

April 14, 2015

The enclosed report "Intermediate Evaluation 2015 of the ETH Domain" has been drafted at the request of Federal Councillor, Johann N. Schneider-Ammann, Head of the Federal Department of Economic Affairs, Education and Research. The following Experts have participated in its elaboration:

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The report and the 13 recommendations have been unanimously accepted by all the experts.



Jean-Daniel Gerber  
Chairman of the Expert Committee



Jérôme Billotte  
Secretary of the Expert Committee

Enclosure

# **Intermediate Evaluation 2015 of the ETH Domain**

## **Report of the Expert Committee**

8 April 2015

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# 1. Introduction

## Summing up the mandate of the Expert Committee (EC)

The EC has been mandated by H.E. Johann N. Schneider-Ammann, Federal Councillor, Head of the Federal Department of Economic Affairs, Education and Research, to carry out the Intermediate Evaluation of the ETH Domain.

The objective of the intermediate evaluation is to assess the role and contribution of the ETH Domain and to reflect on future improvements regarding its position as a driving force for innovation, its national position and international competitiveness, the role of federal and higher education policy, and issues relating to medical sciences and medical technology.

In contrast to past reports, the EC has not focused primarily on the quality of teaching and excellence of research as well as on academic performance but more particularly on the role played by the ETH Domain institutions in higher education, economic and innovation policy in Switzerland as well as academic performance. This modified focus notwithstanding, in its deliberation the EC had the opportunity to touch upon a series of quality-related aspects of teaching and research and can confirm that the ETH Domain continues, as in the past, to be a worldwide centre of excellence in these respects.

## General remarks

The EC wishes to acknowledge the continued high relevance of the ETH Domain in higher education policy and economic and innovation policy in Switzerland. The ETH Domain influences politics, the economy and the society as a whole. Its excellent reputation greatly impacts the Swiss economy, the education system and the political discourse not only on research and innovation but also on society at large.

At the same time, the EC would like to stress how important it is for the ETH Domain not to rest on its laurels. The world of science is changing dramatically. New forms of teaching, extraordinary progress in research achievements and a spectacular increase of competition among lead universities, mean that the ETH Domain must continue to adapt to change.

The ETH Domain is well equipped to face these challenges. The EC stresses how important it is that the most valuable preconditions supporting the ETH Domain are preserved:

- The educational policy resting on different pillars: academic education, education in applied sciences, and the apprenticeship system;
- Flexibility between the different modes of technical education with established *passerelles* between education models;
- The two quite different approaches taken by the technical universities, ETHZ and EPFL, to fulfil their mandate which, on the one hand, complement each other but, on the other hand, foster excellence through competition;
- The close integration of its universities in the world of science and their high rating in all respects among their peers;

- The research institutes, which conduct first class research, provide a unique research infrastructure of national importance and also fulfil a series of much appreciated public services;
- The solid budgetary means provided in order for the ETH Domain to fulfil its mandate.

At the same time, the EC draws the attention of the Swiss Government, Parliament, actors in the economy and in universities and the public at large, to the extreme importance for Switzerland not to jeopardize its privileged place in the world of science with actions that are not compatible with its long-term interests. Switzerland needs to attract the best professors, the best students and the best research teams if it wants to continue to be able to compete and retain its innovative edge. In particular, the deterioration of its privileged position in the EU-research and education system would have detrimental effects on its international standing in research and teaching, as well a harmful effect on its economy.

The EC has drawn up a number of recommendations and hopes that these are helpful and supportive for the further development and the continued quality of the ETH Domain, as well as for the competitiveness of Switzerland in research, teaching and knowledge and technology transfer. The members of the EC have not made recommendations on all the points mentioned in the mandate conveyed to them but concentrated their work on those sections in the self-evaluation report of the ETH-Board where it deemed it necessary. Where no specific recommendation has been made, the EC is in general agreement with the self-evaluation report.

The EC expresses its thanks to the ETH-Board for the excellent preparation and organization of its meetings. In particular, the self-assessment report made in the context of the Intermediate Evaluation 2015 of the ETH Domain has greatly facilitated the work of the EC. The EC would also like to thank the numerous stakeholders for their open and significant remarks that contributed to several of the EC's recommendations. Last but not least, its thanks go to the Federal Councillor H.E. Johann N. Schneider-Ammann and to the State Secretary for Education, Research and Innovation, Mauro Dell'Ambrogio, and his staff for their trust.

## 2. General Assessment

The EC has carried out a large number of hearings (see appendix A), together with the analysis of the self-assessment report, the ETH Domain's Strategic planning for 2017-2020, and other additional information. This chapter synthesizes this analysis, and presents the EC views on different strengths and weaknesses of the ETH Domain, as well as on the challenges the latter is facing.

This general assessment, which should not be considered as an exhaustive review, was used to understand the ETH Domain's potential within the higher education changing environment. The recommendations presented in chapter 3 have been designed, in the lights of the terms of reference, to leverage the strengths and opportunities and respond to weaknesses and threats.

### Strengths

**Internationally recognized quality of research and teaching:** ETH Domain institutions are, with their specificity, definitely among the best institutions in the world. The quality of their education and research is internationally recognized, as evidenced by the rankings, the results in internationally competitive funding, or the attraction of high profile faculties and students.

**Recognized role as a key partner by industry:** The EC was impressed by the uncontested vote of the economy to say that the Institutions of the ETH Domain were outstanding partners. This partnership is primarily built on the capacity to provide high value graduates in keeping with the economy's needs and requirements. In addition, they particularly stressed the interest of having strong curiosity-driven research. Indeed, in terms of goal-oriented research, big companies have many means to conduct it by themselves, and SMEs have privileged links with universities of applied sciences (UAS).

**Quality of infrastructures:** The Institutions of the ETH Domain run research infrastructures of the highest standard, allowing their researchers to access to the necessary tools for conducting cutting-edge research. The EC was particularly impressed by the high quality and performance of the infrastructures run by the research institutes, especially the Paul Scherrer Institute (PSI) that it was able to visit.

**Sustained funding over the years:** The ETH Domain has benefited from solid support from the Confederation over the past years, with an average yearly increase of 3.6% over the last 6 years. In addition, its capacity to attract third party funding has increased by 6% yearly over the same time period.

**Quality of the Swiss education system** (vocational education and training, UAS, cantonal universities, institutions of the ETH Domain): While the quality of graduates from the institutions of the ETH Domain is widely recognized, the Swiss education system and its three main pillars (vocational education and training, Universities of applied sciences and universities and polytechnic schools) allows the ETH domain on the one hand to position itself clearly and on the other hand to develop synergies with other actors of the system.

**Framework conditions:** Framework conditions (infrastructure, funding, autonomy, etc.) for teaching and research have been first rate in recent years and allowed the institutions of the ETH Domain to reach the position they occupy today. Switzerland in general and the ETH Domain in particular, provide excellent working conditions in international comparison. This allows, despite the very high cost of living, to attract the best professors, a key element for the competitiveness of academic institutions on an international level.

**Autonomy of the institutions:** The ETH domain and its institutions have the necessary autonomy for their development. In particular, they may decide on their strategy, define the criteria and objectives of quality and performance and implement the actions necessary to achieve these objectives. The EC considers this autonomy as central to their success.

**Sustained support by the Swiss population and the political world:** The institutions of the ETH Domain have an outstanding image among the public and its political representatives. This support is an undeniable strength to allow it to face future challenges.

## Weaknesses

**Cultural allergy to risk and weak development of entrepreneurship spirit among academics and graduates:** Generally speaking, the concept of risk taking is addressed with great caution in Switzerland. Failure is seen very negatively, and not through its high learning potential. This severely limits the possibility of major developments (high risk - high gain). The EC has been struck by the very high survival rate of spin-offs from the ETH Domain (over 90%), which is excellent, but certainly shows that too few risks were taken. It believes that a more entrepreneurial culture should be developed at the level of both faculties and students.

**Academic community not enough involved in public debate:** Recent public debates on subjects of great importance for the position and competitiveness of Switzerland and academic institutions have shown that the academic community is weakly involved. Particularly in view of the numerous topics on which the population will have to make decisions in the future, a much greater involvement of the academic community is very important. This is true for aspects regarding framework conditions as well as major social issues.

**Research interest of faculty vs. size of a country with limited resources:** Switzerland is a country with limited resources. This means that under certain conditions and in specific areas, access to specific infrastructure or achievement of critical mass can prove to be difficult. In other words, research institutions should be careful not to disperse resources and to define strategic directions if needed. The balance that institutions have found between free research and the necessary focus, and which has proven to be relevant, should remain.

**Danger of complacency:** The successes of Switzerland, and of the ETH Domain in particular, and the management of the Swiss higher education and research system, with actors operating in a relatively small world, bring a risk of complacency. The EC stresses the importance of a critical view, at all levels, to ensure long-term competitiveness.

**Tendency to have less hands-on industrial experience by the faculties:** The research mission of the institutions of the ETH Domain is clearly oriented towards basic research. The increasing specialization requires professionals who focus fully on their research. The position of the ETH



Domain as a key player in the economic development of the country, however, requires a specific listening to the long-term needs of the industry. While a number of professors do not have direct experience with the industrial world, it is the responsibility of institutions to maintain and develop these ties.

## Challenges

**Inclusion in the international and in particular in the European higher education and research area:** the EC must of course note and report the risk for the system incurred by the potential exclusion of Switzerland from the European Research Network. Access to this network is fundamental to be able to compete internationally at different levels: The international networking opportunities and the competition with other countries strengthen Switzerland's research. It allows the institutions to attract and retain the best professionals it needs to remain competitive.

In a more general way, the tendency for less openness and internationality could prove detrimental to the higher education and research area in Switzerland. Therefore, as mentioned above, a much greater involvement of the academic community in the public debates is very important.

**Global issues requiring systemic innovations:** The innovation ecosystem has to be seen in a dynamic way. In the past, innovations have been seen as outcome of (scientific) research and development activities only. The key issue was how to employ research findings in the economy for innovations. Today we see much more systemic and multidisciplinary and also non-R&D driven innovations. A successful research policy has to integrate business models, marketing, branding and organizational issues in a systemic way with technology or knowledge as such. The challenge is to be able to combine technological, non-technological and social innovations.

Since 2000, the impact of the institutions of the ETH Domain on innovation and entrepreneurship has risen dramatically, as attested to by the numbers of patents, start-ups, industrial interactions, etc. These efforts are commendable and recognized by the community. However, the EC believes that the ETH Domain can elevate its performance to an even higher level, and be an outstanding and a worldwide leader in this area as it is in science where it performs at the level of a select group of institutions. In addition, the ETH Domain can serve as a catalyst for the country. The role of a catalyst is especially important as the culture of entrepreneurship and risk taking does not appear prevalent among the young scientists and engineers (see above).

**Capacity to provide enough highly trained professionals in certain key fields:** Some fields suffer from a shortage of qualified personnel. This is particularly true for engineering and medicine. The current situation, with too few graduates trained in Switzerland is unsustainable. In general, Switzerland is a country of highly qualified jobs for highly qualified people. The role of the institutions of the ETH Domain is central to attract more qualified Swiss students in this respect.

**Increasing expectations of short term return on investment can weakens basic research:** If there is a strong correlation between the level of fundamental research and long-term economic prosperity, the results of basic research sometimes require many years to find commercial applications. In a field such as medicine, considerable efforts are made to

promote transfer towards clinical applications (translational research). The general trend is to expect a faster return on investment. This trend should be carefully monitored to avoid a weakening of the basic research capacity in favour of research with quicker benefits but with ultimately much smaller potential.

**Balance between accountability towards taxpayers and autonomy (and administrative burden):** On one hand the State needs to monitor the results of the universities in the name of public accountability. On the other hand, universities need autonomy to be able to act according to the evolution of the national and international environment. If the needs of the State are not met, a trust deficit might emerge which could lead to a limitation of autonomy. The ability of the ETH Domain to operate and maintain trust between itself and a set of stakeholders, primarily the State, is therefore central to its success.

**Risk of deindustrialization of Switzerland:** The industry, from mechanical to pharmaceutical companies, is a key player in the Swiss economy. It is highly linked to high-tech and as stated by their representatives, is very much dependant on very well-trained professionals and strong research. Switzerland has a very high cost of labour and therefore can only compete internationally on quality and innovation, two assets for which the ETH Domain has a central role to play.

**Equilibrium between the regions and the cantons in reaping the benefits:** Switzerland is built on a delicate balance between regions, cantons and cultures. Each canton has given up part of its sovereignty to the Confederation, but expects to be treated fairly. The investments of the Confederation and their profits must therefore be distributed carefully to ensure the country's political balance.

**Not to permit internal rivalries to harm joint actions in pursuing excellence in research and education:** Competition has proven to be efficient in raising the global level of the ETH Domain in the past years. But some issues might require joint forces and competencies, and put together, combined resources of the ETH Domain have huge potential. Therefore, the balance between cooperation and competition, within the ETH Domain, should be carefully addressed, taking into account the global interest and performance.

**Enhancing gender diversity at all levels.** Gender diversity is not only a question of equal opportunities; it has a very positive potential impact for the institutions. It permits access to a wider talent pool, and allows a better mix of skills. As results and literature show, gender diversity has a positive impact on performance, at the working team and management levels, and it promotes radical innovation.

**Optimal adaption to regulations by the law (e.g. entrance criteria for students, tuition fees):** The number of students of both ETH Zürich and EPFL has doubled in the past 15 years. Maximum room capacity is reached, practical sessions are reduced due to lack of resources, and teaching loads have increased. In order to sustain a higher level of teaching, regulation of incoming flows and adjustment of resources according to the number of students might become more and more important.

## 3. Recommendations<sup>1</sup>

### 1) Strengthening the autonomy of the ETH Domain

All stakeholders consider autonomy of the ETH Domain as a major asset for the high performance of the system<sup>2</sup> and for the fulfilment of the mandate. In this respect the present governance works well and there is no need to change it substantially.

In the past years, there has been a tendency to limit autonomy, as exemplified by the separation of the regular budget from the budget for buildings, and by the limitations in the public-private partnerships projects. This evolution could also hamper curiosity-driven research as one of the cornerstones for innovation.

The EC recommends that this tendency be reversed and the autonomy strengthened including for the four Research Institutes. Within the framework of the mission and strategy of the ETH Domain, the autonomy of the Domain comes with accountability. Therefore, the EC recommends to better define the content of accountability and recommends that the ETH Domain develops a coherent policy of risk assessment and risk management.

### 2) Securing stable funding

The substantive increase of funding for the ETH Domain over the last years was key to its outstanding success, particularly in fostering curiosity-driven research. In order to guarantee the success and the international competitiveness of the institutions of the ETH Domain in the future, the EC recommends that the budget be secured over the coming planning periods as much as possible.

In addition, the EC recommends that the ETH Board assesses the possibility and, if relevant, define a framework supporting the development of complementary funding such as endowments, increased overhead, development of fund raising, monetization of continuous education, strengthening of licensing income (equity, royalties, etc.), promotion of innovative financial instruments (PPP, etc.), and a review of tuition fees. In addition, the EC would welcome a discussion on the current and potential cantonal co-financing schemes to which not all cantons currently participate.

### 3) Reinforcing the strategic capacity of the ETH Board

As indicated in the general remarks, the world of science, economic competitiveness, and societal needs continue to change rapidly. In order to meet these challenges, the strategic

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<sup>1</sup> The recommendations are not listed in any order of priority.

When there is no specific recommendation on an issue, the EC agrees with the self-assessment report.

<sup>2</sup> See also the survey conducted by the European University Association regarding university autonomy in 29 European higher education systems. It focuses on four autonomy areas and ranks countries according to the level of autonomy they have in each of these. <http://www.university-autonomy.eu/>

capacity of the ETH Board should be strengthened. Furthermore, the ETH Board has to find the appropriate balance between internal competition and creating synergies in cooperation among its member institutions. In addition, the ETH Board must foster cooperation between the ETH Domain and the universities as well as the universities of applied sciences.

To fulfil all these goals, the EC recommends that the ETH Board consider the merits of establishing a strategic fund. This fund would enable the Domain to set up new strategic initiatives, encourage collaborative programs as well as provide incentives when needed (examples could include promoting gender diversity, strengthening entrepreneurial spirit, etc.). This fund should act as a catalyst; hence, the resources it provides for a particular activity should be for a limited period of time.

From an efficiency point of view, the six institutions of the ETH Domain pursue common objectives and share many interests. Each has developed competencies that could be pooled and shared whenever appropriate, also to reduce administrative costs. For example, a centre of competence on business policies (e.g. licenses and patent regulations, procurement rules) would improve the use of available knowledge by concentrating topics of general relevance to a single institution or to the ETH Board staff. Furthermore, at the level of the ETH Domain the cooperation on dual career hiring should be fostered.

## **4) Reviewing the organisation of the ETH Board**

In all its aspects, the work of the ETH Board should focus on strategic issues and leave the operational activities to member institutions to the maximum extent possible.

No substantive change on governance of the ETH Board is proposed. However, to emphasize the national significance of the ETH Domain, the EC recommends that the ETH Board should take steps to have its seat and central activity moved to Bern.

In the interest of a lean organization, the working method of the ETH Board needs to be reviewed in order to ease the administrative burden.

In general, there is a shared feeling by the ETH Board and the institutions of the ETH Domain that administrative work has increased significantly over the past years. The EC recommends that the State Secretariat and the ETH Board review the situation and propose appropriate measures.

Finally, the EC noted the recommendation of the previous expert committee and shares its concern about the lack of international representation in the ETH Board. It invites the Swiss government to follow up these recommendations and re-assess the situation.

## **5) Intensifying the relations between the ETH Domain and the Cantons**

The national mission of the ETH Domain is presently fulfilled at different locations in Switzerland. So far, the ETH Domain is present in 13 cantons out of 26.

There is an increased interest of cantonal institutions (cantonal universities and universities of applied sciences) in leveraging the strength and mission of the ETH Domain.

There are differences in approaches within the ETH Domain regarding partnerships, territorial implantations and co-financing by the cantons, reflecting diversity in opportunities, and political, economical, and cultural differences in Switzerland.

The EC recommends that the ETH Board carry out a strategic monitoring of the outcomes of these approaches in the light of the missions of the ETH Domain. The monitoring should weigh the positive impact of these initiatives, their sustainability, as well as the risks associated with them, including the potential dilution of the institution's resources. The results of this monitoring should be made transparent.

## **6) Fostering research infrastructures**

The ETH Domain, with the two schools and the four research institutes, plans, constructs, and runs outstanding technology platforms and unique large-scale research facilities for their own research and for the scientific community at national and international level, including users from the private sector. Such large-scale infrastructures need particular skills to be conceived, built and operated.

The EC was impressed by the fact that especially the Swiss FEL (Free Electron Laser) and NEST (Next Evolution in Sustainable Buildings Technologies) infrastructure projects seem to be on schedule and within budget. The EC points out that these infrastructures require long term planning with stable budgets, and recommends assuring this by appropriate means. In its area of competence, the ETH Domain plays a key role in further developing the national roadmap for future large-scale infrastructures and in the participation of Switzerland in international initiatives.

## **7) Striving for gender diversity**

Progress has been made in all institutions to raise awareness of the importance of gender diversity and equality of opportunities, including increasing the number of female faculty. Nevertheless, practices, improvements and level of commitment and implementation vary across the institutions and their programs.

The EC recommends that the ETH Board insist on the formulation and implementation of a clear gender diversity and equality of opportunity policy.

The implementation of this policy should start immediately and not wait for the re-accreditation procedure mandated by the Federal Act on Funding and Coordination of the Swiss Higher Education Sector (Article 75, paragraph 1).

The EC also recommends that the ETH-Board enhance its continued monitoring of the implementation of the policy. Monitoring could include benchmarking against best practices at comparable institutions worldwide. The possibility of providing incentives and quantitative targets to accelerate implementation is encouraged.

## 8) Improving graduation rates

The universities within the ETH Domain, ETH Zürich and EPFL, provide a superb education to their students. The educational experience is of the calibre of that of a very select group of elite science and technology universities in the world. Nevertheless, it is unfortunate and surprising that a large percentage of the students entering the Bachelor's program are not able to continue after the first year. Hence, the graduation rates are lower than would be expected for such leading institutions in the world. In addition, this comes at a significant cost to the ETH Domain and the country.

The EC notes with concern an inefficiency in the system of admission, i.e. an existing gap between the learning outcome of the Matura and the success rate of students in the first year of their bachelor studies at ETH Zurich and EPFL. Efforts are under way to close this gap.

The EC recommends that these efforts be strengthened in order to improve the quality of the Matura and to close the gap more rapidly. On the other hand, ETH Zurich and EPFL should consider the possibility of a selective admission for students holding foreign qualifications, respecting the existing national and international regulations. Furthermore, for students with a Swiss certificate, the option of a non-compulsory, informative entrance assessment, as practiced in some areas by some universities and UAS, should also be taken into consideration. The EC appreciates that this question is only one aspect of the many facets of the entire educational system, and thus a complex issue to even consider. However, from the perspective of good stewardship of the country's resources, it ought to be re-assessed.

## 9) Improving communication and dialogue capacities

Practically all stakeholders expressed concerns about the considerable risks for research and innovation in Switzerland in case the country does not maintain its particular status with the EU and no longer has full access to the Horizon 2020 program and other instruments. This has to be communicated with urgency to the public and its political representatives.

There is a strong responsibility of all actors, including the ETH Board, the management of the institutions and the scientific community at large, to be actively engaged in the debates about societal issues affected by science and technology.

Therefore, the dialogue with the population and its representatives towards a better mutual understanding should be improved and intensified. The need for building up and maintaining strong international networks and exchanges, the sensitivity of the higher education system to many policy regulations and the acceptance of new technologies in society, are some examples of the importance of public engagement faced by the ETH Domain, and the higher education area in general.

The EC recommends that the ETH Board develops a strong communication strategy in coordination with the other major actors of the higher education system to increase informing of and interaction with the public in general and political representatives on one side, and to foster ways to better listen to and understand societal concerns on the other side.

Furthermore, the ETH Domain should enhance communication on how science is able to contribute to political decision-making and how it impacts regulation, societal issues and policies (e.g. climate change, ageing, health care) in view of “evidence based policy”.

## 10) Enhancing the collaboration with the universities of applied sciences

The institutions of the ETH Domain and the UAS each have unique strengths that should be better leveraged for the benefit of society at large. As an example, the ETH Domain alone will not be able to solve the problem of shortage of engineers. UAS are in position to play an important role to alleviate this shortage.

The EC recommends that the ETH Domain and UAS jointly define ways to better interact in matter of education and research. Among the many possibilities for improvement are the following:

- Strengthen the *passerelles* between curricula (e.g. by exploiting experiences with mobility of UAS-Bachelor students entering ETH Zürich/EPFL Master study programs and by defining the *passerelles* for UAS Master students looking for an ETH Zürich/EPFL PhD);
- Support transfer from fundamental research created within the ETH Domain to market through better utilization of applied research and development created within UAS;
- Define and propose together with interested partners financial incentives targeted towards collaboration between ETH Domain institutions and universities on one side, and universities of applied sciences on the other side.

## 11) Defining a strategy relative to the medical and health field

The ETH Domain is active in many areas of the life sciences and medical technology, and interacts with many actors in the health field. However, the EC noted that an overarching approach to health research and to fully utilizing the resources available outside the life sciences (e.g. in architecture, urban planning) is lacking. The EC recommends that the State Secretariat, the ETH Domain and the cantons acting in accordance with their respective responsibilities:

- Support the evolution of medical curricula towards greater Bologna compatibility, to facilitate *passerelles* and define a strategy regarding involvement in medical curricula, e.g. through pre-med programs;
- Define a strategy on how the institutions of the ETH Domain can contribute to increasing productivity in the health care sector, in order to compensate for the shortage of health care professionals;
- Sharpen the vision and the role of the institutions of the ETH Domain regarding precision medicine and translational medical research;
- Define a strategy with the main actors regarding public health, including the potential contribution of the institutions of the ETH Domain in prevention and health promotion;
- Define where the institutions of the ETH Domain could and should take leadership.

The EC takes note that the ETH Board has no strategic aims to strive towards the creation of a medical school within the ETH Domain. The EC concurs with this view.

## **12) Developing better entrepreneurship and innovation capacity**

In view of the analysis of the situation, the EC recommends that the institutions within the ETH Domain reinforce their commitment to innovation and entrepreneurship. The EC believes that this can take different forms and vary among institutions.

For instance, efforts could be undertaken or expanded, in cooperation with universities and UAS as well as business actors, to develop a stronger culture of entrepreneurship among the student body, faculty and research staff. Whenever applicable, resources and incentives could be applied to these efforts. The institutions of the ETH Domain could also consider the creation of formal (possibly externally funded) seed or venture funds. It may also be useful to share practices and expertise among the institutions, especially between the universities and research institutes.

These efforts should include selecting broader measures of success and appropriate benchmarking criteria. For instance, survival rate of spin-off companies is not sufficient as criteria, and could be complemented by measures of growth, jobs, impact on SMEs, etc.

## **13) Defining the role of the ETH Domain components regarding the innovation park**

The ETH Board states in its self-assessment report that it has so far refrained from taking an independent role in the process of creating a Swiss Innovation Park.

On their part, EPFL and ETH Zürich have played leading roles in the development of the two hubs. But a clear vision, especially regarding the development of the Dübendorf hub, is expected from many stakeholders and should be shared.

While the EC notes that the question of the innovation park was considered by the ETH Board as a matter to be dealt with at the institutional level, the EC is of the opinion that the Board needs to take a more proactive role in view of the national importance of the innovation issue. It should do so by taking into consideration the views expressed by the ETH Zürich, EPFL and the research institutes, as well as by the Swiss and cantonal governments. The EC appreciates the different approaches with regards to the Innovation Park. It does not favour a particular model, but recommends that the ETH Board analyses the many already existing success and failure stories of innovation parks abroad and draws the appropriate conclusions.



## 4. Table of concordance between the recommendations and the terms of reference

Terms of reference	Recommendations												
	1	2	3	4	5	6	7	8	9	10	11	12	13
A.1. Contribution to innovation performance		x	x						x	x		x	
A.2. Freedom and incentives for curiosity-driven research	x	x				x	x						
A.3. Contribution to the creation of the Swiss innovation park													x
B.1. Impact of science policy	x	x	x	x		x	x		x	x	x		x
B.2. Cost-intensive research infrastructures		x				x							
B.3. Benefits for Switzerland		x	x	x	x	x	x	x	x	x	x	x	x
C.1. Geographic developments			x		x	x				x			x
C.2. Long-term Development		x	x	x		x		x	x				
C.3. Contributions to the improvement of the Swiss higher education system					x		x	x		x	x		
C.4. Structure of study programs										x	x	x	
C.5. Cooperation			x		x	x			x	x	x		
D.1. Strategy in medical science and technology											x		
D.2. Contribution to the alleviation of shortage of medical staff											x		

### Acronyms used

EC	Expert Committee
SME	Small and medium-sized enterprises
UAS	University of applied sciences

# Appendix A: List of persons consulted

## 1. Principal

- H.E. Johann N. Schneider-Ammann, Federal Councillor, Head of the Federal Department of Economic Affairs, Education and Research
- Dr Mauro Dell'Ambrogio, State Secretary for Education, Research and Innovation

## 2. ETH Board

- Dr Fritz Schiesser, President
- Prof. Dr Paul L. Herrling, Vice-President
- Prof. Dr Lino Guzzella
- Prof. Dr Patrick Aebischer
- Prof. Dr Joël Mesot
- Béatrice Fasana Arnaboldi
- Beth Krasna
- Jasmin Staiblin
- Dr Markus Stauffacher

## 3. Federal Institutes of Technology

- Prof. Dr Lino Guzzella, President, ETH Zürich
- Prof. Dr Sarah Springmann, Rector, ETH Zürich
- Prof. Dr Roman Bouteiller, Vice-President Human Resources and Infrastructure, ETH Zürich
- Prof. Dr Detlef Günter, Vice-President Research and Corporate Relations, ETH Zürich
- Dr Robert Perich, Vice-President Finance and Controlling, ETH Zürich
- Prof. Dr Patrick Aebischer, President, EPFL
- Prof. Dr Philippe Gillet, Vice-President Academic Affairs, EPFL
- Prof. Dr Karl Aberer, Vice-President Information Systems, EPFL
- Dr Adrienne Corboud Fumagalli, Vice-President Innovation and Valorisation, EPFL
- Dr André Schneider, Vice-President Planning and Logistics, EPFL

## 4. Research Institutes

- Prof. Dr Joël Mesot, Director, PSI
- Prof. Dr Konrad Steffen, Director, WSL
- Prof. Dr Gian-Luca Bona, Director, Empa
- Prof. Dr Janet Hering, Director, Eawag

## 5. School Assemblies ETH Zürich and EPFL

- Dr Markus Stauffacher, Delegation leader, ETH Zürich
- Julia Wysling, Student representative, ETH Zürich
- Gilles Baud, Student representative, EPFL
- Remo Senn, PhD representative, ETH Zürich
- Consuelo Antille, Administrative staff representative, EPFL
- Dr Ludger Weber, Academic staff representative, EPFL
- Prof. Dr Christopher Onder, Academic staff representative, ETH Zürich
- Prof. Dr Aude Billard, Faculty representative, EPFL
- Prof. Dr Peter Widmayer, Faculty representative, ETH Zürich

## 6. Stakeholders

### 6.1. Politics

- Regine Aeppli, President of the Government Council, Head of the Department of Education, Canton of Zürich
- Anne-Catherine Lyon, State Councillor, Head of the Department of Education, Youth and Culture, Canton of Vaud
- Chantal Ostorero, Managing Director, Higher Education Office, Canton de Vaud

## 6.2. Innovation

- Dr Stefan Vannoni, Deputy Director, General Economic Policies & Education, Economiesuisse
- Robert Rudolph, Member of the Executive Board, Head of Training and Innovation, Swissmem
- Katharina Prelicz-Huber, President, VPOD
- Dr Beat Moser, Director, Scienceindustries
- Dr Rudolf Walser, Senior Consultant, Avenir Suisse

## 6.3. Medicine

- Prof. Dr Peter Meier-Abt, President, Swiss Academy of Medical Sciences
- Prof. Dr Martin Täuber, Rector, University of Bern, Former President of the Conference for Academic Medicine of the CRUS, Swissuniversities
- Rita Ziegler, President of the Executive Board, University Hospital Zürich
- Prof. Dr Gérard Waeber, Head of the Department of Internal Medicine, CHUV
- Thomas Cueni, Secretary-General, Interpharma

## 6.4. Science Policy and Higher education area

- Prof. Dr Martin Vetterli, President of the National Research Council, Swiss National Science Foundation
- Prof. Dr Angelika Kalt, Deputy Director, Swiss National Science Foundation
- Prof. Dr Martine Rahier, Rector, University of Neuchâtel, President, Swissuniversities
- Prof. Dr Crispino Bergamaschi, President of the Executive Board, University of Applied Sciences Northwestern Switzerland, President of the Chamber of universities of applied sciences, Swissuniversities
- Walter Steinlin, President, Commission for Technology and Innovation

# Appendix B: Mandate of the Expert Committee

## **Intermediate Evaluation of the ETH Domain**

Mandate

from

H.E. Johann N. Schneider-Ammann,  
Federal Councillor,  
Head of the Federal Department of Economic Affairs, Education and Research

to the expert committee:

Dr. h.c. Jean-Daniel Gerber (chairperson)

Prof. Jean-Lou Chameau

Prof. Dr. Werner Inderbitzin

Prof. Erkki KM Leppävuori

Prof. Jürgen Mlynek

Prof. Helga Nowotny

Prof. Jean-Marc Rapp

Prof. Thomas Zeltner

Bern, August 2014

# **Intermediate Evaluation of the ETH Domain**

## **1. Background**

The Swiss Federal Council (Swiss government) governs the ETH Domain through a four-year performance mandate and a corresponding global budget. The owner of the ETH Domain is the Swiss Confederation. The ETH Domain is affiliated to the Federal Department of Economic Affairs, Education and Research (EAER); the strategic leadership for the ETH Domain is delegated to the ETH Board.

The ETH Domain comprises the two Federal Institutes of Technology in Zurich (ETH Zurich) and Lausanne (EPFL) as well as the four research institutes PSI, WSL, Empa and Eawag. The ETH Board, the strategic authority of the ETH Domain, is responsible for implementing the objectives of the performance mandate. The autonomy of the ETH Domain as a whole as well as of the six institutions mentioned is guaranteed by law.

The ETH Domain institutions form part of a differentiated system of higher education in Switzerland, which comprises different types of higher education institution (Federal Institutes of Technology (ETHs), cantonal Universities, Universities of Applied Sciences and Universities of Teacher Education) and is organised within the federal structure. The ETH Domain institutions enjoy an excellent international reputation as places of research and education. As strong players both in the Swiss tertiary education system and in the international academic community, they make a significant contribution to the economic and innovative success and to the social development of the country.

Over the coming years, there will be fundamental changes in tertiary education, innovation and society, and these will have an effect on the role of the ETH Domain institutions as a whole. When the Federal Act on the Funding and Coordination of the Higher Education Sector comes into force, the Federal Councillor responsible for the education portfolio will assume the chair of the future Swiss Higher Education Conference, which will be responsible for coordinating the higher education sector (in particular in cost-intensive areas). This means that the Confederation will play a greater role, with co-responsibility for the overall system and as sponsor of the ETH Domain. In addition, an innovation park will be set up in Switzerland which, according to the decision of the Cantonal Directors of Economic Affairs, will comprise two hubs near each of the Federal Institutes of Technology and a number of regional network locations. Other developments involve the training of health workers and an increased role of the ETH Domain institutions in translational medical research and teaching, including medical science and technology. The ETH Domain institutions will also be required to contribute to research on the biggest current global challenges.

Annual reporting by the ETH Board giving comprehensive information on the attainment of targets is part of the ongoing process of ensuring that the performance mandate is fulfilled. In March/April 2015, the Federal Department of Economic Affairs, Education and Research will conduct an intermediate evaluation of the ETH Domain with the participation of external experts. In view of the above-mentioned imminent changes, it was decided to adopt an approach for the evaluation by the external experts unlike that normally taken in a conventional evaluation of an academic institution. Previous evaluations have repeatedly found that the institutions in the ETH Domain offer first-class teaching, conduct excellent research and are leaders in the international academic community, and this should continue to be expanded. The expert report to be drawn up here should, in contrast, focus in particular on the role played by the ETH Domain institutions in higher education policy and economic and innovation policy in Switzerland. The experts are invited to assess performance in the current

period (2013-2016) and, in addition, to consider how the ETH Domain can position itself and develop in the context of the coming changes. They should take account of the potential tension between the ETH Domain's competitiveness on the international stage and its position and role in Switzerland across the range of ETH Domain activities. The ETH Board's annual reports for the Confederation, the assessment of this performance by the Federal Council and the corresponding part of the ETH Board's self-evaluation report provide a basis for an assessment of other aspects of performance in the current period (2013-2016) not forming part of the external experts' evaluation.

The expert committee's report is one of the elements in the reporting on the ETH Domain made available to the Confederation. The Federal Council will submit the report to Parliament together with the response of the ETH Board. These documents will also be taken into account when the next performance mandate is drafted.

The present document commissions the independent experts to draw up an evaluation report at their own discretion and outlines the terms of reference.

## **2. Terms of Reference**

The objective of the intermediate evaluation in 2015 is to assess the role and contribution of the ETH Domain in the following areas and to reflect on future improvements:

### **A The ETH Domain as a driving force for innovation**

- A.1 To what extent do the ETH Domain institutions contribute to innovation performance in Switzerland and to knowledge and technology transfer to Swiss industry and society? Where can improvements be made?
- A.2 Do the ETH Domain institutions have sufficient freedom and incentives to conduct curiosity-driven research, so that effective bases for future innovation can be laid? Which instruments allow curiosity-driven research to take place, and which instruments are still required?
- A.3 Do the ETH Domain institutions pursue suitable strategies to contribute in the best possible manner to the successful creation of an innovation park? Where can improvements be made?

### **B National position and international competitiveness**

- B.1 What impact does science policy have on the academic autonomy of institutions in the ETH Domain?
- B.2 Do the ETH Domain institutions have the networks, competences and instruments necessary to play a leading role, in collaboration with international partners, in the development and operation of future cost-intensive (large-scale) research infrastructures which will benefit the Swiss higher education system? What competences and instruments are required and which should be developed in future?
- B.3 Are the ETH Domain institutions managing to reap benefits from their strong position on the international competitive stage, both for industry and technology in Switzerland and for the Swiss higher education institutions?

## **C Role of federal and higher education policy**

- C.1 What assessment can be made of the increasing regional expansion of the individual ETH Domain institutions? What impact will this have in terms of their funding, independent decision-making and autonomy?
- C.2 How can the ETH Domain institutions grow long-term and how can their position be strengthened within the overall academic and economic system in Switzerland?
- C.3 In what way do the ETH Domain institutions contribute to improving the Swiss higher education system as a whole? In which areas can they make a greater contribution?
- C.4 Do the Federal Institutes of Technology structure their study programmes appropriately for the Swiss higher education system and for Switzerland as an economic and academic centre in a globalised world? Do the Federal Institutes of Technology respect the principle of subsidiarity in terms of the training portfolio of the Universities of Applied Sciences and cantonal Universities, concentrating on their core mandate?
- C.5 How is cooperation between the Federal Institutes of Technology and the Swiss Universities of Applied Sciences and cantonal Universities to be judged?

## **D Medical Science and Medical Technology**

- D.1 What assessment can be made of the ETH Domain's strategy of boosting translational research and teaching and Switzerland's innovative strength in the areas of medical science and medical technology?
- D.2 How can the ETH Domain contribute to alleviating the shortage of medical staff in Switzerland?

Any other observations made by the experts on performance in the selected topic areas or recommendations for the future development of the ETH Domain are welcomed. The expert committee is also free to address any other issues falling within the performance mandate.

### **Principles of action for the intermediate evaluation**

- The intermediate evaluation conducted by the expert committee is based on a self-assessment report. The self-assessment report is directed by the presidency of the ETH Board and covers all six institutions and the Domain as a whole including the ETH Board. In the first part of the report, the above questions focussing on the evaluation from the viewpoint of the ETH Board are addressed. This provides a basis upon which the external experts can make their assessment. The second part reports on fulfilment of the performance mandate (including bibliometric data), and on the extent to which the experts' recommendations made in the 2010 intermediate evaluation were implemented. If a recommendation was disregarded, reasons for this should be given. The president of the ETH Board should send the self-assessment report to the expert committee by the end of 2014.
- The expert committee can organise their evaluation as they wish. An audit will be arranged from March 22 to March 26, 2015. Enough time will be allowed for presentations and discussions with representatives of the institutions, according to the wishes expressed by the experts.



- The expert committee will write an evaluation report for the attention of Federal Councillor Johann N. Schneider-Ammann no later than April 20, 2015.
- Organisational support will be provided by the ETH Board staff (e.g. accommodation, trips, etc.). Financial support for secretarial assistance will be provided by the ETH Board, if needed.
- The ETH Board will cover all of the experts' expenses. In addition, the experts will be granted a fee of CHF 1,000 per day based on their individual engagements.
- Experts will have to sign a confidentiality agreement, as the owner of the report will be the Head of the Federal Department of Economic Affairs, Education and Research (EAER).