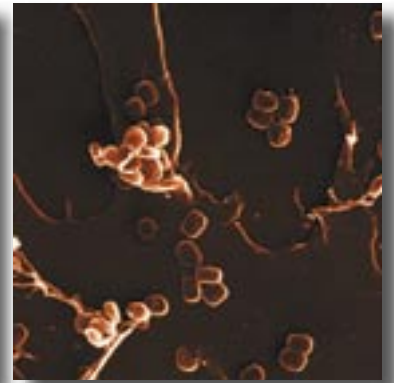


# Education, Research, and Technology: promoting investment in Switzerland's excellence

Switzerland's education, research, and technology policy between 2004 and 2007. An overview



# Education, research and technology: the main resources of the knowledge-based society

Rapid and important developments in the field of information and communication technology are creating a 21st century *knowledge-based society* which covers the globe. This society rests on three main pillars: education, research and technology, elements which, for every citizen and for society as a whole are of major importance socially, culturally and economically.

- *Education* is essential to the independence of the individual and his/her integration into society and the working world.
- *Research* stimulates the cultural dynamism of a society enabling a critical assessment of the present and preparation for the future.
- *Innovation* springs from basic research and applied research and development and, along with education, is the motor for growth, a source of income and prosperity and the basis for the continued competitiveness of a country in a globalised world.

Against this backdrop, Switzerland's education, research and technology policy intends to make a substantial contribution between 2004 and 2007 to help the ERT sector face up to looming challenges and participate in the shaping of the future of the country.

## The political priority of the education, research and technology sector

The Swiss government places education, research and technology (ERT) at the top of the list of its political priorities. Following a period of stagnation (see graph), the ERT sector is to enjoy an above-average increase in financial resources between 2004 and 2007. The government has proposed an average annual growth in overall contributions of 6% (Basis: 2003 financial plan) to enable Switzerland to remain competitive internationally in education, research and technology. This means a planned financial commitment over the whole four-year period of around SFr. 17.3 billion\* in support of ERT.

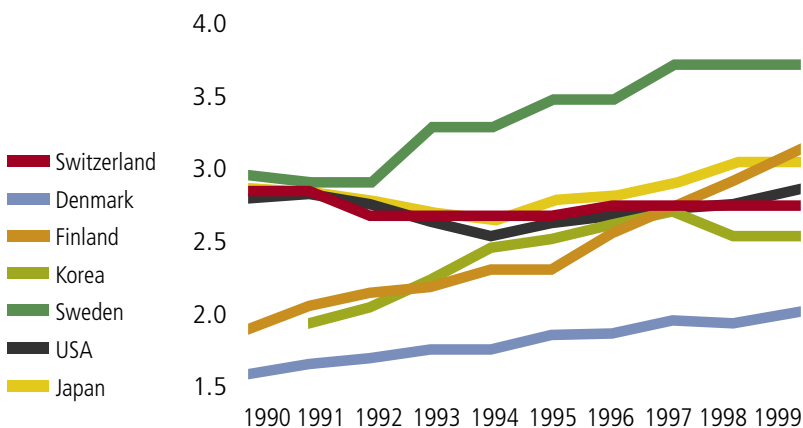
This investment is to be used for specific purposes.

- It should enable the responsible institutions to offer education on the secondary and tertiary levels which corresponds to the demands of the knowledge-based society and the expectations of the people being educated.
- It should make it possible for Switzerland to affirm its leading position internationally in basic research and in the field of applied research and innovation.
- It should contribute to the creation of economic growth and prosperity.

## A systematic process of reform

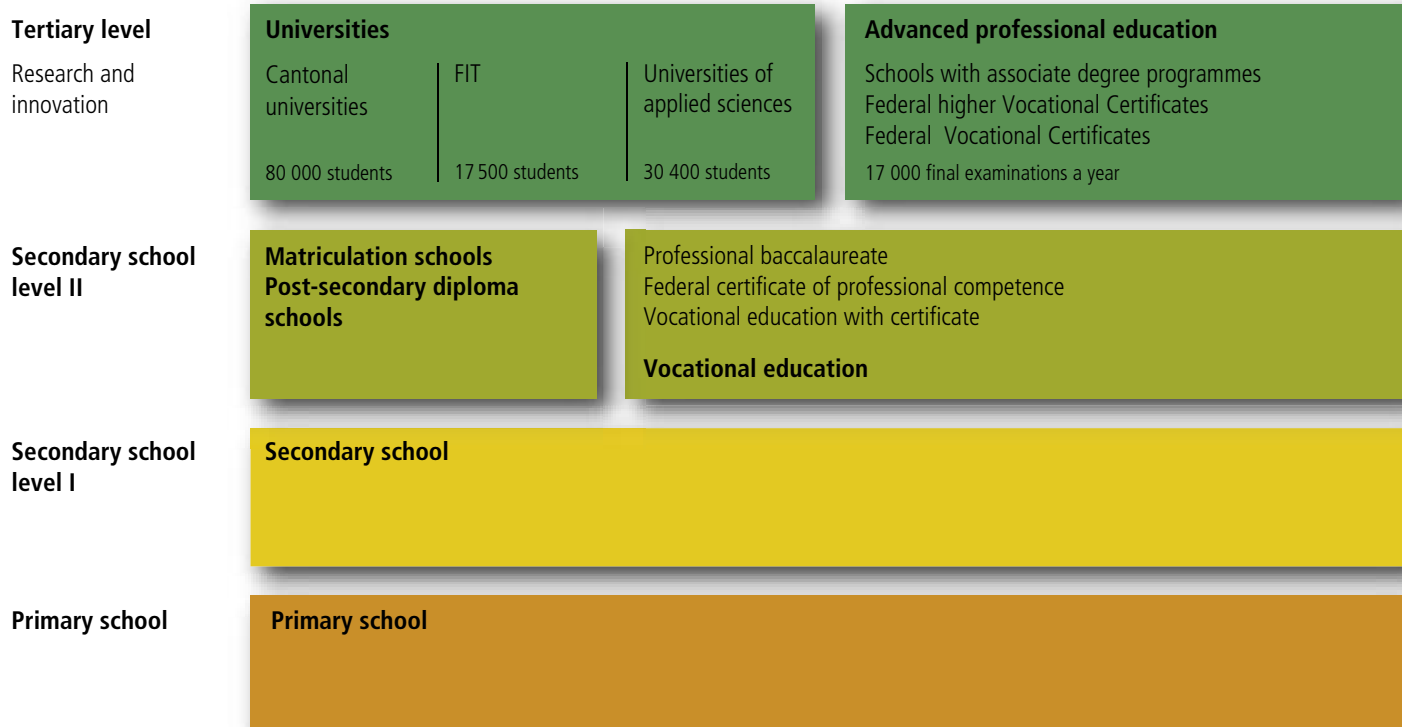
The proposed ERT policy 2004–2007 is a continuation of the reform process which the federal and cantonal authorities have set in motion over the past few years. In cooperation with the cantons, the Confederation plans, through its ERT promotion efforts, to continue putting considerable weight on the strengthening of national and international cooperation and on the creation of synergies between institutions in the Swiss ERT sector.

\*This sum could be reduced because of a possible restructuring of federal finances.



Public and private spending on research and development in percent of Gross Domestic Product 1990–1999 Source: OECD

# The Swiss ERT system: organisation, responsibilities and financial outlays



In Switzerland, the federal authorities share responsibility with the cantons for policy in the ERT sector. The cantons have considerable autonomy in the educational sphere but this autonomy varies depending on the kind of educational institution and the level of education. For example, the cantons have sole competence for pre-school, primary school and secondary school I levels. From secondary school level II the competencies are shared, with the cantons in charge of general education (grammar school) while the Confederation has jurisdiction over vocational education.

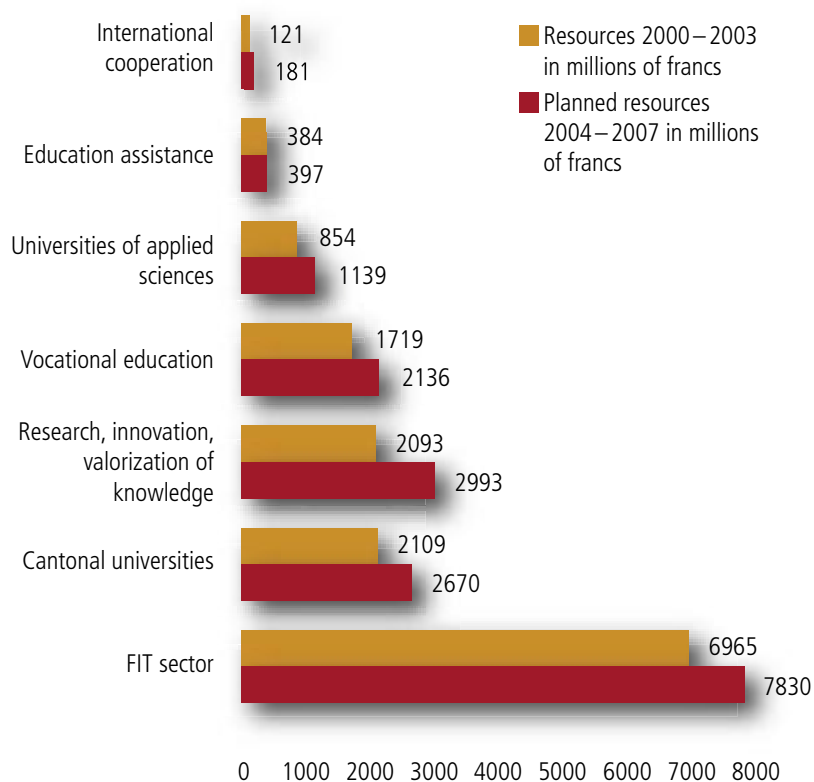
At the tertiary level the federal authorities manage the Federal Institutes of Technology (FIT), have regulatory control over the advanced vocational education and the universities of applied sciences. The Confederation is also the most important public promoter of research and innovation. The cantons, with the financial help of the Confederation, are responsible for the 10 cantonal universities and as a rule, frequently with the private sector, for vocational education and the universities of applied sciences.

This distribution of competencies reflects the breakdown of financial resources.

- The Confederation, cantons and municipalities contribute SFr. 24.2 billion annually for education and research of which
  - SFr. 4.1 billion comes from the Confederation (17%)
  - SFr. 12.3 billion comes from the cantons (51%)
  - SFr. 7.8 billion comes from the municipalities (32%).
- For vocational education, the Confederation contributes 16% of total public spending.
- At the university level, the Confederation's share of total spending is around 65%:
  - 90% for the Federal Institutes of Technology (under federal management)
  - 28% for the universities of applied sciences (domains: technology, economy, applied arts)
  - 25% (including research resources) for the cantonal universities (the Confederation has a subsidiary role).

(All data refer to the year 2000)

# Setting priorities for the sustainable support of the ongoing reform process: funds for the promotion of education, research and technology

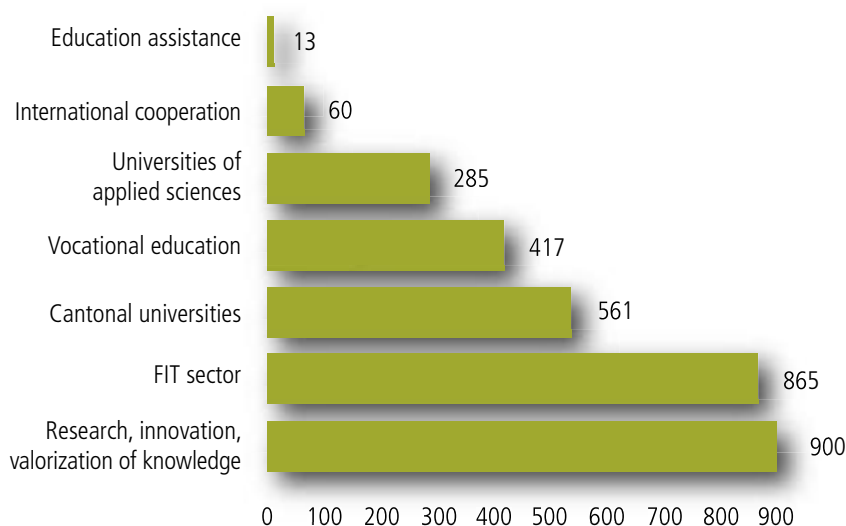


2000–2003 and 2004–2007 credit periods in comparison (in millions of SFr.)

The proposed additional resources of around SFr. 3.1 billion for 2004–2007 in comparison to 2000–2003, will not be distributed in linear fashion, but scaled with the focus on new impulse programmes and the development of established promotional instruments. The government will determine increases in allocations on the basis of the following criteria:

- societal and economic priorities and needs;
- the constitutional jurisdiction of the Confederation;
- the contribution to a sustainable development and stimulation of the ERT sector;
- the consideration given to sectors with large demand and insufficient investment by international standards;
- the strengthening of national and international cooperation efforts launched during the 2000–2003 programme;
- the strengthening of synergies between the creation of knowledge and its valorisation for and by the economy.

The use of these criteria has resulted in the following additional sums for each ERT field being promoted during the 2004–2007 period (in millions of SFr.)

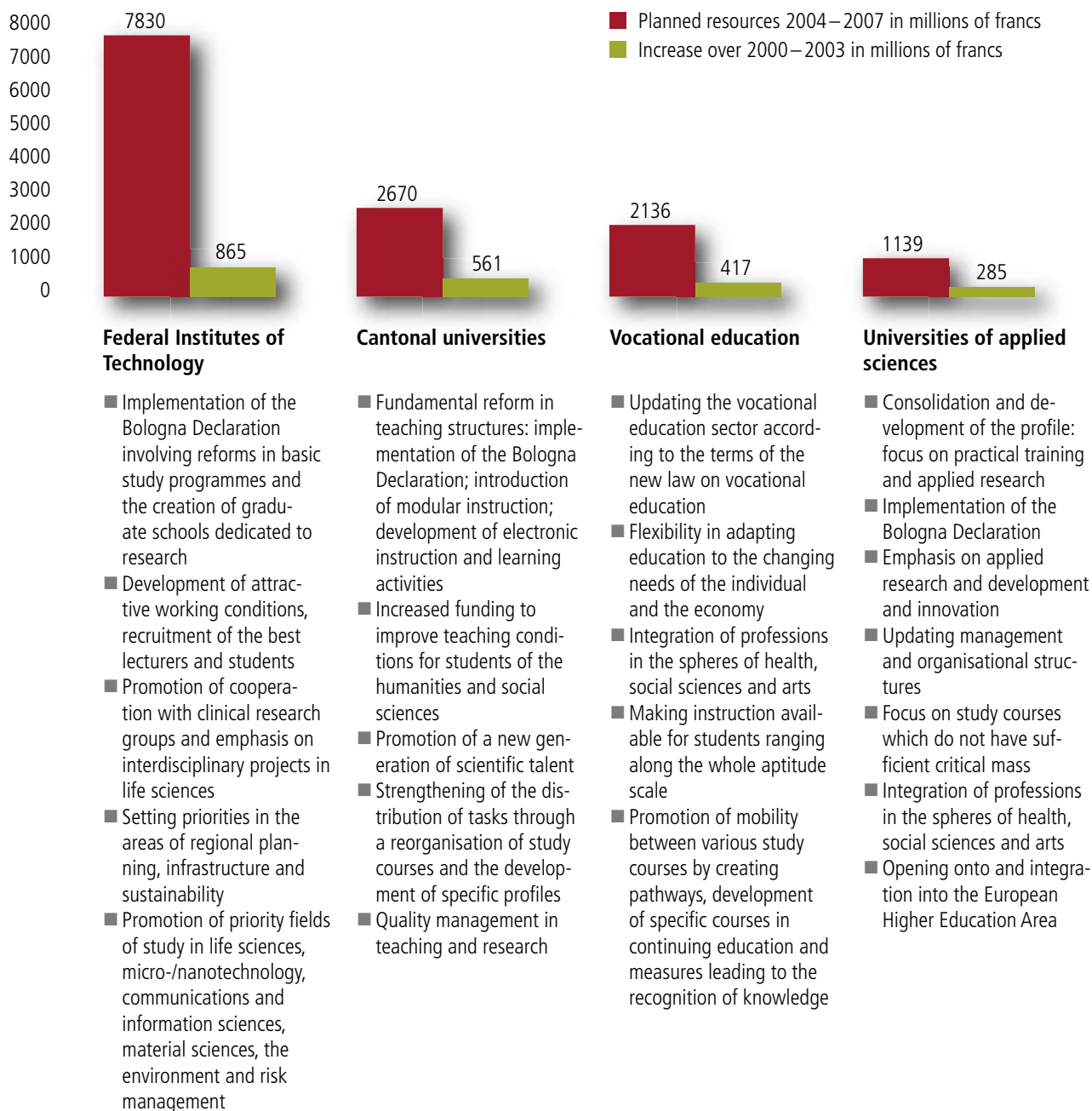


# The priorities of the Confederation's 2004–2007 education, research and technology policy

The Swiss government's proposed ERT policy 2004–2007 consists of four priorities outlined below.

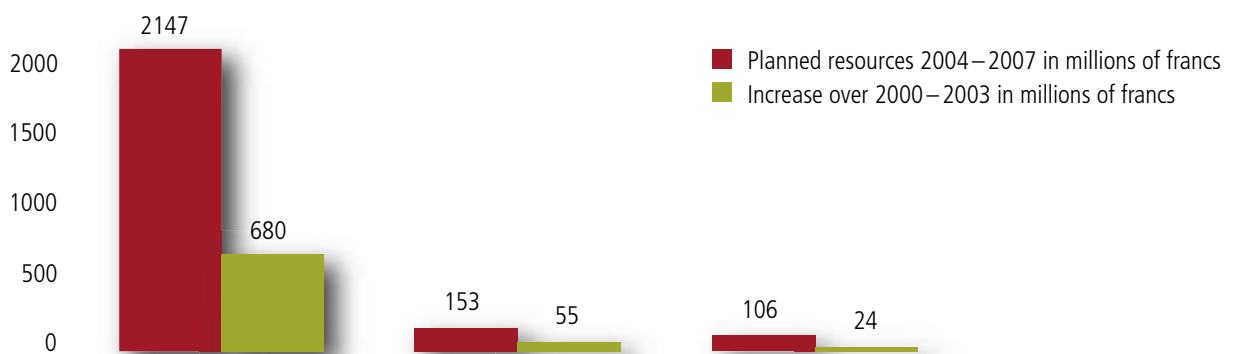
## Updating the teaching structure

This priority involves various measures which will be implemented through an important boost in resources going to vocational education, the Federal Institutes of Technology, the cantonal universities and the universities of applied sciences.



## Increasing research activities

The Swiss National Science Foundation (SNF) is the Confederation's most important instrument in the promotion of independent basic research, in nurturing the next generation of scientific talent and in the development of applied research. For quite some time federal spending in this area has lagged behind the sums committed by other leading scientific countries. The 2004–2007 ERT programme represents renewed interest in making up lost ground by boosting research through additional financial injections to promote the activities of the SNF, research institutions and scientific services outside the university sphere and the four scientific academies.



### Swiss National Science Foundation

#### Emphasis on promoting basic research:

- Greater emphasis on and financing of independent basic research projects
- Greater financing of research in the humanities and social sciences and research infrastructures
- Promotion of projects at the universities of applied sciences in the health, social sciences and arts spheres

- Strengthening of clinical research activities

#### Focus on promoting a dynamic new generation of scientific talent:

- Introduction of training grants for doctoral students
- Introduction of post-graduate courses
- Development of the post-doctoral scholarship programme for studies abroad
- Development of the professorship programme

#### Applied research

- Establishment of three to six additional National Centres of Competence in Research

### Research institutions and scientific services

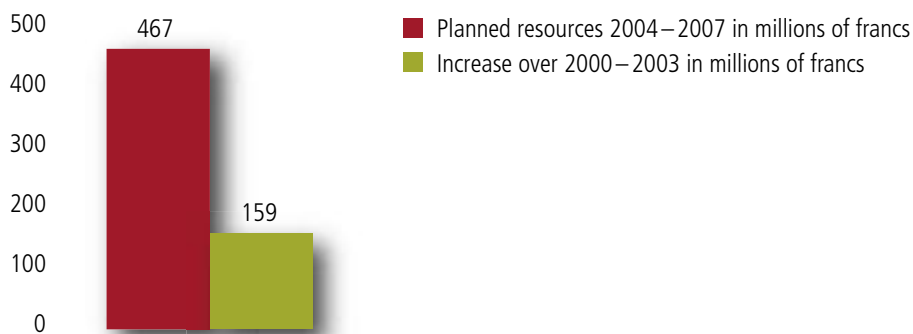
- Strengthening of cancer research
- Development of technology transfer offices at colleges and universities, establishment of an information platform for the technology sector
- Strengthening dialogue between the scientific community and the society

### Academies

- Increased support for the Historical Dictionary of Switzerland in view of the end of the project in 2008
- Consolidation of the tasks of the scientific academies

## Promoting innovation

The Commission for Technology and Innovation (CTI) is the Swiss Confederation's agency for the promotion of applied research and development. It supports projects between companies and the universities and colleges according to the bottom-up principle which means that the project partners define their projects themselves. The private sector partner bears at least half the costs. This arrangement has three important effects. It strengthens the innovative processes in the private sector. It gives researchers at the schools practical qualifications and it improves cooperation between schools and the private sector. Because of tight financial constraints, the CTI has had to reject a considerable number of high quality project ideas in recent years. But with fresh financial injections, the CTI should be able to contribute to an increased transformation of scientific potential into innovative goods and services. Each SFr. 25 million instalment finances more than 150 additional projects in which more than 200 researchers collaborate with companies. One franc from the Confederation produces SFr. 1.50 in additional investment by the private sector.



### Commission for Technology and Innovation

- Increased promotion of the establishment of companies and a company culture, development of the CTI start-up initiative
- Setting priorities in the areas of the life sciences, nanotechnology and microsystems technology, information and communication technologies
- Expansion of activities in international cooperation in the framework of ESA, EUREKA and IMS
- Development of competencies in applied research and development in the universities of applied sciences
- Promotion of higher risk projects, so-called "Discovery Projects" which could have high market value
- Raising the awareness of young people for science and technology

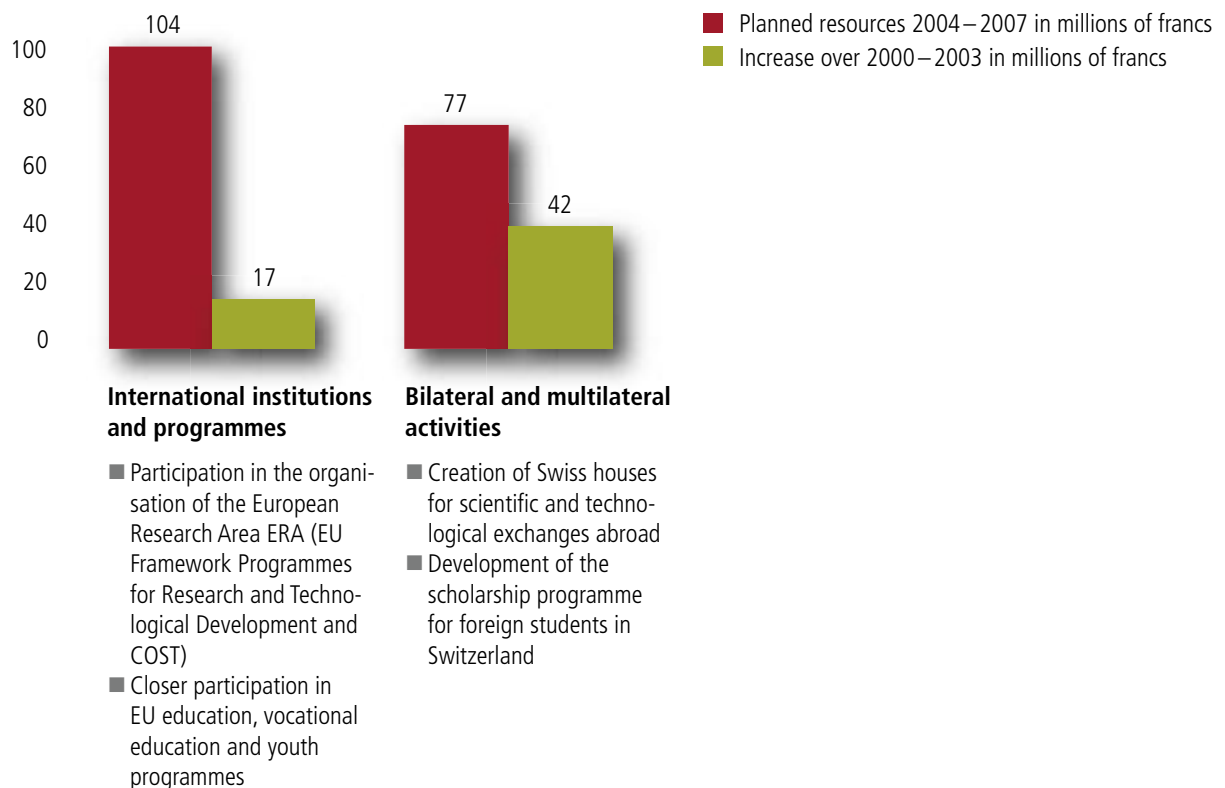
## Intensifying national and international cooperation

To strengthen national cooperation, tasks should be undertaken which involve the whole university and college sector. These include

- A review of the present division of labour among the three types of schools and an intensification of cooperation
- The introduction of a two-tier study programme along the lines of the Bachelor's and Master's degrees according to the Bologna Declaration
- The promotion of mobility
- The promotion of equal opportunity

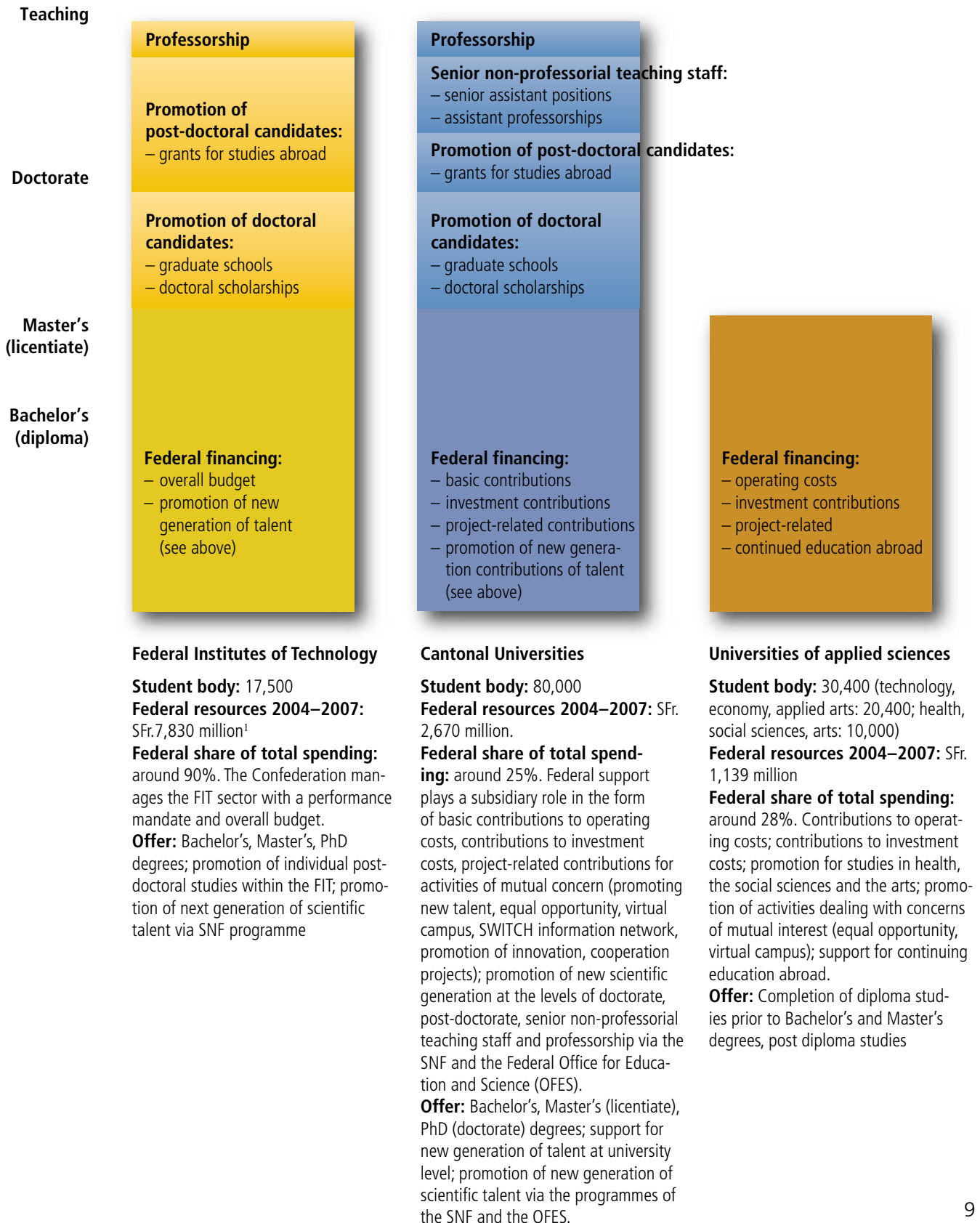
In the area of research and innovation, the CTI and the SNF are to better integrate basic and applied research by means of jointly developed projects. Furthermore, the establishment of an information platform for the technology sector will permit closer relations between schools and business.

Finally, the strengthening of international cooperation should take place through the consolidation of existing instruments and the creation of new instruments to support the cooperation activities of researchers, schools and businesses in the context of international institutions and programmes and through specific bilateral and multilateral activities.



# Support for the tertiary education sphere by the Confederation 2004–2007

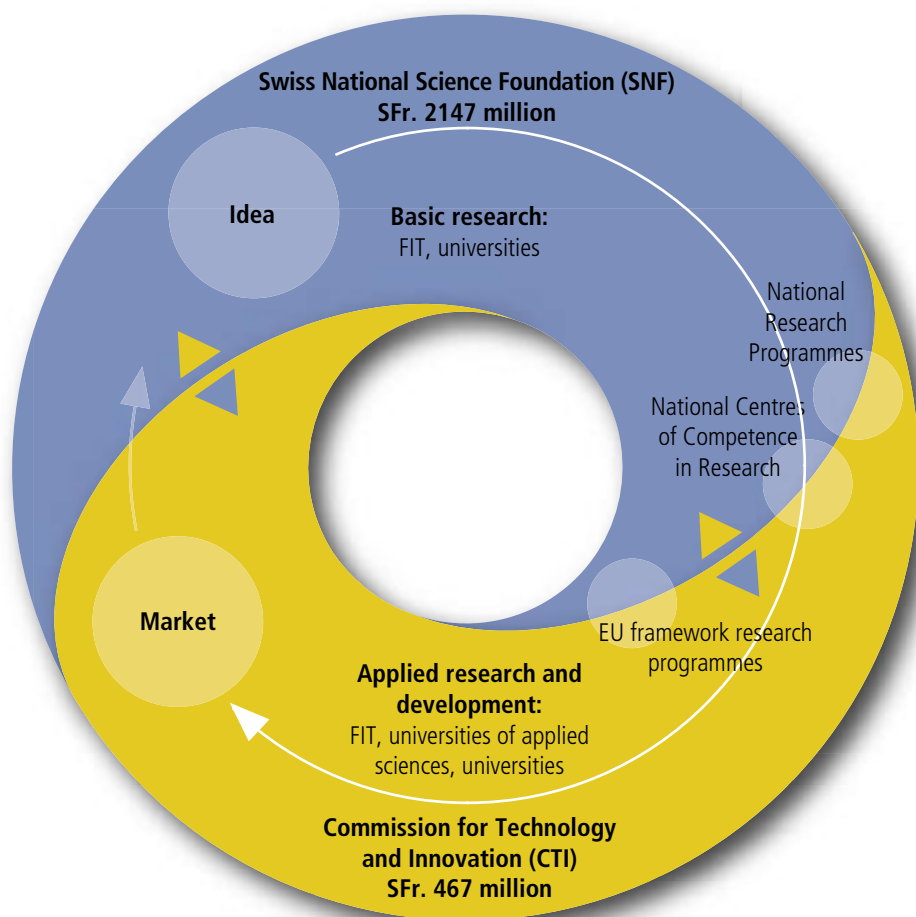
The Confederation supports the two Federal Institutes of Technology, the 10 cantonal universities and the seven universities of applied sciences. The amount of support depends on the type of institution. The illustration below shows how this support is distributed.



# The Confederation's support for research and innovation 2004–2007

The ERT message 2004–2007 proposes individual specific measures for the promotion of basic research, applied research and development as well as innovation and the valorization of knowledge. Also special emphasis is given to the strengthening of cross sectoral and institutional cooperation with the aim of better exploiting knowledge and working more stringently to transform research results into marketable goods and services.

The illustration below shows the efforts of the Confederation to promote research and innovation. It includes the most important financial contributions and shows which ERT institutions are involved in the chain of innovation.



**Bologna Declaration (p.5)**

The Bologna Declaration, which was signed in June 1999 by the education ministers from 29 European countries including Switzerland, proposes that all European tertiary education institutions adopt a two-tier system of studies based on the Anglo-Saxon model. This consists of a three-year basic course leading to a Bachelor's degree and a one- or two-year Master's degree course. A PhD course could follow. This proposed change aims to harmonize higher education structures in Europe, facilitate academic mobility and improve the competitiveness of the European education system around the world.

**COST (p.8)**

The European Cooperation in the field of Scientific and Technological Research (COST) is the oldest initiative for scientific and technical cooperation in Europe. It aims to strengthen European cooperation through information exchanges and the building of networks and to achieve international coordination in national research activities.

**ESA (p.8)**

The goal of the Paris-based European Space Agency is to promote cooperation between European countries in space research and technology.

**EU education, vocational education and youth programmes (p.8)**

An important EU goal is the establishment of an open and dynamic European Education Area. Three major programmes have this goal in their sights: SOCRATES (general education) LEONARDO DA VINCI (vocational education), YOUTH (extracurricular activities).

**EUREKA (p.7)**

This programme, which was set up in 1985, offers application oriented research in Europe, industry and science a framework for cooperation projects. There are 33 countries in the programme including Switzerland as well as the European Commission.

**EU Framework programme for research, technological development and demonstration activities (p.8)**

Because the 2003-2006 running time of the EU framework programme is not the same as the 2004-2007 time frame of the ERT programme of the Swiss government, the two houses of Parliament on 6 June 2002 approved a separate SFr. 869 million credit to finance Swiss participation in the 6th framework programme.

**Graduate schools (S.9)**

Graduate schools are institutes and thematic and cross-disciplinary networks for the education of doctoral students in which the best students regularly interact with each other and with a group of lecturers.

**IMS (p.8)**

Intelligent Manufacturing Systems is a worldwide research and development programme for production technologies. More than 200 firms and more than 200 research centres participate in IMS. They come from Switzerland, Australia, Canada, the EU area, Norway, Japan, the United States and South Korea.

© Bern 2002

Federal Department of Home Affairs:

State Secretariat of the Swiss Science Agency ([www.gwf-gsr.ch](http://www.gwf-gsr.ch))

Federal Office for Education and Science OFES ([www.bbww.admin.ch](http://www bbw.admin.ch))

Federal Department of Economic Affairs:

Federal Office for Professional Education and Technology OPET ([www.bbt.admin.ch](http://www.bbt.admin.ch))