Chapter 7
Switzerland

Between Cooperation and Competition

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7.1 Introduction

For a couple of years, political debates and legal decisions have resulted in an increase, from a formal point of view, of the power of higher education institutions' (HEI)[1] rectors. According to policy makers, this institutional change should increase the autonomy of the HEI. However, the dismissal of a university rector by the cantonal government in a quite authoritative way[2] seems to counterbalance this statement on HEI "autonomy" and addresses the governance issue: who governs the universities? The question is especially sensitive since this example is not an isolated one but embodies several cases in Switzerland.[3] This situation illustrates the tension between, on the one hand, the reinforcement of an *individual* HEI direction regarding *academic* activities and, on the other hand, the redefinition of higher education and

[1] In the Swiss case, the HEIs represent equally cantonal universities, Federal Institutes of Technology and universities of applied sciences.

[2] Opposed to a transfer project (which was initiated by the cantonal government and supported by the Federal state secretary of education and research) of a micro-techniques laboratory (based in his university) to the Federal Institute of Technology of Lausanne (EPFL), the rector of the University of Neuchâtel (UNINE) was dismissed of his function without delay.

[3] Under political and social pressure, the director of the University of Geneva (UNIGE) resigned in 2006. The same year, the director of the Federal Institute of Technology of Zurich (ETHZ) also resigned from his job due to faculties pressures expressing a disagreement with his suggested organisational reform inside the institution.

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research (HER) activities as a *collective* and *political* issue.[4] To what extent does this tension reveal changes in terms of the governance of HEIs?

This chapter focuses on transforming means of state action in the Swiss HE system occurring between two main periods: the 1980s and the 1990s–2000s.[5] This diachronic presentation portrays, in a first section, the former structure of the HE system (1980–1990) and, in a second section, the reframed one (1990–2007). Both sections are divided into sub-sections, depicting, firstly, the structure of the actors' constellation, secondly the HE funding regarding allocation procedures and the institutional budget structures, and thirdly the organization and management of the academic marketplace, including the promotion and organization of doctoral studies. A comparative section discusses the changes occurring during the last decade. Finally, a conclusive section discusses the new governance regimes of the Swiss HER system.

7.2 The Swiss Higher Education and Research System (1980–1990)

7.2.1 Actors of the Higher Education and Research System

Historically, in Switzerland, HER policies have been a shared prerogative of the cantonal and Federal authorities, even if the cantons have more legal competences in higher education. This organization takes its roots in the national political system, identified in terms of executive federalism: the Confederation's competences being subsidiary in comparison to the autonomy of the cantons in public affairs.[6]

The sharing of the authority on HER expresses this political feature. First, at the Federal level, two ministries are involved, namely the Federal Department of Home Affairs and the Federal Department of Economic Affairs. Each department is specifically in charge of a subsystem: the Federal Department of Home affairs deals with the universities, which are oriented toward HE and fundamental research, while the Federal Department of Economic Affairs is concerned with vocational

[4] In the example mentioned above, the localisation of the micro-techniques laboratory seems to be a *political* issue that involved not only the direction of the HEIs, but several actors. It is a political issue in the sense that the re-localisation of the lab in other HEIs follows not only scientific or academic criteria but also a financial one: The cost of this lab seems to be too high compared to the cantonal financial situation.

[5] The analysis carried out in this chapter does not consider other issues like accreditation and quality.

[6] In Switzerland, the principle of subsidiarity means that the Confederation only intervenes in domains which are not already managed by the Cantons and Communes or in domains which are legally and politically delegated to the Confederation. Therefore, the division of tasks between Federal and cantonal authorities can change in time depending on the power balance.

training and applied research.[7] Second, at the cantonal level, ministries for education have large responsibilities for HE policy. Due to the cantons' autonomy, important differences are observed between regional regulations: the organization and legal frameworks of universities differ from one canton to the other, for example, academic titles and wages are framed within a specific cantonal scale.

Within these two different levels of governance (Federal and cantonal), two agencies are in charge of policy coordination: The Swiss University Conference – which associates cantonal ministers of education and the president of the Federal Institutes of Technology Board – is responsible for the political coordination between Federal and cantonal authorities. While the Rectors' Conference of the Swiss Universities and Federal Institutes of Technology promote the coordination of the "operational" level and is responsible for translating and implementing the decisions taken by the Swiss University Conference.

Besides these two coordination agencies, the Federal Parliament voted in a new Federal Act on research in 1983. Its aim is twofold: first, to increase the coordination between the actors in charge of research activities by consulting each other in order to use the Federal budget in an efficient way and, second, to define and to plan a Federal research policy (cf. Benninghoff and Leresche, 2003). However, this Federal Act does not constitute a new way to increase the financial support for research activities. Federal support for research activities is indirectly channelled through two Federal funding agencies.

The Swiss National Science Foundation is the most important one in terms of financial resources. This agency supports mostly basic research, but since the 1970s, applied and oriented research has been funded too (Benninghoff et al., 2004). A second agency, the Commission for the promotion of scientific research, provides funding for applied and industrial research (Joye, 2007).

The "operational" level of the HER system is represented by ten cantonal universities, two Federal Institutes of Technology and attached institutes.[8] The system is historically diversified: cantonal universities were devoted to fundamental research and education, the Federal Institutes of Technology, created later, were dedicated to the education of the engineers that were expected to build up modern Switzerland. To these institutions, one can add a dozen of research institutes that are affiliated neither to a cantonal university nor to the Federal Institutes of Technology.[9]

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[7] As we will discuss later, vocational training was not considered as part of the HER system before 1995.

[8] Only the two Institutes of Technology – Lausanne (EPFL) and Zürich (EPFZ) – are considered here. The four other attached institutes are funded exclusively by the Confederation and concentrate on fundamental and applied research. They fall into the same responsibilities as the two main Institutes as far as legislation is concerned, namely the Federal Act on the Federal Institutes of Technology.

[9] These institutes carry out research activities in very specific areas (risk governance, tropical diseases, bioinformatics, art studies, etc.) which are not addressed by the HEIs (cf. subsidiary principle). They are jointly funded by their home canton, the Confederation and private sources. Due to their specific place in the system, these institutes are not further addressed here.

As regards vocational education, a large number of schools dealing with engineering, business and administration as well as art exist. However, they are not part of the HER system. About 50 of these superior vocational schools would be upgraded as universities of applied sciences (UAS) in 1995 (see Section 2.1).

7.2.2 Funding Allocations and Budget Structures

In general, HEIs receive their allocations directly from their respective authorities. These funds are allocated to allow the institutions to carry out their fundamental missions of teaching, research and service to society. It is quite difficult to identify how the funds are used among the different tasks, because it is assumed that all academic staff pursue the ideal of a teaching and research unity. In addition to this core funding, HEIs can receive additional funds for research, both from public and private sources.

The budgets of *cantonal universities* integrate several types of public and private sources: the resources allocated by their respective canton, those allocated by the Confederation (since 1968) through the Federal Act on financial assistance to cantonal universities[10] and the inter-cantonal allocations constitute the largest share of university finance. However, their proportions vary considerably from one institution to the other. The reasons for these differences lie not only in the size of the institutions (a large institution like the University of Zurich receives more funds from extra-cantonal students than a smaller one like, for instance, the University of Neuchâtel) but also in the economic wealth of the respective canton. The Federal contributions, only dating back to 1968, have served as a mean to reduce these inequalities. Alongside these three funding types, competitive research funding coming from the Swiss National Science Foundation and the European Union can also be considered public. Generally, private resources like industrial funding and contributions provided through students' tuition fees constitute a smaller part of a university's budget.

The budget of the *Federal Institutes of* Technology is mostly provided by the Confederation (reallocated by the Board of the Swiss Federal Institutes of Technology). It is completed by third funds such as the National Science Foundation or the Commission for the promotion of scientific research (see Section 1.1), European Union and private sources (companies and tuition fees).

7.2.2.1 Academic Marketplace and Doctoral Education

Similarly to the actors' constellation (Section 1.1) and funding configuration (Section 1.2), the Swiss academic market is highly differentiated (Felli et al., 2006). Each institution is characterized by specific recruitment processes, professors' status and

[10] This new Federal law on HE can be considered as a historical turning point. It is the first time that the Confederation intervenes in the cantonal HEIs.

wages, degree of internationalisation and gender representation. These differences go along with specific internal steering, within an academic marketplace characterized by a hierarchical and pyramidal organization. Such as the German academic market, it is organized around a chair system, the non-professors being dependent on the professor responsible for the chair and hired on non-permanent positions. The same hierarchical structure applies for doctoral education, characterized by a strong dependency of the doctoral student on his thesis director. At this stage, doctoral education is a (political) non-issue and, as such, does not appear on political or institutional agendas.

Historically, the academic marketplace is organized around disciplines, institutionalized in faculties. As a result, university rectors have little power compared to faculty deans and professors. In contrast, the governance structure is different in the two Federal Institutes of Technology where the presidents have more power (although there is also a difference to note between the two EPF, the ETHZ being characterized by a two-headed leadership shared by a president and a rector.

7.2.2.2 Governance Patterns of the Higher Education Institution System Between 1980 and 1990

During this time period, the HEI system can be characterized as a triple institutional differentiation: between types of institutions (Universities more involved in basic research activities, Institutes of Technology more focused on applied research activities and technical disciplines even if they are also largely involved in basic research); between types of funding agencies (National Science Foundation: basic research; Commission for the promotion of scientific excellence: applied and industrial research); and between types of public authorities (Cantons and Confederation). This differentiation is not the result of a particular political will. It is more the expression of the main rules of the Swiss political system being the institutional back-ground of any policy-decision making in the HE system: the Confederation does not intervene in the domain of competence of cantonal authorities (subsidiary principle) and the public authorities (Federal and cantonal) do not intervene in economical affairs (liberal state). Therefore, the HE system is more the result of an uncoordinated process that leads to incremental changes during a long period of time. It is why we can describe the system, at that period of time as quite fragmented. Nevertheless the governance patterns of HEIs operate a move during this time period. Indeed, the Federal state tries to give an impulse in the direction of a more coordinated system, even if this new legal instrument (cf. Federal law on Higher education) is not really constraining.

7.3 Changes in Higher Education and Research System (1990–2007)

The last 15 years have witnessed important changes in the structure of the Swiss domains of education, research and innovation. Different factors can be brought forward to explain these changes: rapid increase in the number of students during

the 1980s due to the 1960s baby boom, the retirement of numerous professors, a political will to integrate the European economic market, an increase of the unemployment rate, a decrease of the small and medium enterprises' competitiveness, and, last but not least, a crisis in public funds.[11]

In this context, different political and administrative reports have pointed out the need to optimize the use of public money and to increase the efficiency and the effectiveness of state actions. In order to achieve these goals, policy-makers have stressed the importance of *coordination* and *competition* as new patterns of state regulation in HER (Weber, 1998; Perellon and Leresche, 1998).

7.3.1 Changes in Actors' Configuration and Competences

In order to increase the competitiveness of the economy and the level of employment, different measures have been taken by the Federal administration.

The main changes in the HER system have appeared in vocational training and within industrial and applied research. Both the actors and the structure of this sector have been redefined. On the one side, public administration was transformed: the Federal department of economic affairs was reorganized through the creation, in 1998, of a new office that promotes vocational education and economical innovation: the Federal Office for Professional Education and Technology (OPET).[12] On the other side, the funding agency dedicated to applied research was reformed: the former commission for the promotion of scientific excellence was transformed into an Innovation and Technology Agency provided with more resources to reinforce the technological transfers between applied public research and the small and medium enterprises.

What is more, in order to increase the feasibility of these technological transfers, a large number of former higher vocational schools were upgraded to the HE level. This transformation resulted in seven networks of cantonal or inter-cantonal UAS that were introduced in 1995.[13]

The fact that higher vocational schools were upgraded to the level of UAS illustrates a profound change in the HER sector and testifies of a political will to favour a European harmonisation, to balance the absence of professional HE and, to a lesser extend, to create a more integrated HER system. At the same time, as the HER sector was enlarged and diversified, the relationships with the respective

[11] These financial crises lead to a general reform of the Federal and cantonal administrations. In this context, new public management tools such as contracts, merit-based salaries, ex-post evaluation, controlling, quality assurance, etc. were introduced within public administrations (see, Hablützel et al., 1995; Giauque, 2003).

[12] The OPET replaced the Office of economic affairs and took also responsibilities from the old Office of Industry, Trade and Work.

[13] In 2005, a private UAS was recognised by the Federal Council, testifying to the emergence of private actors within a public service.

authorities responsible for each type of institution were redefined through several legal frameworks (cf. Table 7.1), which have intervened in the steering mechanisms of the system (see Section 7.3).

In addition to the reorganization of the Federal department of economic affairs, the Federal Department of Home has also been transformed in order to increase the coordinated action of the Federal government. In 2005, the Secretariat for Education and Research (SER) was created, headed by a state secretary. This new body results from the merger of the Federal science agency and the Federal office for education and science. This merger confirms and reinforces trends that have taken place in recent years aiming at concentrating the Federal prerogatives on HER field in fewer agencies.

However, this double reorganization appears to be unsatisfying for some policy-makers. The Federal ministerial organization of the whole HER field is again under scrutiny. In the meantime, political pressures (mainly coming from the Swiss parliament) have invited the Federal government to consider the reorganization of the concerned departments in the perspective of concentrating the Federal HER competences within a single department. The main argument for this reorganization was a better coordination between cantonal and Federal authorities, HER activities, different HEI, and, finally, economic and scientific activities (Braun et al., 2007).

These deep institutional transformations at the levels of the HEIs and at the Federal administration also impact on intermediary bodies, i.e. on the Swiss University Conference, the Rectors' Conference of Swiss Universities and the Federal Institutes of Technology Board. In 2003, a common project group of the Confederation and the cantons[14] was created. In a first step, their appointment relied on the elaboration of basic principles about a new organization of the HER field. The result, a policy paper called Higher Education Landscape 2008 (*Paysage des Hautes Ecoles 2008*),[15] especially stresses the deficit of national steering, a lack of funding transparency and the necessity to reorganize the responsibilities of the different public authorities.

Table 7.1 The Swiss HER system

	Legislation	Funding education	Funding research
Federal institutes of technology	Confederation	Confederation	Confederation
Cantonal universities	Home canton and Confederation	Home canton, other cantons and Confederation	Confederation and home cantons
Universities of applied sciences	Confederation and home canton(s)	Confederation, home canton(s) and other cantons	Confederation and home canton(s)

[14] More precisely, this group was composed of the heads of the Federal department for home affairs, the Federal department for economic affairs and the delegation of the committee of the public education directors' conference.

[15] This policy document is also the base for the elaboration of a new legal framework seeking to regulate the whole HE system. According to the State Secretariat for Education and Research, this new law should come into effect from the 1st of January 2012.

Regarding the steering issue, three main options were discussed. The first one suggested that the steering and financing of all HEIs should be the prerogative of the Confederation. The second option proposed that the Confederation had the complete control on research policy and that the cantons had all competences in HE policy. The last proposal, which won the favour of the project group, consists in strengthened cooperation between the Confederation and the cantons. To achieve this goal, different measures are planned: (a) the idea is to enlarge the competences of the current Conference of Swiss Universities by a UAS representation in order to increase the steering capability of the HE and research system. According to the Swiss HE landscape paper, this new body would be responsible for the entire system and design the common framework. This is important, since it would reinforce the national coordination of policy-making decision into a single body for the first time in Switzerland. (b) The second proposition concerns the institutions' coordination regarding the implementation of the decisions adopted in the new Conference of Swiss Universities. This task would be left to the reshaped Rectors' Conference of Swiss Universities. (c) The third proposition deals with the construction of a form of public arena for critical debate on the future directions of the HER system. This debate could take place in a new body: the science and innovation council.

The ideas coming from this report were taken up by a Federal parliamentary commission dedicated to elaborate a new constitutional article on education. This article gives more power to the Confederation to intervene in the HE domains which historically was the competence of the cantons. The idea is to foster the cooperation principle (cf. "cooperative federalism") between the Confederation and the cantons regarding the main issues: quality assurance, autonomy of universities, harmonisation and transparency of rule related to (a) the acknowledgement of curricula and diploma, (b) the mobility of students, teachers and researchers, and (c) the financial allocation. This new constitutional article was accepted by a popular vote in 2006, after 8 years of discussion.

7.3.1.1 Changes in Funding Allocations and Budget

The idea of efficiency promoted by politicians and administrators at the Federal level is partly implemented through new modes of funding allocation. However, we cannot speak of radical changes at the empirical level (see Benninghoff et al., 2004; Lepori, 2006). The change in the funding allocation is also related to the political aim to increase the autonomy of the HEIs and to give more power to the heads of the HEIs.

In the following sub-sections we focus on further changes related to funding, studying separately each HEI type.

7.3.1.2 Cantonal Universities

The source of the cantonal universities' funding is diverse but still illustrates the historical power of the local public authorities: in average, the home cantons fund

43% of their corresponding university. The Confederation is the second funding provider (15%). Its part is even larger if we add the part of the national funding agencies (FNS – National Science Foundation and the CTI – Swiss Innovation Promotion Agency), provided by the Confederation (although the Confederation funds the National Science Foundation, the former is autonomous in the management of its budget), which elevates its funding share to 23%.

Figure 7.1 constitutes an average. Concerning the part of the home canton, however, the repartition of funding sources varies quite strongly between institutions: the Universities of Geneva and Lausanne strongly depend on their canton (54%), while the cantons' part is significantly smaller in the case of the Universities of St. Gallen (19%) and Lugano (20%). By comparison, the Confederation's part is varying between 13% (Universities of Lausanne and Geneva) and 29% (University of Lugano). With Lucerne (20%) and Neuchâtel (23%) two other small Universities are more strongly funded through the Confederation, whereas the Universities of Zurich, Basel, Bern and St. Gallen all show a proportion around the average (14–15%).

As we have seen (Section 1.1), the cantonal universities' budgets are established on the basis of the cantonal university acts, and those have been revised in all cantons during the 1990s. Two dynamics are at play in the funding calculation. On the one hand, the funding is transformed from being itemized to being allocated on a global basis (lump sum). On the other hand, it is not anymore exclusively focused on inputs

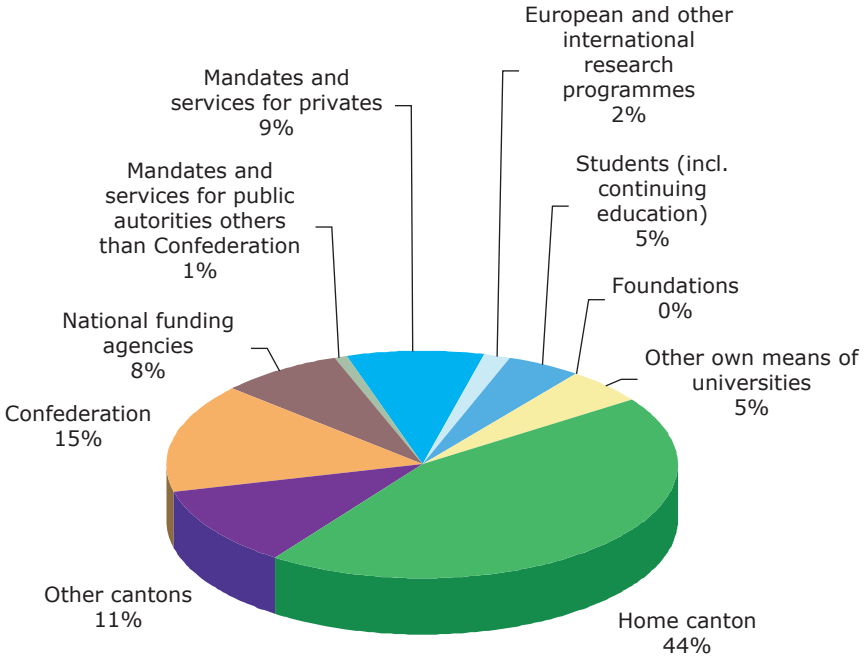

Fig. 7.1 Funding sources for universities 2007 per actor (www.bfs.admin.ch, own calculations)

and gives more importance to outputs. Performance-oriented mechanisms have, in some cases, been introduced, but remain limited in most cases and input-oriented mechanisms – the number of students, existing members of staff and existing infrastructure – are still predominant in the way cantons fund their universities. These changes in funding are framed in performance-contracts between cantons and their university. The degree of constraint varies from one contract to another: some are defined only in terms of general goals while others are formulated in terms of clearly defined performances.

The funds allocated by the Federal authority to support the activities and missions of the cantonal universities have also witnessed changes. This is especially true since the revision in 1999 of the Federal act on financial assistance to cantonal universities, which regulates, among other elements, the amounts that should be allocated by the Confederation to the universities, as well as the modalities of this allocation.

Similarly to the different cantonal acts on universities, the sums allocated through the Federal act incorporate both teaching and research activities. An innovation of the revision is that, since 1999, the sums are divided at a rate of 70% for teaching and 30% for research. It is important to note that this distinction does not mean that 70% of the funds allocated to the universities are targeted at teaching activities *only* and 30% at research activities *only*. Rather, the ratio serves as a means for calculating the total amounts to be allocated to each institution, universities being entitled to use this funding to support their research priority. In other words, 70% of the total Federal contribution is distributed on the individual universities based on indicators related to "teaching" activities – like the number of students – and 30% on indicators related to "research" activities – such as the number of research projects being carried out. In both areas, one has observed an increase of performance-oriented mechanisms, for instance by limiting the number of studied semesters funded by the Confederation or, in research, by taking into consideration the amounts of external funds the universities have been able to gather from other sources, notably the national and international funding agencies, to determine the Federal subsidy for this activity.

In terms of the role to be played by the Confederation in the steering of the HER system, we stress the fact that the revised Federal act has introduced a new funding instrument aimed at sponsoring priority projects that address the concerns of cross-cantonal coordination and inter-institutional cooperation. This instrument is managed by the Swiss University Conference.

The inter-cantonal agreement is the third funding mechanism for the cantonal universities. It dates back to 1981 and was revised in the late 1990s. The *raison d'être* of this agreement lies in the necessity to integrate all cantons in the financing of universities. For that reason, each canton whose inhabitants study in other cantons pays a given amount of money per student to the university cantons where its students register.

Over the years, not only the amount but also the modalities of allocations have changed. The amount has generally increased in line with inflation. In 1995 a decision was made to differentiate the type of disciplines to adjust more precisely the allocations to the actual costs. This led to a three-tier system distinguishing

between humanities and social sciences, natural and technical sciences and medical studies, which indicates that a more accurate mechanism was applied to this part of the funding allocation.

The above table also testifies to an increase in the cost of medical and life sciences studies, while the cost of humanities and social sciences studies remains constant. This reveals an anticipated adjustment of the funding mechanisms to the changes in the disciplinary students repartition, and, maybe, a shift toward a "real cost" funding. In 2007, the average funding based on the inter-cantonal agreement constitutes 11% of the total average expenses of all cantonal universities.

Another important element in the organization of the funding structure and budget allocation is the increasingly stormy debates about the introduction of higher tuition fees. The access to education in universities or in the Federal Institutes of Technology is open to every holder of a Federal *maturité* degree (upper secondary). In average, fees constitute 3% for ordinary students and 2% for students of continuing education programmes of the overall expenses. They are low compared to other countries but not inexistent. They have increased during the last 2 decades and their amount varies substantially regarding the institutions but not the discipline.

This table underlines differentiated fees regarding HEIs. First, we can observe a regional or linguistic effect: the French speaking universities are characterized by lower fees compared to their German counterparts. Thus, the hypothesis of an indexation on life costs is not pertinent: Geneva and Zurich (cf. Table 7.3) are places where life costs are very high while it is lower in the Italian part of Switzerland (USI), Lucerne and Bern. Tuition fees may thus reflect a political and institutional strategy independent of other factors. The high level of the USI fees can be explained by the fact that initially USI did not get any financial support by the Confederation and had to find other financial resources.

This strategy is also at play regarding foreign students, some institutions having introduced a differentiated cost regarding the student origin. In these cases, similarly to an increasing number of HE systems, international students are charged higher fees compared to national students. However, unlike HE systems, new-regional (European) students are assimilated to international ones (which is not the case, for example, in England).

Besides the previously mentioned sources of funding, universities also benefit from the funding of the two national funding agencies, the National Science Foundation and the Swiss Innovation Promotion Agency. Since the creation of the National Science Foundation in 1952, we observe an evolution of its allocation mechanisms. Until the 1970s, the whole budget supported basic research. From the 1970s to the 1990s, 10% was dedicated to applied research and, since the 1990s, a further 20% to oriented research. For the last few years, in relative amounts, we observe a stagnation of the funding allocated to fundamental research and an increase in the funding allocated to oriented and applied research. The National centres of competence in research represent the most important instrument for the promotion of oriented research. It aims at different goals: first, supporting high level research activities by building networks (centres of excellence); second, organizing, promoting and rationalising the costs of research through a strong

management. This tool is also aimed at encouraging the research education (see Section 2.3) as well as the technology transfer to industry. This funding type works on a contract basis between the National Science Foundation and the host institute. This contract obliges the researchers to account for their activities to the National Science Foundation. This programme, built to last 10–12 years, illustrates the development of NPM mechanisms in the Swiss HER system (Benninghoff, 2006). All in all, the FNS and CTI constitute 8% of the cantonal universities' budget. The CTI's part being less than 1%, the core of this funding agency part is almost exclusively managed by the FNS.

Another source, i.e. mandates and services for privates, is, with 9%, even slightly higher positioned than the public funding agencies. This shows that this type of funding represents a source that should not be neglected in the discussion on the funding of Universities. However, the role of foundations seems to be completely insignificant.

Finally, still in 2007, the cantonal Universities' budgets comprise 5% of other "own means", 2% of European and other international research programmes and 1% of mandates and services for other public authorities than the Confederation, hence cantons and municipalities.

Altogether, public authorities (Confederation, cantons and the funding agencies) remain the most important sources for cantonal universities (78%). However, two important changes must be noted: first, they are more strongly related to conditions, namely to input and output criteria, and second – partly as these criteria's effect – became more competitive.

However, it is difficult to calculate the respective part of competitive and non-competitive funding. If we consider "competitive" every type of funding distributed on the basis of a competition between HEIs, funding from the funding agencies for instance belongs to this category. From this point of view, funding coming from the home canton may be considered rather "non-competitive" because each canton maximally funds one university. However, one could argue that besides that, Universities could compete for more students in order to get more money from their canton. Yet, one has to ask the questions, to what extent this competition really takes place (also regarding certain Federal funding) and whether cantons are always able to follow up the developments within their University from a financial point of view.[16] Finally, there are several types of funding, like mandates and services from private funds, which – because of the lack of more detailed differentiation – can neither be clearly classified within one or the other type of funding. From this point of view, real changes in terms of competition depend on the behaviour of the University staff, the students and the privates. However, one can argue that the funding mechanisms now offer the possibility for competition between HEIs.

[16] An administrative staff responsible of a small University explained that its cantons' finances do not always allow to increase the University's budget according to the increasing number of students (interview 20.2.2008).

7.3.1.3 The Federal Institutes of Technology

With 88% (Confederation and funding agencies), public authorities play an even more important role in the funding of the Federal Institutes of Technology than for cantonal universities (Fig. 7.2). Moreover, the Confederation taking into charge the whole "public part", the cantons have no responsibility at all for these HEIs. It is also interesting to note that mandates and services for privates represent a smaller part of the budget (6%) than in the universities (9%). This does not mean that, in absolute terms, Federal Institutes of Technology attract less private funding than cantonal universities. The Zurich one (ETHZ), for instance, attracts twice as much private funding as the University of Geneva or the University of Basel (www.bfs.admin.ch).

The situation of the Federal Institutes of Technology must also be differentiated, although the repartition of funding does not substantially vary between institutions: the ETHZ attracts more than twice as much of the amount received by the Lausanne institute (EPFL), probably due to its "bigger size" (for example in terms of students or researchers, etc.).

Some years ahead of the universities, the Federal Institutes of Technology Board introduced the lump sum contract and a performance contract signed with the Swiss government as the body responsible for the coordination of this sector. The amounts are allocated for a 4-year period. However, the Parliament votes annually on the yearly amounts. As a result, variations can be introduced, especially if cutbacks are imposed on the institutions. This situation characterizes the whole sector and affects, in fact, the entire HER system.

The modalities of funding allocation are codified in a contract, in which seven general goals are identified together with more precise objectives indicating the modalities through which the goals can be achieved. Indicators have been devised to ensure that the objectives will be met and that, by extension, the seven general goals too. Hence, as in the case of cantonal universities, the FIT's funding from

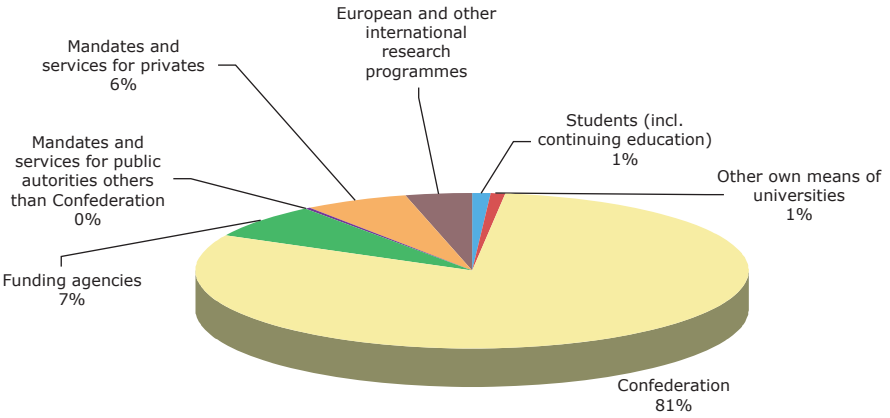

Fig. 7.2 Funding sources for Federal Institutes of Technology, 2005 (www.bfs.admin.ch, own calculations)

public authorities is more strongly related to certain conditions. Concerning the degree of competition between HEIs in funding distribution, the situation is generally the same as for cantonal universities, with one exception: the two Federal Institutes of Technology share the same public authority – compared to cantonal universities where every institution has its "own" home canton – and, hence, are in direct competition regarding their principal funding resource (Confederation).

Compared to the universities, the tuition fees' part in the overall budget at the Federal Institutes of Technology is even lower. Thus, they are not related to the institutional degree of prestige. What is more, foreign students are not charged higher fees than national ones (cf. Table 7.4), which testifies to a perception of international students as a prestige oriented resource as opposed to a financial one. The fact that the Federal Institutes of Technology have low and non-differentiated tuition fees partly explains why they represent only 1% of their overall funding, compared with 3% for the universities.

Finally, the Federal Institutes of Technology's budget contains 4% of funding coming from European and other international research programmes, compared to 2% for cantonal universities.

7.3.1.4 The Universities of Applied Sciences

As for the cantonal universities, the UAS also receive most of their funds from the Confederation and the cantons. The Federal act on the UAS indicates that one third of the overall running cost of these HEI has to be covered by the Federal government. The cantons that host a UAS or that have a college that is integrated in one of the networked institutions allocate funds for its functioning. Finally, an intercantonal agreement states the amounts to be allocated by each canton for each of its students. This agreement only applies to the study fields that were accredited by the Federal government or that were in the process of getting such recognition (Table 7.2).

As illustrated by the previous table, the funding of HER is characterized by an almost 80/20 ratio that translates the stronger importance of teaching in UAS compared

Table 7.2 Funds allocated to cantonal universities through the intercantonal agreement (in Swiss francs) (Intercantonal agreement, 1999)

	Social sciences and humanities	*Natural and technical sciences*	*Medical sciences and biology*
1999	9,500	17,700	22,700
2000	9,500	19,467	30,467
2001	9,500	21,233	38,233
2002	9,500	23,000	46,000
2003	9,500	23,000	46,000

Source: International Agrement, 1997.

Table 7.3 Fees in Swiss Universities for academic year 2007/2008* (in Swiss francs) (CRUS, 2008)

	USI	*SG*	*LU*	*BS*	*ZH*	*BE*	*FR*	*LA*	*GE*	*NE*
Tuition fees (including other taxes) per year	4,000	2,040	1,570	1,400	1,378	1,310	1,210	1,160	1,000	1,030
Added fees for foreign students	4,000	300	–	–	200	–	300	–	–	550
Total yearly fees for foreign students	8,000	2,340	1,570	1,400	1,578	1,610	1,510	1,160	1,000	1,580

*USI, University of Lugano; SG, University of St. Gallen; LU, University of Lucerne; BS, University of Basel; ZH, University of Zurich; BE, University of Bern; NE, University of Neuchâtel; FR, University of Fribourg; LA, University of Lausanne; GE, University of Geneva.

Table 7.4 Fees in Swiss Federal Institutes of Technology for academic year 2007/2008 (in Swiss francs) (CRUS, 2007)

	EPFL	*ETHZ*
***T**uition fees (including other taxes) pre year*	1,266	1,288
***Added fees for foreign students-**Total yearly fees for foreign students*	1,266	1,288

to other HEI. This corresponds to their historical orientation (before their upgrading to UAS). As a result, the proportion of public funding dedicated to research is low (18% of the Confederation funding and 17% of the cantons funding). Nevertheless, other funding sources balance this trend by devoting 41% of their resources to research. Behind this "other funding" lies the increased trend in self-funding, or, to put it in other words, the necessity for academics to apply for external funding in order to sustain not only their research and teams salaries but sometimes also part of their own wages (see for example Giauque, 2006). At the same time, strong accountability mechanisms require to justify the use of resources. The accountability obligation is related to contract-based resources allocation.

In 2006, the average part of Federal funding[17] for all UAS consists of 20%. With an average cantonal contribution[18] of 59%, the cantons have an even bigger importance for UAS than for cantonal universities.[19] The funding allocations have moved in the direction of managerial precepts (performance – evaluation/assessment – customer-oriented, target based) and a more precise differentiation of tasks and theirs costs. A "professionalisation" of the techniques of accounting through the introduction of

[17] Including the Confederation's contribution per student (cf. Table 7.5), CTI, FNS and "other Federal contributions".

[18] Including contributions from home and other cantons.

[19] The UAS of Zurich and the UAS of Southern Switzerland have respectively the most varying percentages: Confederation: 16% vs. 26%; cantons: 64% vs. 51%.

Table 7.5 Funding of UAS charges by origin and type of activity (2006 in millions of Swiss francs) (OFS, 2007, percentages are own calculations)

	Total		*Confederation*		*Cantons*		*Others*	
	Amount	*(%)*	*0.111*	*(%)*	*Amount*	*(%)*	*Amount*	*(%)*
Undergraduate teaching	1,071	70	248	81	724	80	99	31
Continuing education (post-graduate)	118	8	4	1	25	3	89	28
R&D et services	340	22	54	18	152	17	134	41
Total	**1,529**	**100**	**306**	**100**	**901**	**100**	**322**	**100**

cost accounting has also been witnessed, which implies the description and prescription of the tasks. By turning to cost accounting, decision-making bodies have provided themselves with a potentially powerful tool to look into the HEIs' activities, assess their cost and steer them.

Finally, the part of private contributions[20] (21%), compared to cantonal universities and also Federal Institutes of Technology, constitute a considerable part of the overall budget.

7.3.2 Developing the Academic Market and Doctoral Education

The transformations of the HE landscape have strongly affected the organization of the academic market. Between 1980 and 2005, the number of students increased from 61,347 to 166,449,[21] and, as underlined in Table 7.6, the staff body – composed of professors and other teaching staff – did not follow this trend.

Relatively speaking, the increase in discrepancy between the students and staff bodies is 35% for universities, 40% for Federal Institutes of Technology and 12% for UAS (yet only for the period 2000–2005). However, this tendency varies if we add the assistants and scientific staff: staff at universities was growing stronger than their student body, and the staff of the Federal Institutes of Technology and UAS was quite equilibrated compared to their number of students. As a consequence, especially in universities, the lack in professor and teaching body has been compensated somehow by a growth in the number of assistants and scientific collaborators.

Participating in the assistants' number increase, the growth of doctorates is also striking.[22] In order to transform the structure regarding the new context, the academic

[20] Including tuition fees, "contributions of thirds," and "other contributions." Private contributions vary between 16% (UAS of Western Switzerland) and 27% (UAS of Central Switzerland).

[21] Almost half of this increase (54,140) can be attributed to the HES' integration into the HE system and their growing popularity. The number of students in the Federal Institutes of Technology doubled (9,545 to 18,959) and the cantonal universities' one largely augmented (51,829 to 80,119).

[22] This increase is much bigger in Federal Institutes of Technology (294%) than in universities (175%). Altogether, doctorates awarded by universities and Federal Institutes of Technology per year almost doubled from 1,586 in 1980 to 3,093 in 2005.

Table 7.6 Development of Swiss HE system 1980–2005 (Calculated on basis of OFS data (2006). In grey: 2000 is year of reference (=100%))

	1980	1985	1990	1995	2000	2005
UNIs Students	100%	120%	137%	139%	155%	180%
*UNIs Staff**	100%		110%/126%		130%/169%	145%/197%
vUNIs doctorates	100%	112%	137%	154%	154%	175%
EPFs Students	100%	133%	157%	168%	173%	199%
EPFs Staff	100%		118%/144%		119%/178%	159%/192%
EPFs doctorates	100%	113%	136%	205%	268%	294%
HES Students	–	–	–	–	**100%**	**215%**
HES Staff	–	–	–	–	100%	203%/196%

* For all staff percentages: in the 1st percentage, assistants, scientific collaborators, administrative and technical staff not included, in the 2nd percentage, assistants and scientific collaborators included.

market has been several times object of political intervention, especially since the early 1990s. The next section analyses these political measures.

7.3.2.1 Fostering the New Academic Generation

Stemming from the enlargement of the HE system, characterized by the necessity to educate more potential professors, and from an increased international competitiveness both at public and private sector levels, doctoral training in the Swiss HER system has gained political and institutional attention only during the last decade, along with the reorganization of the academic career in Switzerland. In a first phase at the beginning of the 1990s, a Federal programme ("*programme de relève académique*") offering complementary working places to the universities has been launched in order to answer to the teaching needs. This programme remains in the traditional marketplace organization by providing HEI with the power to choose their professors. In the meantime, the National Science Foundation was assigned to implement a new programme ("fellow professors programme"), focusing more on the research dimension. Within this programme, starting at the end of the 1990s, HEIs enter in competition to attract the best researchers before they submit their application at national level (to the National Science Foundation). This illustrates a shift in the steering configuration, the National Science Foundation being in charge of selecting the professors. This period is also characterized by the increase of doctoral programmes or schools,[23] initiated both by political bodies and HEIs. In fact, the tension between cooperation and competition is particularly at stake in the reinvention of the doctoral training.

The current offer of structured doctoral training that can be distinguished between politically and institutionally initiated, illustrates this shift.

[23] The existing denominations are not uniform.

7.3.2.2 Current Doctoral Training

Several reasons led to a (broader) offer of organized doctoral training and partly even to its stronger formalisation: the necessity to improve the preparation of the new academic staff, international competition, the increasing number of doctoral students and their difficulty to finish their doctoral theses as well as the Bologna process. Roughly seen, two kinds of initiatives can be noticed: coming from the state, or from HEIs themselves.

With regards to the political initiatives, most of the doctoral schools have been inter-institutionally organized and emerged under the incentives of the Swiss Science and Technology Council, the science policy advisory body of the Swiss government, whereas the National Science Foundation in collaboration with universities – and in the case of the most recent initiative also with the rectors' conference – took in charge the implementation. For example, the first politically initiated doctoral school was part of a research project funded by the National Science Foundation, "Switzerland: Towards the Future." The first goal of this project, whose aims and topics where politically defined and which was launched in January 1996, resided in promoting topic-oriented research and networks for research, the second one consisted in structurally strengthening social sciences.[24] One of the adopted measures that aimed at realising the second goal consisted in the offering of organized doctoral training. The first 3-year offer started in 1998, the last in 2000.

Another political initiative is related to National Centres of Competence in Research (NCCR) again managed by the FNS. One of the NCCR goals consists in the promotion of talented young researchers at doctoral and post-doctoral levels and in the advancement of women in research careers (FNS, 1999). Numerous offers of doctoral training are created in this framework; they are mostly incorporated in their respective inter-institutional NCCR projects and cover a wide range of scientific domains. These politically initiated doctoral schools illustrate both the political will to foster cooperation while stimulating competition and disciplinary negotiations: within the first selection round, in December 2000, social sciences were not considered and, thus, no organized doctoral training was proposed in this domain. Representatives of the social sciences were shocked (Stücheli, 2001) and, a few months later they formulated a "manifest" including different demands. Among others, they asked for the creation of doctoral schools for social sciences. Their demand was supported by the Swiss Science and Technology Council (CSST, 2002) which designated the lack of a uniform and fair fostering of the new generation as the most urgent problem of Swiss HER policy. It also confirmed the need for doctoral schools, especially in social sciences and the humanities.

This wish has become reality: the Swiss government integrated in its Higher Education, Research and Innovation white paper for the 2004–2007 period[25] the creation of doctoral programmes,[26] initially exclusively for human and social sciences. Since the end of 2006, these programmes, called Pro*Doc, have been

[24] http://www.swiss-science.org/_sppzch/html_e/spp_frame.htm

[25] "*Message FRI 2004–2007*".

[26] In this context the term "doctoral programme" has been preferred to the term "doctoral school".

implemented under the direction of the National Science Foundation. Each Pro*Doc offers ten to twelve 3-years doctoral grants as well as several training components organized by researchers from at least two related HEIs. Besides the beneficiaries of the doctoral grants, about ten more doctoral students, financed through other funding channels, may get access to the organized doctoral training.

In the context of the implementation of the Bologna Declaration, the issue of doctoral training is set up on the European and national political agenda (Berlin Conference, 2003). In its "strategic planning 2008–2011", the Conference of Swiss Universities (CUS, 2006) formulated the doctoral training reform as a strategic goal. Therefore the CUS mandated the Rectors' Conference of Swiss Universities and Federal Institutes of Technology to suggest a "national project of doctoral training" for the period 2008–2011. The Rectors' Conference has recommended that any given doctoral programme should normally be implemented by several Swiss universities together and should be opened for collaborations with foreign universities. Progressively, all doctoral students in Switzerland should be integrated in such a programme. Scheduled in the Higher Education, Research and Innovation white paper 2008–2011 of the Swiss government, this project has been implemented through two kinds of initiatives: on the one hand, the Rectors' conference decided to join the National Science Foundation's Pro*Doc project by funding further doctoral programmes of the same type. Hence, from 2008 on, the Rector's conference and the National Science Foundation manage the Pro*Doc programmes together. On the other hand, the Rectors' conference undertakes different measures in order to elaborate "good practices" in doctoral education, which then could be diffused within the Swiss HER system.

These four actions show the growing importance of organized doctoral training on the national agenda. However, they also have two important limitations: first, they have only concerned a small part of the Swiss doctoral student body and, second, they are all limited in time and therefore no durable solution.

Besides the politically initiated doctoral programmes, *Swiss HEIs* developed themselves[27] further programmes. Among others, these programmes vary regarding institutional and disciplinary organization, applied rules and objective(s). From the point of view of institutional organization, two types can be distinguished, namely mono-institutional and inter-institutional programmes. The 17 doctoral programmes of the Federal Institute of Technology Lausanne essentially correspond to the mono-institutional model. They are united in a supra-structure called "EPFL Doctoral School", existing since 2003. From 2005 on, the University Conference of French-speaking Switzerland suggests – apart from its already existing offers ("third cycles" and "post-graduate training" called DEA or DESS[28]) – 15 inter-institutional doctoral programmes. Funded by the participating universities and co-funded as well as coordinated by the Conference, these programmes cover varying disciplines,

[27] We do not precise here whether the initiative for the doctoral programmes' creation came from the HEI or faculty direction (top-down) or from researchers themselves (bottom-up). However, an ongoing doctoral thesis shows that there is variation regarding this governance issue according to the respective HEI and doctoral programme.

[28] DEA: Diplôme d'études approfondies. In English: Diploma of deepened studies. DESS: Diplôme d'études supérieures spécialisées. In English: Diploma of specialized studies.

two thirds of them being concentrated on social sciences and humanities. According to the programme, between three and five institutions are associated to a programme.

Due to varying institutional arrangements, rules related to doctoral programmes also strongly vary: in the case of the mono-institutional "EPFL Doctoral School", EPFL doctoral regulations define for instance the number of credits and types of eligible courses to be done by doctoral students. The situation is more complicated for inter-institutional programmes. On the one hand, it is more difficult to get a consensus about applicable rules and, on the other hand, many institutions have, until now, not defined any rules regarding doctoral training in their doctoral regulations (Baschung, 2008). This often results in *ad hoc* or gentleman agreements at the programme level with relatively few constraints for participating doctoral students and professors.

The range of objectives related to doctoral programmes is wide. Programmes, especially in human and social sciences, mostly aim at providing to the doctoral students with some additional disciplinary training and opportunities to meet other doctoral students and professors. Other programmes, especially those united in a supra-structure, like the "EPFL Doctoral School" or the "Life Sciences Zurich Graduate School," aim at getting a large visibility in the international academic market. Visibility should help attracting especially strong doctoral students from all over the world. A selection process with elaborated recruitment mechanisms is part of this competitive tool. Hence, objectives go farer than only the provision of post-master education.

All in all, due to political and institutional initiatives, the offer of doctoral training has strongly increased during this period since the 1990s. However, there are still doctoral students without access to any training offer.

7.4 Tracers Issues

As mentioned at the beginning, the aim of this chapter is to compare two periods of time (1980–1990/1990–2007) of the Swiss HE system in order to stress the main changes in terms of governance regime. To that end, we focus on the different modes of state actions (Federal and cantonal) in two specific domains: financial allocation and academic workplace and doctoral education (Table 7.6).

7.4.1 Allocation of Resources as Mode of Higher Education Institution Regulation

Even if we do not observe a radical change – especially in quantitative terms (see Lepori, 2006) – we can describe, from the 1980s onwards, a qualitative change in the way resources have been allocated by Federal and cantonal authorities. Allocations are more and more based on output criteria related to performances (in teaching and research activities). Such kind of allocation allows a more targeted financing control-

led through indicators. However, nowadays, the universities budget is not itemized anymore but allocated on a global basis (lump sum). The allocation is often part of a contract between the cantonal or Federal authorities and the HEIs. Besides the aim to increase efficacy and efficiency of some financial instruments, the contractualisation of the relation between public authorities and HEIs also constitutes a mean to increase their accountability, although the degree of accountability varies according to the contract, from one university to another.

We have also seen that the parts of third funds or external resources have relatively increased compared to institutional accounts. This is due to increased Swiss participation in EU research programmes (see Lepori, 2006). What is more, the Federal authorities decided in 2006 to proportionally increase the 2007–2011 budget of the funding agency (National Science Foundation) in comparison with the Federal institutional allocation for HEI, in order to improve the competitiveness of funding allocation between HEIs which thus have to apply at the FNS level to increase their research funds. The final idea is to move from a "watering can" policy to a more targeted one based on a competitive allocation of financial support. This new trend in funding allocation follows the rule "be the best" (if you want to get money). Nevertheless, the funding allocation mechanism of the late 1990s is also based on the rule: "strong through unity", that is by the concentration of (financial and human) resources on specific research domains and disciplines.

We have seen that new funding allocation mechanisms sometimes imply a large cooperation between researchers (or teachers) but also between HEIs (cf. The "National Priority Programme" and the "National Centre of Competence in Research" of the National Science Foundation, but also the EU programmes and the "Cooperation and Innovation" instrument managed by the Conference of Swiss Universities). Administrators or politicians argue that due to the economic situation and the size of the Swiss academic field, it would no longer be possible to support all disciplines and all research domains in all HEIs. Therefore, researchers have to collaborate in large research projects or infrastructures that go beyond traditional institutional boundaries. This type of instrument also implies a financial contribution of the host institution (fund matching rule) where the management of the research project-network is located. This rule leads the HEI to select the projects they want to support. One of the possible consequences of this allocation mechanism concerns the politics of institutional profile and differentiation. HEIs have to devise more and more precisely their research and teaching profiles (see Perellon and Baschung, 2006). Consequently, the matching fund rule in such kind of instruments increases in a certain way the importance of the HEI direction in the attribution of large scientific projects.

7.4.2 Doctoral Education as Mode of Higher Education Institution Governance

The development of structured doctoral training has begun relatively late in Switzerland. This gradual development was related to varying problematic contexts.

The necessity to foster the new academic generation became obvious when structural problems of the Swiss academic labour market appeared and threatened the well-being of the Swiss HE system. The apparently poor situation of social sciences was another context that contributed to the development of doctoral education. The function of doctoral education has also developed according to the context. Doctoral education may not only give the doctoral students a better education, but it can also be interpreted as contributing to the creation of new and more concentrated research networks within the Swiss HER system. Eventually, it may also be a more or less potential tool for the HEI to attract the "best" young researchers and, thus, to increase their competitiveness.

The governance of this recently developed field seems to be shared by several actors. At the moment, both the HEIs and other actors, especially the Confederation via the Swiss National Science Foundation, play an important role. The Bologna Declaration appears to be an opportunity to introduce common rules in this highly diversified field. However, the future will show to what extent HEIs accept new regulations concerning the doctorate, a domain that has "always" been conserved and ruled by the universities themselves. Nevertheless, for the moment, it comes out that an important objective of the Swiss HE landscape – i.e. the building of stronger concentrated networks within the Swiss HER system – is being accelerated, thanks to the numerous collaborations both within politically and institutionally initiated doctoral training.

7.5 Concluding Discussion: A Tension Between Two Competing Governance Regimes

At the beginning of this chapter, we stressed the tension existing in the governance of Swiss HEIs. We argue that the tension expresses two competing approaches of state intervention: *New public management* vs. *network governance*. The first one is characterized by a more vertical state-university relationship based on contract, strong HEIs' direction, economic instruments, and *competitive rules*. The second one is defined in terms of horizontal state-university relationship based on network, joint problem recognition, solving capacity and *coordination rules*.

These a priori *opposed rules* can be seen, in fact, as *two faces of the same coin*: a new governance regime of the Swiss HER system that aims to modify the social and material conditions of research and teaching activities inside HEIs. The competitive rules of the NPM governance regime allow the allocation of public resources only to the best researchers or the best projects and, by the same way, increase the efficiency of the state interventions. However, this new competitive instruments do not only target individual researchers. Indeed, new instruments are also dedicated to collective research projects. The aim, there, is not only to increase the quality of research but also to restructure the HEIs and the disciplines.

Therefore the tension mentioned at the beginning of the chapter around the notion of HEI autonomy could be explained as following: on the one hand, the state

wants to give more power to the direction of the HEI in order to define a strong academic profile. On the other hand, this strong academic profile has to be coordinated with the other HEIs and actors of the HER policy.

Related to these two modes of governance, we observed the implementation of a more constraining policy which conducts both, the researchers and the HEI director, to be more coordinated at national level. New reforms, like the forthcoming new law on HEIs, initiated at national level could reinforce this tendency in the next years.