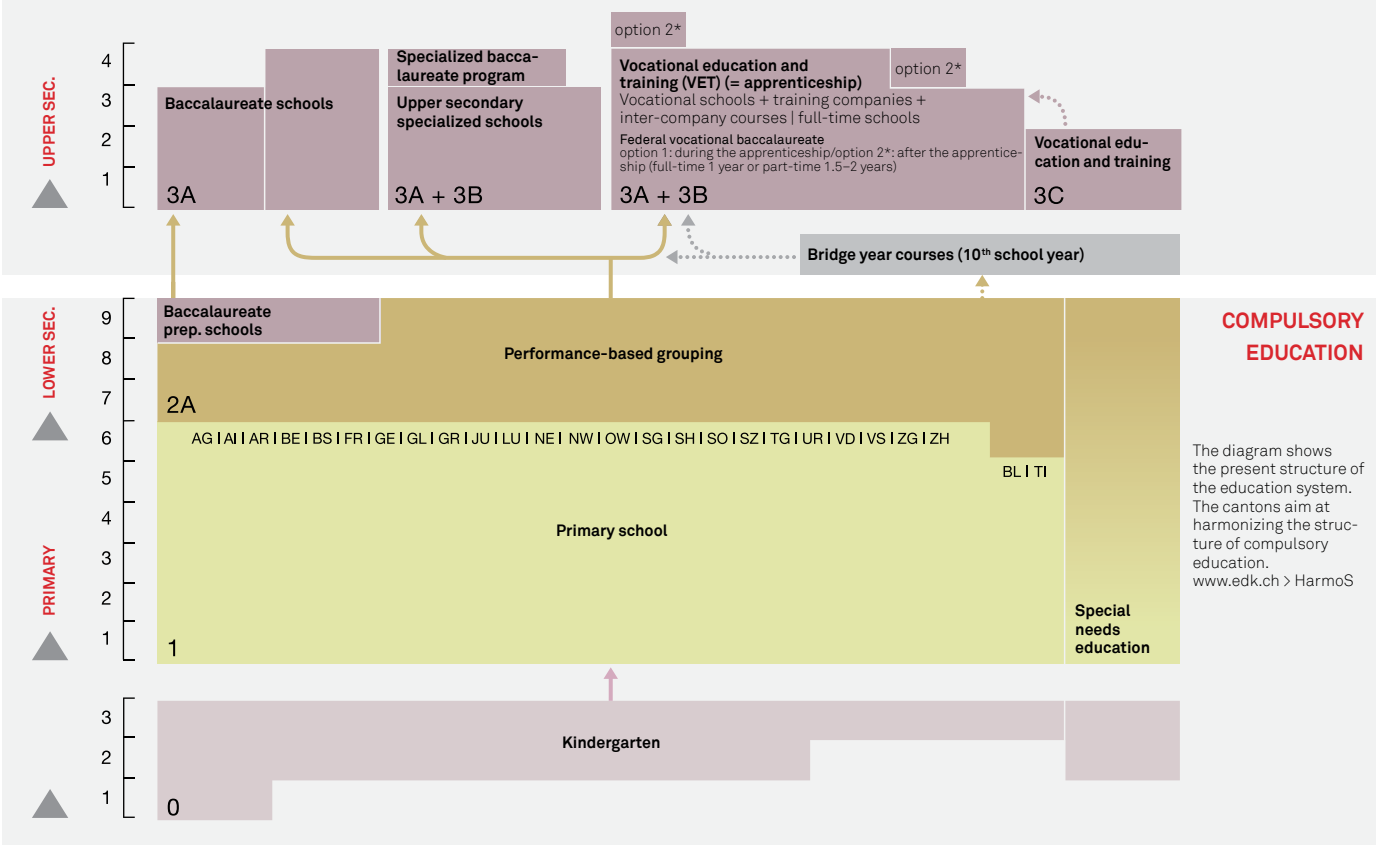
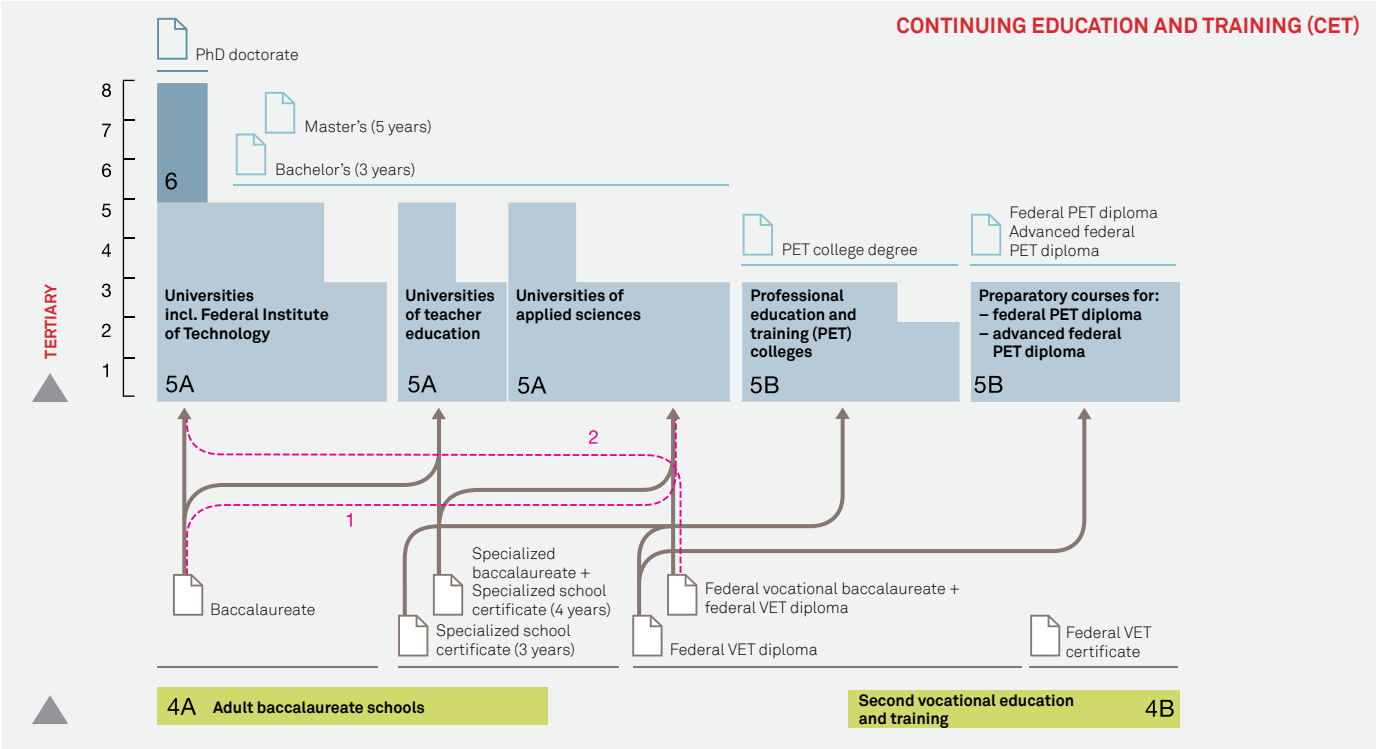
www.bildungssystem.bfs.admin.ch
Education statistics
Languages: German, French

12.1.1 Basic and Further Education

Education begins at the kindergarten level at age five or six. Primary school starts at age seven and runs through to grades four to six, followed by a lower secondary school which corresponds to their personal ability. The name and curriculum of the educational levels varies from canton to canton. Once they have completed lower secondary school, students have finished their compulsory nine years' schooling. They can then either begin vocational training or attend high school to prepare them for university studies. Aside from apprenticeship and high school, students can continue their education beyond the statutory minimum by attending an intermediate diploma school to earn a specialized diploma.

The Swiss Education System

(FIG. 55)



ISCED: The diagram contains a link to the ISCED (International Standard Classification of Education www.uis.unesco.org). The ISCED assigns an internationally defined code (ISCED 0 to ISCED 6) to each educational level. This ensures international comparability of educational levels.

Quality of the Education System, 2015

1 = Completely fails to meet the economy's needs,
10 = Meets the economy's needs

(FIG. 56)

1	Switzerland	8.74
2	Finland	8.56
3	Singapore	8.27
4	Canada	8.20
5	Germany	7.84
6	Netherlands	7.82
7	Belgium	7.78
8	Denmark	7.50
9	Ireland	7.45
15	Hong Kong SAR	6.71
18	United Kingdom	6.41
19	USA	6.37
21	Luxembourg	6.13
26	France	5.70
33	India	5.37
34	Italy	5.30
36	Japan	5.27
40	China	4.59
45	Russia	4.04
61	Brazil	1.88

Source: IMD World Competitiveness Yearbook 2015

94% of students finish their mandatory education at a local state school. Only 6% attend private schools. Public schools enjoy a good reputation. In the 2012 OECD Program for International Student Assessments (PISA), Swiss students scored higher than the average in OECD states, with public schools achieving slightly higher scores than private ones. Within Europe, Switzerland is in second place overall behind the Principality of Liechtenstein. The IMD management institute has also confirmed that Switzerland has a high-quality education system that meets the economy's needs (Fig. 56).

Switzerland's public schools not only provide an education, they also fulfill an important integration function: Children with different social, linguistic and/or cultural backgrounds all attend the same schools. For Switzerland, a country with four national languages, multilingual skills are extremely important. In addition to their mother tongue, children are taught a second national language and English from primary school onward.

In 2012, public-sector spending on education in Switzerland was just under CHF 35 billion. That's 5.5% of the gross domestic product. On a per-capita basis, this level of spending puts Switzerland in first place worldwide.

www.pisa.oecd.org
PISA study
Languages: German, English, French, Spanish

Public Per Capita Spending on Education, 2013

(in US dollars)

(FIG. 57)

1	Luxembourg	6,272
2	Switzerland	5,091
3	Norway	5,027
4	Denmark	4,448
5	Sweden	3,975
6	Australia	3,575
10	United States	3,052
11	Belgium	3,011
12	Netherlands	2,815
14	Ireland	2,398
16	France	2,360
17	United Kingdom	2,281
19	Germany	1,838
20	Singapore	1,723
21	Japan	1,650
24	Italy	1,439
25	Hong Kong SAR	1,370
35	Brazil	674
40	Russia	633
51	China	261
59	India	58

Source: IMD World Competitiveness Yearbook 2015

12.1.2 Vocational Training

Basic vocational training begins after the completion of compulsory education. Great importance is placed on practical on-the-job training. More than three-quarters of all young people complete a work-and-training-based apprenticeship lasting three to four years and consisting of practical work in a company coupled with study of the accompanying theory at a vocational school for the relevant sector. In addition, students are eligible to obtain professional certification, which entitles them to enter a university of applied sciences where they can earn a Bachelor's or, in some cases, a Master's degree. Universities of applied sciences provide a tertiary level of education. 86% of Swiss students continue their education once they have completed compulsory schooling, placing Switzerland near the top of all OECD countries with regard to further education.

This dual system ensures that businesses have a choice of well-qualified and practically-trained employees ready to enter the relevant sector. The unemployment rate among young people is approximately a third as high as in Sweden, and half that in the United States. It is important to note that the practical aspect of vocational training in no way reduces the importance of in-depth teaching in school.

Professional education and training play an important role in Switzerland. Higher specialist and professional training courses are conducted with the approval of the federal authorities and professional associations. Successful completion of these courses leads to the attainment of a Swiss federal vocational certificate or diploma. In Switzerland there are nearly 150 federally recognized schools offering professional college degree programs, the majority of which are engineering colleges. These schools teach qualifications that are often learned only at universities in other countries. Vocational degrees are mutually recognized through bilateral agreements between Switzerland and the EU. The plethora of Switzerland's vocational training courses is made easier to understand and compare by the National Qualification Framework for Swiss Vocational and Professional Education and Training (NQF VPET) as well as explanations about certificates and diploma supplements.

www.s-ge.com/education

Facts and figures on professional training in Switzerland
Languages: German, English, French, Italian, Spanish, Portuguese, Russian, Chinese, Japanese

www.sbfi.admin.ch

State Secretariat for Education, Research and Innovation (SERI)
Languages: German, English, French, Italian

www.wbf.admin.ch > Topics > Education, research and innovation

Information issued by the Swiss Federal Department of Economic Affairs, Education and Research (EAER)
Languages: German, French, Italian

www.swissworld.org > Education

Education in Switzerland
Languages: German, English, French, Italian, Spanish, Russian, Chinese, Japanese

www.berufsberatung.ch

Advice on choosing a profession, higher education course and career
Languages: German, French, Italian

12.2 CONTINUING TRAINING

Continuing training plays an important role in Switzerland. Public institutions such as universities and universities of applied sciences offer not only postgraduate programs but also courses on various specialized topics which are open to everyone, not just graduates. Non-students can also register to sit in on regular courses. Adult education courses are publicly subsidized and open to everyone. There is also a wide variety of courses offered by private educational establishments, from language courses to yoga and managerial courses.

www.weiterbildung.ch

www.ausbildung-weiterbildung.ch

www.seminare.ch

Overview of continuing training (providers and courses)
Language: German

www.up-vhs.ch

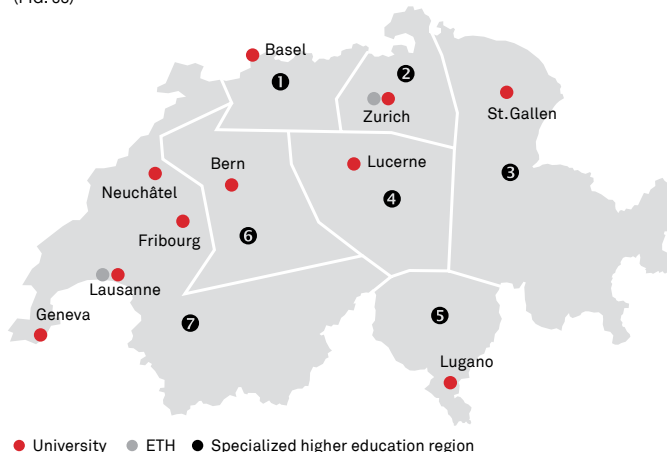
Swiss Adult Education Association
Languages: German, English, French

12.3 UNIVERSITIES/COLLEGES

12.3.1 Universities and Technical Colleges

Universities and Technical Colleges

(FIG. 58)



Specialized higher education regions

- ① University of Applied Sciences Northwestern Switzerland
- ② Zurich University of Applied Sciences
- ③ University of Applied Sciences Eastern Switzerland
- ④ University of Applied Sciences Central Switzerland
- ⑤ University of Applied Sciences Southern Switzerland
- ⑥ Bern University of Applied Sciences
- ⑦ University of Applied Sciences Western Switzerland

Source: State Secretariat for Education, Research and Innovation (SERI)

Annual Tuition Fees, 2014/2015

(in CHF)

(FIG. 59)

	EPF LAUSANNE	ETH ZURICH	UNIVER- SITY OF BASEL	UNIVER- SITY OF BERN	UNIVER- SITY OF FRIBOURG	UNIVER- SITY OF GENEVA	UNIVER- SITY OF LAUSANNE	UNIVER- SITY OF LUCERNE	UNIVER- SITY OF NEUCHÂTEL	UNIVER- SITY OF ST. GALLEN	UNIVER- SITY OF ZURICH	USI (LUGANO MENDRISIO)
Domestic students	1,266	1,288	1,700	1,568	1,310	1,000	1,160	1,620	1,030	2,452	1,538	4,000
Supplementary fees for international students					300			600	550	3,800	1,000	4,000
Total for international students	1,266	1,288	1,700	1,568	1,610	1,000	1,160	2,220	1,580	6,252	2,538	8,000

Source: berufsberatung.ch

In Switzerland there are ten cantonal universities at which the main language of instruction is either German (Basel, Bern, Zurich, Lucerne, St. Gallen), French (Geneva, Lausanne, Neuchâtel), Italian (Lugano) or German and French (Fribourg). There is a Swiss Federal Institute of Technology in Lausanne (French) and one in Zurich (German). In the fall semester 2014/2105, a total of 144,000 students were enrolled at Switzerland's twelve universities and colleges. Of these students, 50% were female and 29.5% foreign students. This is one of the highest percentages of international students worldwide. At 50% (2014), the number of foreign professors is also comparatively high, and has been rising since 2002, underlining the international aspect of Swiss universities.

The range of subjects offered for study at Swiss universities is very wide. With the exception of medicine, there are no specific restrictions on admission. For a Bachelor's/Master's degree, foreign students must meet the language requirements and some universities require students to pass an admissions exam. Tuition fees for international students are also very reasonable. In addition to tuition, between CHF 18,000 and CHF 28,000 a year are required for living expenses, depending on the city and personal needs. As a result of the Bologna Accords, which aim to create a European higher education area, all Swiss universities have converted all courses of study to the Bachelor's/Master's system. Within the scope of this reform, courses of study are increasingly offered either partially or fully in English (esp. Master's courses). Switzerland participates in international student exchange programs such as ISEP, which enable foreign students to study at a Swiss university for a semester.

Swiss universities have earned high praise worldwide for their curricula and fields of research in certain areas of specialization in various degree subjects. The two Federal Institutes of Technology in Zurich (ETHZ) and Lausanne (EPFL) work together with the international research community to conduct cutting-edge research. They strive to attract world-renowned scientists. Swiss universities regularly rank among the top 100 universities worldwide and even higher in Europe, while some institutes are part of the world elite. Swiss colleges and universities are also involved in international research programs and offer postgraduate studies (e.g. in cooperation with foreign academic institutions).

www.ch.ch > Studying at a university
Information on studying in Switzerland
Languages: German, English, French, Italian

www.sbfli.admin.ch
State Secretariat for Education, Research and Innovation (SERI)
Languages: German, English, French, Italian

www.universityrankings.ch
University rankings
Languages: German, English, French, Italian

www.swissuni.ch
Swiss university continuing training association
Languages: German, English, French

www.swissuniversity.ch
Information for foreign students
Language: English

www.crus.ch
Studying in Switzerland
Languages: German, English, French, Italian

Executive MBAs: The Most Important Providers

(FIG. 60)

PROVIDER	CAMPUSES	HOME PAGE
International Institute for Management Development (IMD)	Lausanne (Switzerland), Europe (Ireland, Romania), Shanghai (China), Silicon Valley (United States)	www.imd.ch/programs/emba English
Omnium Alliance (University of St. Gallen, University of Toronto, partner schools)	Brazil, China, India, Canada, Switzerland, Hungary, Argentina, Turkey, United Arab Emirates	www.omniumgemba.com, www.gemba.unisg.ch English
University of St. Gallen	St. Gallen (Switzerland), Germany, UK, Brazil, Argentina	www.emba.unisg.ch German/English
University of Zurich	Zurich (Switzerland), Yale (United States), Shanghai (China), Hyderabad (India)	www.executive-mba.ch English
Rochester-Bern (University of Bern, University of Rochester)	Bern (Switzerland), Rochester (United States), Shanghai (China)	www.lorange.org German/English
Lorange	Zurich (Switzerland)	www.lorange.org German/English
ZfU International Business School	Zurich (Switzerland), Boston (United States)	www.zfu.ch/weiterbildung/master German

Source: Collated internally

12.3.2 Universities of Applied Sciences

Universities of applied sciences offer practical training at the Bachelor’s and Master’s level for professionals, most of whom have professional certification and have already gathered professional experience. In addition to normal teaching, these universities carry out research and development projects with private companies, particularly SMEs, and provide advanced training courses to local enterprises.

www.sbf.admin.ch > Topics > Higher education > Universities of Applied Sciences
Overview of universities of applied sciences
Languages: German, English, French, Italian

As a result, universities of applied sciences have partial responsibility for regional science and technology transfer and therefore continuously interact with industry. They have a large pool of teaching, research, development and services skills which are strongly geared to clients, markets and practice. In their role as research institutes, they are supported at the national level by the Commission for Technology and Innovation (CTI) and work together with the Swiss Federal Institutes of Technology and universities.

“In Switzerland, 100,000 children at 240 private schools are taught in German, French, Italian or English (and in some cases in other languages).”

12.3.3 Executive MBA (EMBA) Programs

A special type of further education is the Executive MBA program, which is aimed at managers with many years’ managerial experience under their belt. Generally, EMBA courses are work-study programs that are based on a modular system. Most of the degree programs also include time studying abroad in addition to the courses in Switzerland. IMD in Lausanne is a prime example of a top Swiss school whose EMBA program is regularly ranked as one of the best in the world. The program at the University of St. Gallen is also in the top 30 in Europe.

- www.find-mba.com > Europe > Switzerland
MBA/EMBA programs in Switzerland
Language: English
- www.ausbildung-weiterbildung.ch
Swiss continuing training portal
Language: German
- www.swissuniversity.ch
Programs at Swiss universities
Language: English
- www.economist.com > Business & Finance > Which MBA?
Economist rankings
Language: English
- www.ft.com > Management > Business Education
Financial Times rankings
Language: English

Cost of Private International Schools, 2014

(in US dollars)

(FIG. 61)

City	ENGLISH SCHOOL		FRENCH SCHOOL		GERMAN SCHOOL	
	Annual fees for primary school	Annual fees for secondary school	Annual fees for primary school	Annual fees for secondary school	Annual fees for primary school	Annual fees for secondary school
Amsterdam	19,448	20,680	6,936	10,914	9,551	9,551
Brussels	33,156	40,388	6,787	8,228	12,962	14,600
Budapest	19,568	20,518	6,136	7,261	5,117	5,117
Dublin	16,889*	20,238*	5,047	7,507	6,290	5,935
Frankfurt	20,589*	22,391*	4,844	5,908	Not available	Not available
Geneva	24,568	Not available	16,807	18,985	13,233	13,233
London	22,884	24,194	7,481	9,129	10,069	10,069
Milan	17,492	19,935	5,645	7,000	7,573	7,573
New York	39,650	39,650	22,760	25,950	18,875	18,875
Paris	28,214	32,758	6,734	6,754	10,506	10,506
Singapore	23,613	28,551	14,995	16,810	12,975	14,971
Vienna	17,514*	22,235*	7,944	8,061	Not available	Not available

* No English school available. Information is based on the international school.

Source: Mercer, Cost-of-Living Report, March 2014

12.4 INTERNATIONAL PRIVATE AND BOARDING SCHOOLS

The Swiss education system also includes private schools. The more than 240 private schools teach courses in one of the three national languages – German, French and Italian – or in English (and some also offer other languages) to about 100,000 students. International schools are primarily important for employees of foreign companies who often remain in Switzerland for only a short time. During their stay, the children receive a suitable education in their native language or an international education and are prepared for the school-leaving certificates valid in their home country, such as the German Abitur, French baccalauréat or the admission requirements of a US university. Suitable establishments can be found in every region and all cities. The school fees are average compared to other countries.

Swiss boarding schools are known not only for their high level of education, but also for their strict discipline and international student body. Often they have very selective acceptance criteria and are known for their elite standing in the world.

www.swissprivateschoolregister.com
Register of private schools in Switzerland
Languages: German, English, French, Italian

www.swiss-schools.ch
Swiss Federation of Private Schools (SFPS)
Languages: German, English, French, Spanish, Italian

www.sgischools.com
Swiss Group of International Schools
Language: English

12.5 RESEARCH AND DEVELOPMENT

12.5.1 Conducting Research in Switzerland

The faster the pace of technological change, the greater the role that research and development play in a country's economy. Switzerland is one of the world's most research-intensive countries. In 2012 it spent more than 3% of its GDP on research and development. Since 1996, the real rate of change has been 4.1% as an annual average and thereby higher than the average annual economic growth during the same period (2.9%). All relevant indicators put Switzerland in the top ranks in international comparisons.

Of the CHF 17.8 billion spent on research and development in 2012, 88% (approx. CHF 15.7 billion) was financed by the private sector. The pharmaceutical industry (CHF 5.1 billion) and the mechanical engineering industry (CHF 1.7 billion) have the highest expenditure. The combined R&D expenses of all universities and research institutes amounted to CHF 213 million in 2012, 1.2% of total Swiss expenditure. In 2012, more than 53,000 people worked in research, nearly 52,000 of them in the private sector.

Relative to its population, Switzerland has the world's second-highest proportion of Nobel laureates (Fig. 63). Since 1901, 24 Swiss citizens have had the honor of receiving the world's highest scientific accolade.

Overall per Capita Spending on Research and Development 2013

(in US dollars)

(FIG. 62)

1	Switzerland	2,481.50
2	Sweden	1,983.80
3	Denmark	1,832.20
8	USA	1,442.60
10	Germany	1,350.40
11	Japan	1,343.00
12	Luxembourg	1,293.50
13	Singapore	1,119.90
15	Belgium	1,073.40
16	Netherlands	1,006.90
17	France	955.60
20	Ireland	791.90
21	United Kingdom	679.20
26	Italy	443.30
31	Hong Kong SAR	280.10
36	Russia	164.30
37	Brazil	155.20
40	China	140.50
57	India	13.80

Source: IMD World Competitiveness Yearbook 2015

Nobel Laureates per Million Inhabitants, 2014

(FIG. 63)

1	Norway	1.55
2	Switzerland	1.47
3	Israel	0.96
4	United Kingdom	0.95
5	Sweden	0.92
6	United States	0.89
7	Denmark	0.71
8	Netherlands	0.47
10	Germany	0.39
11	Belgium	0.36
14	France	0.30
15	Ireland	0.22
18	Hong Kong SAR	0.14
19	Japan	0.12
21	Italy	0.08
22	Russia	0.07
25	China	0.00
26	India	0.00
27	Brazil	0.00
27	Luxembourg	0.00
27	Singapore	0.00

Source: IMD World Competitiveness Yearbook 2015

Publishing articles in scientific journals (whether printed or digital) is the most important way to distribute research findings and knowledge. The “impact factor” shows how often articles in one journal are cited in another. Across all scientific disciplines, Switzerland is in second place overall behind the US on this scale. Switzerland leads the world in the category “technical sciences, engineering and computing” (Fig. 64). The impact of Swiss publications has been increasing continuously since the 1980s and is now 17% higher than the global average. If the number of publications is compared to the size of the population, Switzerland is currently the world’s most productive nation, with 3.6 publications per 1,000 inhabitants.

Government funding is provided principally for basic research. The private sector and the scientific community work closely together. Each institute at university and college level has a coordination office for cooperation with the private sector. The Commission for Technology and Innovation (CTI) can make significant financial contributions to research and development projects in which companies cooperate with non-profit research organizations.

www.sbf.admin.ch > Topics > Research + innovation
State Secretariat for Education, Research and Innovation (SERI)
Languages: German, English, French, Italian

www.kti-cti.ch
Swiss Commission for Technology and Innovation
Languages: German, English, French, Italian

www.snf.ch
Swiss National Science Foundation (SNSF)
Languages: German, English, French, Italian

www.myscience.ch
Swiss research and innovation portal
Languages: German, English, French

12.5.2 International Collaborative Research

The Swiss private sector has a keen interest in research cooperation with partners abroad, particularly from the EU. Research and development cooperation with innovative foreign partners also gives smaller companies access to know-how from which they can benefit. Bilateral agreements with the EU create even more favorable conditions for this type of cooperation.

Further information on international collaborative research can be found in Section 4.2.4.

www.snf.ch > The SNF > Research policies > International co-operation
International research and development cooperation
Languages: German, English, French, Italian

www.sbf.admin.ch > Topics > International cooperation in research and innovation
International cooperation on education, science and research
Languages: German, English, French, Italian

12.6 SWITZERLAND INNOVATION

Switzerland Innovation offers domestic and foreign business in Switzerland first-class locations for developing innovative ideas into marketable products. As a collective instrument of the Federal Government, Cantons, science and industry, Switzerland Innovation strengthens Switzerland's innovative capacity in international competition. Switzerland Innovation creates a platform for making connections between Swiss universities and innovative enterprises.

Large sites suitable for development in the vicinity of leading universities are made available to internationally operating businesses for setting up research and development facilities.

Impact Factor, 2007–2009

Based on the number of citations per published article

(FIG. 64)

RANK	TECHNICAL SCIENCES, ENGINEERING, IT	PHYSICS, CHEMISTRY AND GEOSCIENCE	AGRICULTURE, BIOLOGY AND ENVIRONMENTAL SCIENCE	LIFE SCIENCES	CLINICAL MEDICINE	SOCIAL AND BEHAV- IORAL SCIENCE	HUMANITIES AND ART
1	Switzerland	USA	United Kingdom	USA	USA	USA	Netherlands
2	Denmark	Switzerland	Switzerland	United Kingdom	Belgium	Switzerland	United Kingdom
3	Netherlands	Netherlands	Netherlands	Switzerland	Canada	Netherlands	Australia
4	Belgium	Italy	Belgium	Netherlands	Denmark	Belgium	Italy
5	USA	United Kingdom	USA	Belgium	Switzerland	United Kingdom	USA
6	Australia	Denmark	Germany	Ireland	Netherlands	Denmark	Israel
7	Germany	Germany	Sweden	Denmark	United Kingdom	Germany	South Africa
8	Singapore	Canada	Denmark	Germany	France	Canada	Canada
9	United Kingdom	Ireland	Australia	Canada	Australia	France	Belgium
10	Spain	Norway	France	Australia	Norway	Finland	France

Source: State Secretariat for Education, Research and Innovation (SERI), 2015

Research Establishments in Switzerland

(FIG. 65)

INSTITUTION		LOCATION	Homepage
CERN	European Organization for Nuclear Research	Geneva	www.cern.ch English, French
EAWAG	Aquatic research institute of the ETH	Dübendorf (ZH), Kastanienbaum (LU)	www.eawag.ch German, English, French
EMPA	Swiss Federal Laboratories for Materials Science & Technology	Thun (BE), Dübendorf (ZH), St. Gallen	www.empa.ch German, English, French
PSI	Paul Scherrer Institute	Villigen (AG)	www.psi.ch German, English, French
SLF	WSL Institute for Snow and Avalanche Research	Davos (GR)	www.slf.ch German, English, French, Italian
The Graduate Institute	The Graduate Institute of International and Development Studies	Geneva	www.graduateinstitute.ch English, French
WSL	Swiss Federal Institute for Forest, Snow and Landscape Research	Birmensdorf (ZH), Bellinzona (IT), Davos (GR), Lausanne (VD), Sion (VS)	www.wsl.ch German, English, French, Italian

Source: Swiss National Science Foundation (SNSF)

The proximity to universities inspires research and training and places Switzerland among the leading knowledge and innovation-driven economies.

Switzerland Innovation consists of five locations and a national foundation:

- Park Zurich in Dübendorf
- Park Network West EPFL in Lausanne
- Park Basel Area in Allschwil near Basel
- Park innovAARE in Villigen in the Canton of Aargau
- Park Biel/Bienne

Switzerland Innovation Foundation coordinates international marketing and guarantees interconnectedness across the five sites.

www.switzerland-innovation.com
Switzerland Innovation Foundation
Languages: German, English, French