

# Les Cahiers de l'Observatoire

**Adopting the US Model?  
The Case of Norwegian  
and Swiss Doctoral Education**

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# Summary<sup>1</sup>

For approximately three decades, doctorates awarded by European universities get more and more structured. Norms concerning for instance the doctoral students' education and the doctorate's duration are gradually implemented in universities. However, implementation varies regarding institutional organisation, content and so on, according to the higher education (HE) system, university, discipline and other criteria. The examples of the US American, Norwegian and Swiss HE systems show that the role of the state is one of several factors, shaping the current diversity in doctoral education. The way a state intervenes in doctoral education illustrates the role the state sees in the doctorate but also the state's position (of power) in its respective HE system. The latter is expressed in various direct or indirect instruments, for instance research funding (USA), national regulations about the doctorate (Norway) or the funding of specific doctoral programmes (Switzerland). Besides the shaping role of the states, different HE systems influence themselves also mutually. As an example, the institutional implementation of the "new" Norwegian doctorate emerging from the 1970s on, was largely conceptualised on the basis of the American Graduate School model, which exists since the end of the 19<sup>th</sup> century. This mono-institutional organisation also inspired at least one Swiss higher education institution. Yet, since quite recently, inter-institutional doctoral programmes based on networks are established in Norway and Switzerland. These different organisational forms raise questions about institutional and national objectives of doctoral education.

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<sup>1</sup> This paper is related to the author's ongoing PhD research about doctoral education and university governance in Switzerland and Norway. The PhD is part of the European research project "Steering of Universities" (SUN), being one of the research projects of the Network of Excellence PRIME (Policies of Research and Innovation in the Move towards the European Research Area).

## Résumé<sup>2</sup>

Depuis environ trois décennies, les doctorats des universités européennes prennent une forme plus structurée. Des normes concernant par exemple la formation des doctorants ou la durée du doctorat sont de plus en plus souvent appliquées. Cependant, on constate des variations par rapport à l'organisation institutionnelle, le contenu, etc. selon le système d'enseignement supérieur, l'université, la discipline ou d'autres critères. Les exemples des systèmes d'enseignement supérieur américain, norvégien et suisse démontrent que le rôle de l'Etat est un facteur parmi d'autres qui marque l'actuelle diversité en matière de formation doctorale. La manière dont un Etat intervient dans la formation doctorale illustre le rôle qu'il attribue au doctorat, mais aussi sa position (de pouvoir) au sein de son système d'enseignement supérieur. Celle-ci s'exprime à travers des instruments directs et indirects comme le financement de la recherche (Etats-Unis), des régulations nationales en matière de doctorat (Norvège) ou le financement de programmes doctoraux spécifiques (Suisse). A part le rôle prégnant de l'Etat, les systèmes d'enseignement supérieur s'influencent aussi mutuellement. Ainsi, l'implémentation institutionnelle du « nouveau » doctorat norvégien, émergeant depuis les années 1970, est en grande partie conçue à partir de la « Graduate School » américaine, existante depuis la fin du 19<sup>e</sup> siècle. Cette organisation mono-institutionnelle a servi également d'exemple pour une haute école suisse au moins. Cependant, depuis peu, des programmes doctoraux inter-institutionnels construits en réseaux sont établis en Norvège et en Suisse. Ces différentes formes d'organisation posent la question des objectifs institutionnels et nationaux liés à la formation doctorale.

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<sup>2</sup> Ce cahier est lié au projet de thèse en cours de l'auteur, qui s'intéresse à la formation doctorale et à la gouvernance universitaire en Suisse et en Norvège. Ce projet de thèse fait partie d'un projet de recherche européen, « Steering of Universities » (SUN). SUN est un des projets du réseau d'excellence PRIME (Policies of Research and Innovation in the Move towards the European Research Area).

## Zusammenfassung<sup>3</sup>

Seit ungefähr dreissig Jahren nehmen die Doktorate der europäischen Universitäten eine stärker strukturierte Form an. Normen beispielsweise bezüglich Ausbildung der Doktoranden und Doktoratsdauer werden je länger je mehr in Hochschulen umgesetzt. Jedoch variiert die Umsetzung in Bezug auf die institutionelle Organisation, Inhalt, usw. je nach nationalem Hochschulsystem, Universität, Disziplin oder weiteren Gesichtspunkten. Die Beispiele der Hochschulsysteme der Vereinigten Staaten von Amerika, von Norwegen und der Schweiz zeigen auf, dass die Rolle des Staates einer von mehreren Faktoren ist, der die derzeit existierende Diversität in der Doktorandenausbildung mitprägt. Die Art und Weise, wie ein Staat in die Doktorandenausbildung eingreift, illustriert die Rolle, welche er dem Doktorat zuschreibt, aber auch seine (Macht-)Stellung im jeweiligen Hochschulsystem. Diese kommt durch verschiedene direkte oder indirekte Instrumente wie z.B. die Finanzierung der Forschung (USA), nationale Regelungen zum Doktorat (Norwegen) oder die Finanzierung spezifischer Doktorandenprogramme (Schweiz) zum Ausdruck. Neben der prägenden Rolle des Staates, beeinflussen sich die verschiedenen Hochschulsysteme auch gegenseitig. So war die institutionelle Umsetzung des „neuen“ norwegischen Doktorats ab den 1970 Jahren zu einem grossen Teil nach der seit Ende des 19. Jahrhunderts existierenden amerikanischen „Graduate School“ konzipiert. Diese mono-institutionelle Organisationsform diente auch im Fall mindestens einer schweizerischen Hochschule als Vorbild. Jedoch werden in Norwegen und der Schweiz seit kurzer Zeit vermehrt Doktorandenprogramme in einer interinstitutionellen Netzwerkorganisation errichtet. Diese verschiedenen Organisationsformen werfen wiederum die Frage nach institutionellen und nationalen Zielen im Zusammenhang mit der Doktorandenausbildung auf.

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<sup>3</sup> Dieses „Cahier de l’Observatoire“ steht im Zusammenhang mit der laufenden Doktorarbeit des Autors. Die Doktorarbeit, welche Doktorandenausbildung und „Hochschul-Governance“ zum Thema hat, ist Teil des europäischen Projekts „Steering of Universities“ (SUN). SUN gehört zum Network of Excellence PRIME (Policies of Research and Innovation in the Move towards the European Research Area).

# 1. Introduction<sup>4</sup>

For approximately three decades, *organised* or *structured* doctoral education has been gaining increased space on European HEIs' and national political agendas. Measures are being implemented, in order to organise doctoral education more thoroughly, in particular through the introduction of obligatory coursework for doctoral students and other norms, for instance concerning doctorate duration. From the year 2000 on, the doctorate has also gained a prominent place at European political level, *i.e.* in the context of the European Research Area (ERA) and the Bologna process. The European Commission underlined the predominant role of both universities (2003) and the training of a highly qualified workforce (2003a) within the process towards the (aspired) most competitive and knowledge-based economy, to which ERA should contribute. On the occasion of the Bologna follow-up conference in Berlin in 2003, the doctorate was integrated into the Bologna process as the third degree (after the Bachelor and Master degrees). Since then, doctoral education has undeniably been present on the European political agenda. However, as mentioned, it had already begun to evolve individually beforehand in different European countries and institutions.

Generally, organised or structured doctoral education can be seen as a counterpart to the traditional European doctoral education, taking place according to the “apprenticeship-model”, *i.e.* between the thesis director and doctoral student without any official regulation. This informal type of education seems to vary a lot according to the discipline – doctoral students in social sciences and humanities being often not integrated in a research team – or even according to other factors like the quality of the relationship between doctoral student and thesis director (or other researchers). As a consequence, the quality of supervision is not always assured and doctorates often last a (too) long time.

In Europe, more organised, regulated or structured doctoral education is seen as potential solution for problems related to the traditional, unregulated education. Today, European organised doctoral education is shaped by a huge diversity concerning current organisational models as well as vocabulary, between and even within European higher education systems. Doctoral, graduate and research education, programmes or schools are terms that circulate in European universities, government reports, literature and so on. Often, some confusion about “What means what?” reigns. Among others, this confusion may be due to the role of the United States of America as a precursor in the domain of organised doctoral education. Being part of the “Graduate School”, American doctoral education is – for more

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<sup>4</sup> Special thanks to my colleagues, Gaële Goastellec, Martin Benninghoff and Gilles Burnand for their comments and corrections of earlier versions.

than a century – an important element of America’s top research universities that helps to contribute to their success (Clark 1995). Apart from its structural continuity, graduate schools – and with it doctoral education – are soundly organised on a departmental base, whereas doctoral education’s institutional place is firstly differing, and secondly, still an object of change in European higher education systems.

Preliminarily, I would like to clarify some terms related to the doctorate and research. As in the whole paper, this clarification shall be especially focused on two European countries, *i.e.* Norway and Switzerland. *First*, it seems useful to clarify the term “research education”. A first difficulty resides in the question from which moment on, thus from which degree<sup>5</sup> on, research education begins. However, as Smeby (2000) writes it regarding the Norwegian degree system (before Bologna), research education is already part of the degree(s) *before* the doctoral degree. This is certainly also true for Switzerland, also regarding Bologna. Therefore, research education is not necessarily a synonym for doctoral education, although research education is generally the first component of doctoral education. It seems difficult to relate research education to a certain degree, at least in Europe. This means that research education has always been part of European university degrees, although it was not that strongly institutionalised within structures and degrees like in the States. *Secondly*, still regarding the issue of degrees and possible confusion about terms, one has to specify that graduate education is not a synonym of doctoral education. American graduate education comprises master and doctoral degrees. Moreover, as Clark noticed in 1993, a simple distinction between undergraduate and graduate cannot be done in European HE. This problem has not been resolved with Bologna. For instance, the response to the question whether “usual” – that is to say undergraduate – university education is finished after a master or already after a bachelor degree may vary in Switzerland, especially between cantonal universities and EPF, on the one side, and universities of applied sciences (HES), on the other side (NZZ 2001). Moreover, the automatic transformation of the old University “Licence” into the Master-title provoked some negative reactions coming from degree-holders from the HES, whose old diplomas were assimilated only to a Bachelor degree. Therefore, HES’ responsables and graduates fear not being accepted as equivalent to cantonal universities’ and EPFs’ graduates on the job market (NZZ 2006).

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<sup>5</sup> By the way, there was and still is a difference concerning the degree system and the relation between degrees, research and graduate education. Before the Bologna declaration’s implementation, European HE systems had no common degree system. Hence, as Clark noticed in 1993, it is difficult to compare European and American degrees. The comparison of degrees remains a problem. The reason of this problem is that, since the Bologna declaration’s implementation, European HEIs awards Bachelor degrees that usually last three years, whereas the American ones generally last four years.

After this preliminary discussion of terms related to the doctorate and research, I come back to the more precise content of this paper, which are the organisation of structured doctoral education in Norway and Switzerland and the role of the state within it. The choice of two countries, which both have a relatively small HE system (for instance in terms of doctorate production) but which traditionally differ regarding the role of the state, allows me to examine to what extent the state is a structuring factor in the domain of HE. Doctoral education is an especially appropriated case for doing that because it is the meeting point of the universities' core missions, *i.e.* education and research. Moreover, the comparison with the United States of America will be an opportunity to discover the potential influence of the American Graduate School on Norwegian and Swiss doctoral education.

Therefore, I will, in a *first* step, very briefly outline the main developments and current features of American doctoral education. In a *second* step, I will focus on the emergence and big steps (including the very recent ones) of organised doctoral education as a public policy in Norway and Switzerland. In this main section, special weight will be put on the development of the doctorate's role, governmental intervention as well as the resulting current states of doctoral education. The *third* section will allow me to draw a balance (about similarities and differences) between the USA, Norway and Switzerland, to respond to the question to what extent those two European cases are influenced by the American model, and to discuss possible implications. The *fourth* section will give the opportunity to compare the role of the state. *Finally*, the conclusion will discuss the structuring role of the state as a first component of the "university configuration"<sup>6</sup> (Musselin 2001).

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<sup>6</sup> The term « university configuration » represents the framework within which take place, make sense and interact the type of government developed by the higher education institutions, the steering style adopted by the political authority and the disciplines' internal modes of regulations (Musselin 2001: 170-1). Translated by us.

## 2. American doctoral education

American doctoral education is organised within department based “Graduate Schools”. From the doctorate’s point of view, graduate school has become the meeting point of research and research education insofar that doctoral students’ education consists not only of their thesis work – sometimes carried out as part of a graduate school based research project<sup>7</sup> – and certain supervision, exercised by (a) researcher(s) of the same department, but also in obligatory course-work defined by the department.

This organisational form is one important lasting result of what Clark (1995) calls “academic revolution”, which took place during the last quarter of the 19<sup>th</sup> century. During this period, some old leading colleges sought to invest in research and to offer some research education in order to create an American university structure and to end the dependence on Europe regarding research training.<sup>8</sup> The result of these colleges’ initiative consisted in the emergence of the “vertical university”, based on an undergraduate level, comprising the historic four-year college, and a newly created graduate level, including master’s and doctoral degrees. The graduate level has eventually offered an appropriate structure for the development of research and research training, neglected in American colleges until then. Within the vertical university, departments became the basic operating unit, linking both levels.

In the twentieth century, common interests of certain institutions contributed to a standardisation of the graduate school. Questions about the international reputation and standards of the American PhD led fourteen institutions to the establishment of the Association of American Universities (AAU) in 1900. The AAU began in 1913 to serve as a sort of accrediting agency. In 1961, the Council of Graduate Schools (CGS), as a forum for graduate school deans, was founded.<sup>9</sup> Over the years the participating deans have agreed upon certain norms related to PhD, such as access to PhD and examinations before the full candidacy for the PhD (Clark 1995). Another element has played an important role in the development of graduate school and the increasing number of doctorates<sup>10</sup>: according to Gumport (1993), the emergence of graduate education has developed hand in hand with the

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<sup>7</sup> According to Gumport (1993 ; 1993a), this is more the case in sciences than in humanities.

<sup>8</sup> By the end of the 19<sup>th</sup> century, about ten thousand Americans went to Europe, especially to Germany, to become trained in the emerging fields’ research (Clark 1995).

<sup>9</sup> In 2006, 480 universities in the United States and Canada, and 13 universities outside North America are member of the CGS. Collectively, these institutions award 90% of all American U.S. doctorates. Source: Council of Graduate Schools, <http://www.cgsnet.org/Default.aspx?tabid=104>, accessed 3<sup>rd</sup> August 2007.

<sup>10</sup> In 1900, about 3,500 doctorates have been granted, the number increased to over 10,000 in 1960 and over 40,000 at the beginning of the 21<sup>st</sup> century (Golde 2006: 3).

expansion of a national system of sponsored research. During the period between the two world wars, increasing financial support came from private foundations and industry, interested in research and trained researchers. Then, during several decades following World War II, federal government invested heavily in research. The age of “Big Science” had appeared and the funding sources were shifting mainly from private to public (Clark 1995).

From the point of view of the federal higher education system, doctoral education has been developing unequally among the different higher education institutions and their disciplines. The federal system is characterised by a huge institutional concentration of the doctorates and a strong disciplinary concentration of federal means at the disposal for research. In its basic classification, Carnegie foundation identifies 4,388 U.S. HEIs out of which 279<sup>11</sup> universities award doctorates.<sup>12</sup>

Besides the concentration of doctorates within a small number of institutions, Gumpert (2005) notices also a concentration of research funding in the top 100 research universities. Moreover, the federal research funding, being an important part of the total research funding, is unstable and concentrated on physical and life sciences. During recent decades, the federal government has been giving weak direct support to doctoral education in the social sciences, moreover, the support has been “virtually non-existent in the humanities” (2005: 453). Therefore, students in these disciplines had to find other funding possibilities, for instance loans. As a consequence, student loan debt at graduate level climbed to record highs during the 1990s and the important link between research and research education has not been established in all disciplines. Thus, one notes that the federal state has been dominating the content and quality of research and research training with its type of research fund distribution (Gumpert 1993; 1993a; 2005).

Concerning the concrete implementation of doctoral education, however, Clark (1995) notes that concrete course work and other requirements are regulated at the institutional level. They are specified and monitored by departments in cooperation with the office of the graduate school. The administration and senate-type faculty bodies enact broader rules, concerning, for instance, the selection of new students. This functioning shares a common ground across American graduate education.

In summary, American structured doctoral education emerged at the end of the 19<sup>th</sup> century as an initiative of a small number of HEI, aspiring to provide competitive research and research training, within an appropriated structure, called graduate school. The implied

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<sup>11</sup> In its basic classification, the Carnegie Foundation for the Advancement of Teaching distinguishes three types of doctoral granting universities: research universities with very high research activity (93 universities), research universities with high research activity (103) and doctoral/research university (83).

<sup>12</sup> Source: 2005 Carnegie Classification; National Center for Educational Statistics, IPEDS Fall Enrollment (2004). <http://www.carnegiefoundation.org/classifications/index.asp?key=805>, accessed 18<sup>th</sup> July 2007.

institutions defined some general norms and regulations related to the doctorate, their internal departments were and still are responsible of precise rules related to coursework and other requirements. Important investments into research through private foundations and industry provoked a strong increase in research and therewith doctorates production between the two World Wars. After World War II, the federal state strongly funded research during several decades, however – and this is still the case today – in a selective manner focused on a small number of research universities and hard sciences with negative consequences for doctoral education in other institutions and disciplines.

### 3. Emergence, development and current organisation in Norway and Switzerland

#### 3.1. THE NORWEGIAN DOCTORATE: FROM AN HONORARY TITLE TO AN ASSET FOR SOCIETY

In Norway, the doctorate was traditionally no formal requirement to do research. Rather it was carried out when an opportunity for tenured professor- or readership emerged (Bleiklie, Høstaker 1994). Hence, “the needs of the university as an institution rather than the needs of scientific development determined when the doctoral degrees were completed” (Bleiklie, Høstaker and Vabø 2000: 245). During the expansion period in the 1960s and 1970s, the significance of the doctorate was becoming even smaller: universities reacted to the increased number of students by hiring lecturers – first provisionally, then on a tenured basis – without doctorates. Thus, the *ius docendi* was not anymore linked to the doctorate.

However, this temporarily low significance of the doctorate does not mean that there were no attempts to change the doctorate as such during this period. After discussions during the 1950s about the disconnection of the university degree system from the needs of the higher secondary schools<sup>13</sup> in order to satisfy other, particularly scientific, needs, the Rosenquist Commission<sup>14</sup>, proposed the introduction of the Anglo-American PhD model in 1963. This proposition is no surprise because, generally, the Norwegian research community was being internationally oriented towards the USA during this period. This can be illustrated by the foreign doctorates awarded to Norwegians: between 1960 and 1966, 53% of all foreign doctorates were American, 35% European (Kyvik, Tvede 1998).

Yet, the enthusiasm for the American PhD was not shared by all disciplines. Representatives of humanities and social sciences rejected the proposal. Nevertheless the breakthrough of a structured doctorate succeeded in 1974. The Norwegian Institute of Technology managed to introduce the *Dr.ing.* degree (in engineering) and opened hereby the formalisation of this new doctorate also for other disciplines: In 1978, the natural sciences followed this trend by introducing a new doctorate based on organised educational programmes. Later, humanities and social sciences followed the movement but maintained the possibility to do a “free” degree, *i.e.* according to the old, “unstructured” doctorate (Bleiklie, Høstaker 1994). All in all, eleven different doctoral degrees, having varying titles

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<sup>13</sup> During this period, students were often educated in order to teach at secondary schools.

<sup>14</sup> A commission from the School of Sciences at the Universities of Oslo and Bergen.

according to the respective discipline, developed according to the new doctorate (Heen 2002). In the framework of the quality reform<sup>15</sup>, the PhD degree replaced these eleven titles in 2003. However, the *dr.philos.* degree continued to exist as an alternative to organised training (Broch, Hillseth 2004). During the 1980s and especially from 1985 on, the total number of doctorates increased thanks to the new doctorates. However, this success was limited to doctorates in engineering and natural sciences. Most doctorates in social sciences and humanities were still being carried out according to the traditional *doc. philos.* mode (Bleiklie, Høstaker 1994).

After the beginning of this bottom-up movement – initiated by engineers and natural scientists and only hesitatingly followed by social sciences and humanities – the government began to intervene increasingly. Seeking to enhance the flow of students through the system, it made an important measurement factor of the master-level candidates' and doctors' production. Moreover, in 1990, the doctorate was declared a *sine qua non* condition for a tenured position which put the doctorate at the very centre of the reproduction process at the university.

As a consequence of these governmental interventions, university leaderships were put under pressure and reforms had to be implemented. One main reform objective resided in the improvement of the national coordination of doctoral education. Three main measures have been taken since 1990: firstly, the University Council<sup>16</sup> has been made responsible for the national coordination of doctorate programmes; secondly, boards of postgraduate education have been established at each university and; thirdly, national disciplinary councils have become responsible for the coordination of the so-called national postgraduate courses. Formal regulations, largely based on a “hard research mode” and a “logic of schooling” (Bleiklie, Høstaker 1994: 316), were related to these measures (Bleiklie, Høstaker 1994; Bleiklie, Høstaker and Vabø 2000). For instance, the national regulation for the new doctorate degree, introduced in 1993, have scheduled a length of three years (or four years with 25% added duties) and obligatory coursework. Inspired by American Graduate schools, organisational structures for doctoral education were installed at all universities. More

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<sup>15</sup> The principal goals of the « Quality Reform » consisted in the quality improvement of teaching and research, higher intensity in teaching and stronger internationalisation. Source:

[http://www.regjeringen.no/en/dep/kd/About-the-Ministry/Minister-of-Education-and-Research/taler\\_artikler/2006/Kvalitetsreformen-mellom-malsetning-og-virkelighet.html?id=445053](http://www.regjeringen.no/en/dep/kd/About-the-Ministry/Minister-of-Education-and-Research/taler_artikler/2006/Kvalitetsreformen-mellom-malsetning-og-virkelighet.html?id=445053).

Accessed on 3<sup>rd</sup> August 2007.

<sup>16</sup> « The Council of Norwegian Universities is a body of cooperation between Universities and Scientific Colleges that was based on the former Rectors' conference and is charged with the co-ordination and promotion of national level initiatives by the institutions (Bleiklie, Høstaker and Vabø 2000: 313).” Since its merger with the Norwegian Council of University Colleges in 2000, this body is called « Norwegian Association of Higher Education Institutions (UHR) » (Universitets- og høyskolerådet in Norwegian).

precisely, doctoral education is being carried out at the faculty or even institute's level in universities and university colleges (Kyvik, Tvede 1998; Kyvik 2002; Heen 2002).

These new government policies – putting universities and especially social sciences and humanities under pressure – are a sign for change for the doctorate's role: “The production of doctors is no longer an internal affair of academia, because availability of competent personnel in all disciplines is regarded as an asset for society at large” (Bleiklie, Høstaker and Vabø 2000: 258-9).

In summary, the significance of the doctorate was limited for a long time to a necessity for people aspiring to a professorship. During the expansion period in the 1960s and 1970s, it was even possible to get a tenured position without a doctorate. However, during the same period academics of technological disciplines strived for the introduction of a more structured doctorate, inspired by the American Graduate School. This goal was achieved in 1974, when a new doctorate “dr.ing.” was introduced. During the following years, the other disciplines followed this bottom-up movement by creating their own corresponding titles. From the 1990s on, the government showed its increasing interest in more structured doctorates and introduced a measurement factor of the doctors' production and the obligation of doctorates for tenured positions. Therefore, human and social sciences, which continued to produce a majority of the doctorate according to the “old” mode, have been put especially under pressure.

### **3.2. FOSTERING THE NEW GENERATION: THE INTERVENTION OF THE SWISS CONFEDERATION**

Compared to Norway, the Swiss government began to intervene quite late in organised doctoral education. Until the second half of the 1990s, it was as a non-issue on the national policy agenda. Among the HEIs, only some isolated institutional initiatives, explicitly targeting doctoral students, existed. For instance, universities of the French-speaking part of Switzerland<sup>17</sup> invested some money in a common pot, in order to offer common courses to doctoral students. However, these courses were thought as a support without any formal obligation for doctoral students. Until a few years ago, only very few HEIs or single faculties and institutes obliged their doctoral students to follow courses as part of the doctorate's

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<sup>17</sup> Universities of Neuchâtel, Geneva, Lausanne, Fribourg and (today) to a certain extent also universities of Bern and Basel (German-speaking part) as well as the Federal Institute of Technology Lausanne. These universities build the university conference of French-speaking Switzerland, called “Conférence universitaire de Suisse occidentale” (CUSO).

requirements. As we will see later, there is still no general regulation about coursework in doctorates as opposite to Norway.

The non-existence, both, of a public policy regarding doctoral education and of common national regulations, can partly be explained by the federal structure of Switzerland and its impact on the Swiss higher education system. Indeed, the competence of the Confederation had been traditionally limited to the two existing federal HEIs, *i.e.* the Federal Institutes of Technology of Zurich (ETHZ) and Lausanne (EPFL), all other HEIs being regulated by their respective cantons. It was only in the late 1960s that the Confederation gained a clear competence of (co-)funding of the cantonal universities, through the Federal Act on Financial Assistance to Universities (LAU). Furthermore, the revision of this Act in 1999 transformed the Confederation from a mere payer to a proactive actor (Perellon 2001). Among others, the revised act allows the Confederation to fund special programmes of limited duration that target cantonal universities. A decisive element of the special programmes consists in the fact that the Confederation does not only pay but that it also defines the related rules.

It was still in the framework of the “old” LAU – hence before 1999 – that the Confederation funded a project that was not directly being thought as a promotional instrument for doctoral education but more generally as a fostering measure for the “new academic generation”. Worried about the predictable retirement of many university professors, federal parliamentarians decided to fund this programme called “*Encouragement de la relève académique*”<sup>18</sup> which finally<sup>19</sup> lasted from 1992 to 2004. During this period, it funded supplementary working places of teaching and research assistants, young doctors doing teaching and research<sup>20</sup> and assistant professors in all cantonal universities (proportionally to each university’s number of graduates). Official goals resided in the promotion of the next academic generation, the improvement of the supervision of undergraduate students, the researchers’ mobility as well as in the increase of women’s proportion in academic working positions (Felli et al. 2006). However, this programme did not include any special measure for doctoral education.<sup>21</sup> During this programme, more precisely in 1997, a research team, commonly mandated by the Swiss Science Council (CSS),<sup>22</sup> the Swiss National Science Foundation (FNS)<sup>23</sup> and the Swiss University Council

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<sup>18</sup> In German: « Akademische Nachwuchsförderung »

<sup>19</sup> Its duration has been lengthened twice, the second prolongation concerning the period 2000-2004. Therefore, this last period fall into the time of the « new » LAU.

<sup>20</sup> In French called « Maître-assistant », in German « Oberassistent ».

<sup>21</sup> Moreover, doctoral students were not anymore sustained during the programme’s last four years (out of twelve).

<sup>22</sup> In French: Conseil Suisse de la Science. The CSS is the counselling body of the Federal Government in the domains of research and education.

(CUS),<sup>24</sup> published a detailed report about the so-called “intermediate body”, comprising doctoral students and generally young doctors (Lévy, Roux, Gobet 1997). According to these researchers, doctoral students were suffering, on the one hand, from insufficient supervision by their official supervisor and, on the other hand, from work overload (especially the doctoral students working as teaching assistants in disciplines with many undergraduate students), which led to too little time being left for their thesis research. Other reports confirmed these general problems concerning the working conditions of doctoral students.<sup>25</sup> The situation has been especially alarming in social sciences, where it also had a negative impact on the state of these disciplines as a whole, as they were considered as underdeveloped. Different experts, beneath the CSS, recommended, among others, the establishment of doctoral schools. As we will see, the Confederation followed this recommendation only hesitatingly and, from the end of the 1990s, has been developing several more or less broader actions.

We can summarise the described period in the following way: Although several institutions established a certain offer of doctoral courses until the second half of the 1990s, this did generally not lead to the obligation for doctoral students to follow them, neither emerged a new type of doctorate. Among others, due to its limited power within the higher education system, the federal government did not intervene directly in doctoral education until that moment. However, a programme aiming to promote the “new academic generation” started in 1992. In the second half of the 1990s, a report about the conditions of the intermediate body of universities, thus also the doctoral students, suggested among others the creation of doctoral schools.

### **3.3. EVALUATION OF NORWEGIAN DOCTORAL EDUCATION: TOWARDS A NETWORK MODEL?**

An evaluation of Norwegian doctoral education in 2002 brought new inputs for changes in terms of organisation and content. Mandated by the Norwegian Association of Higher Education Institutions (UHR), the Research Council of Norway (RCN)<sup>26</sup> and the Ministry for

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<sup>23</sup> In French: Fonds national suisse de la recherche scientifique. The FNS is Switzerland’s leading scientific research funding agency.

<sup>24</sup> In French: Conférence universitaire suisse. The Swiss University Conference is the joint organisation of the cantons (represented through their respective ministers) and the Confederation for university politics.

<sup>25</sup> See Maurer, Zeltner (1997) and Fluder, Hildbrand (1997).

<sup>26</sup> In Norwegian: Norges Forskningsrådet. ”The mandate of the [Research] Council [of Norway] is to promote and support basic and applied research in all areas of science, technology, medicine and the humanities.” Source: Research Council of Norway, accessed the 26<sup>th</sup> September 2007:

Education and Research (UFD),<sup>27</sup> a group of professors under the direction of NIFU's<sup>28</sup> researcher Svein Kyvik evaluated hitherto existing doctoral education. The main problems of current doctoral education reside in too few doctorates compared to the other Nordic countries and candidates who are too old and working for too long on their thesis. These problems are explained by the fact that certain disciplines have still not made a clear cut with the *dr.philos.* tradition. As solutions, the authors suggest, *first*, a new study structure within which doctoral education begins after the first year of master studies, yet, lasts one year more. Hence, a complete study cycle for doctoral candidates would consist of three years of Bachelor, one year of Master and four years of doctoral studies. *Secondly*, the one-year obligatory part (*pliktarbeidsdelen*) should be replaced by only a half-year educational programme about teaching, scientific communication (*vitenskapelig formidling*), etc., as well as a practical part. These measures would leave a supplementary half year for doctoral thesis and contribute to a broader doctoral education qualifying doctoral students for jobs within the HEI system, the institutes sector, administration and the economic sector. *Thirdly*, doctoral education should take place in so-called research schools (*forskerskoler*) with the following features: a research school is based on an internationally recognised research environment, has a broad educational offer, is focused on topics, nationally and internationally visible, has many doctoral students, post-docs and senior researchers, enough resources, covers a broad spectrum of candidates and has a good infrastructure and a good social environment. Such research schools should be established in all disciplines, even though it cannot be for all doctoral students. They should develop a high standard as an example for the other programmes (Kyvik 2002).

The idea of research schools is appreciated both by the UHR (2003) and the Ministry (2005). In a first statement, the UHR recommends the establishment of research schools as an attempt and in addition to ordinary research education. They should be established as flagship or network. Internationally recognised research centres (*forskermiljø*) may serve as an environment for flagship research schools. On the other hand, the network-model may contribute to the strengthening of disciplines that are small within individual institutions. By relating them, resources are put together in order to achieve a better course offer and study environment for doctoral students. All implied institutions should be represented in a steering council. In its position paper "Commitment to Research" (*Vilje til forskning*), the government indicates that it wants to establish a scheme for national research schools. This should be one element among several, targeted to make Norway a leading research nation. Furthermore, the

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<http://www.forskningsradet.no/servlet/Satellite?c=Page&cid=1138785832539&pagename=ForskningsradetEngelsk%2FPage%2FStandardSidemaal>

<sup>27</sup> In Norwegian: Utdannings- og forskningsdepartementet.

<sup>28</sup> Norwegian Research Institute in Studies for Innovation, Research and Education.

number of PhD fellowship positions at universities and colleges should be increased and a scheme for industrial doctorates should be established in order to strengthen collaboration between enterprises and research institutions. The Ministry of Education and Research mandates the UHR and Research Council to examine a scheme for national graduate schools and PhDs in the economy.

Concerning national research schools, the Ministry includes in its mandate several premises, among which the stimulation of the collaboration between several institutions and fragmented fields is underlined. Finally, the mandated working group suggests the establishment of national research schools in a clear network organisation with a disciplinary leader, responsible for relating doctoral students and other researchers to the school and for developing the scientific activities of the research school. Institutions should channel both people and positions to research schools but the admission to a degree awarding institution is a precondition for doing a doctoral degree. One research school should normally be composed of at least 20-30 doctoral students and 4-8 supervisors. 20 schools, each with a yearly funding base of up to three million Norwegian Kroner, should be established for eight years. The scheme should be opened for all disciplines (UHR, RCN 2006). Regarding PhDs in the economy, another working group of the UHR and RCN (2006a) suggests essentially two measures: on the one hand, the government should fund half of doctoral students' salary, because enterprises are often not able to pay the whole amount. However, only enterprises having already R&D staff and pursuing the ambition to increase their scientific competence level should be eligible for doctoral students and the corresponding financial support. On the other side, government shall also fund special research courses for doctoral students oriented towards applied questions (*e.g.* interdisciplinary collaboration, project management, communication, etc.).

In summary, in the framework of an evaluation of Norwegian doctoral education in 2002, several proposals are made to resolve problems related to the doctorate (too few doctorates, too old candidates and taking too much time). Apart a new global study structure and a differently structured content of doctoral education (regarding obligatory workload during the doctorate), a new organisational type of doctoral education, called "research school", is suggested by the evaluators. The idea of research schools is received positively by the UHR and the Ministry. The latter mandates UHR and the RCN to elaborate a more precise concept. The resulting proposal suggests the creation of inter-institutional research schools composed of at least 4-8 supervisors and 20-30 doctoral students, disposing of a yearly funding base of up to three million Norwegian Kroner and existing for eight years. Moreover, the government is also recommended to co-fund professional PhDs because certain enterprises would not be able to fund doctoral students alone.

### 3.4. THE CONFEDERATION'S REINFORCED INTERVENTIONS

If the Confederation's first intervention, targeting the promotion of the new academic generation was rather a programme for doctors and future professors than for doctoral students<sup>29</sup>, further federal programmes were more tailor-made for the latter. Furthermore, more and more regulations are related to them. The politically oriented programme "Switzerland: Towards the Future", launched by the FNS, sought to promote topic-oriented research and networks for research as well as to strengthen structurally social sciences. This latter goal should have been achieved by several measures, among others, through the establishment of eight doctoral schools in social sciences lasting three years. The first of these doctoral schools started in 1998, the last in 2000. According to the evaluator of this programme (Schreitener 2002), goals have not really been achieved, among others reasons, because, besides missing the quality of educational programme, there were not enough incentives for students (*e.g.* formal obligation, related financial support) and lecturers (*e.g.* diminishment of teaching charge).

Almost during the same period, *i.e.* around 2000, a new type of politically oriented programmes – the so-called "National Centres of Competence in Research (NCCR)" – was started and has been implemented. Besides the creation of national research networks, one important goal of these programmes resides in the "promotion of talented young researchers at doctoral and post-doctoral levels and the advancement of women in research careers (FNS 1999: 5)". According to a manager of the FNS<sup>30</sup>, special attention should be paid to professional perspectives inside and especially also outside the academic job market. Generally, NCCR regulations leave quite a lot of room for structural experiments as regards concrete doctoral education's organisation. However, "graduate schools"<sup>31</sup> are mentioned as possible special measures for training (FNS 1999). Each NCCR being composed of different HEIs' researchers and doctoral students, the latter are in principle<sup>32</sup> obliged to follow courses either in mono-institutional based programmes of their "home university" or in common inter-institutional programmes.

Among the ten NCCRs, chosen in the first selection process in December 2000, no proposal coming from social sciences and humanities was accepted. According to the FNS responsible for the NCCRs educational aspect, the emerging polemic as well as the – since the end of the 1990s – regularly returning discussions and reports around doctoral schools, might have contributed to the Confederation's next action in the field of doctoral education. The

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<sup>29</sup> As mentioned, promotion was limited to the position's funding.

<sup>30</sup> Interview in June 2007.

<sup>31</sup> Translated from the German « Graduiertenkolleg ».

<sup>32</sup> There is no written minimal requirement.

FNS has again been mandated to implement a programme, this time exclusively targeting doctoral education and research. This programme called Pro\*Doc is, in a first stage, principally targeting social sciences and humanities. It has been implemented since the end of 2006. Seven projects, comprising a common educational module organised around a precise subject and several so called research modules (each corresponding to a research topic), were selected. Maximally 20 doctoral students, of whom ten receive a salary through the project, are part of one project. Possible course structures are again quite flexible. However, at least two HEIs as well as 40% women must be included in projects.

The FNS stays not the only actor on the national level being actively involved in doctoral education. From 2006 on, the Rectors' Conference of Swiss Universities (CRUS)<sup>33</sup> makes it also one of its issues. The CRUS' involvement is made possible through its enlarged role, among others, thanks to a new competence of perennial strategic planning for the Swiss higher education system from 2001 on. Moreover, CRUS is designated as being responsible for the implementation of the Bologna reform in Switzerland. In the framework of the planning period 2008-2011, the CRUS makes doctoral education and its standardisation one of its four priorities (CRUS 2006). According to its vice-secretary general, this can be seen as the consequence of two elements: first, after a four-year period principally dedicated to teaching, it is the universities' second mission's turn, *i.e.* that of the research. Secondly, since the doctorate's integration in Bologna, it must also be modernised. Like NCCR doctoral education, it should include skills qualifying people for working positions inside and outside the academic job market. With its priority setting, the CRUS asked the Confederation for a particular funding in the framework of a special programme (possible since the revision of the university's act in 1999) in order to gradually implement doctoral programmes for *all* doctoral students. In its message for education, research and innovation 2008-2011, the Federal Council (2007) allocates indeed a credit for new doctoral programmes.<sup>34</sup> However, three elements diverge from initial demand and intention. First of all, the allocated credit is lower than asked and, secondly, as in Pro\*Doc, ten doctoral students per programme shall receive a salary related to the programme<sup>35</sup>, although that has not been thought in this manner in the original proposal (CRUS 2006a).<sup>36</sup> Thirdly, as a consequence, only part of doctoral students instead of their totality is targeted. Like in Pro\*Doc, each programme must involve several HEIs. Implicated doctoral students will be evaluated regarding the different activities taking

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<sup>33</sup> In French: Conférence des recteurs des universités suisses.

<sup>34</sup> At the moment, the parliament has still not formally accepted the message; however, no change regarding this issue is expected.

<sup>35</sup> Interview with vice-secretary general of CRUS.

<sup>36</sup> In its first proposal, CRUS doctoral programmes would have been gradually addressed to all doctoral students, but without any related funding for doctorate as such.

place in the framework of the programmes' education. For the moment, these activities are planned to correspond to about 12 ECTS<sup>37</sup> and will be more or less distributed on the whole doctorate's duration. CRUS' doctoral programmes will be implemented from April 2008 on.

In summary, one notices that from the end of the 1990s on, the Confederation funds four initiatives targeting (more precisely) doctoral education. Three initiatives, *i.e.* doctoral education in the framework of the politically oriented programmes "Switzerland: Towards the Future" and the "National Centres of Competence in Research" as well as the doctoral programmes "Pro\*Doc" are managed by the National Science Foundation. The Rectors' conference is responsible of the most recent initiative, which includes the implementation of inter-institutional doctoral programmes from April 2008 on. This initiative aims contributing to the standardisation of doctoral education.

### 3.5. CURRENT STATE OF NORWEGIAN DOCTORAL EDUCATION

As a consequence of the Bologna declaration, the old degrees, among which the *dr.philos.* degree, are replaced by Bachelors, Masters and PhDs. According to the Norwegian Agency for Quality Assurance in Education (NOKUT), the old degrees will be completely phased out by the end of 2007.<sup>38</sup> Hence, all doctoral students will be obliged to follow organised doctoral programmes. At the moment, the latter are principally still organised at faculty and department levels. However, a few initiatives going in the direction of the proposed research schools already exist.<sup>39</sup>

In total, 6,478 doctoral students are enrolled in 2006. The biggest part of them, *i.e.* 5,930 students, are related to a university.<sup>40</sup> Generally, universities award doctorates in all their disciplines, whereas colleges are allowed to do so only in certain disciplines. In 2006, the Norwegian HE system awarded a total of 905<sup>41</sup> doctorates, of which 837 were awarded by the six existing universities, 41 by specialised university-level institutions, 17 by private colleges and ten by specialised colleges.<sup>42</sup>

In its regulations about the employment of scholarship holders, the Ministry of Education and Research (2003), defines the doctoral students' length of employment on four

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<sup>37</sup> European Credits Transfer System.

<sup>38</sup> Source: <http://www.nokut.no/sw21671.asp>, accessed on 25<sup>th</sup> July 2007.

<sup>39</sup> See for instance the national network research school "Tekst, Bilde, Lyd, Rom. Fortolkning og teoriutveksling", which was established in 2004 as a common project of the humanities faculties of the Universities of Bergen, Tromsø, Agde University College and the Norwegian University of Science and Technology.

<sup>40</sup> Source: Norwegian social science data services.

<sup>41</sup> 68 doctorates were still awarded according to the "old" *dr.philos.* degrees.

<sup>42</sup> Source: Norwegian social science data services.

years with 25% teaching duties or three years full-time. Supplementary and more detailed regulations are the responsibility of the individual doctorate awarding HEIs. Regulations at central and/or faculty level define more clearly the amount course work and so on. However, the Council for Higher Education (2003) recommends standard regulations. The latter include, among others, the establishment of a contract about admission between the doctoral student, academic advisor(s) and the unit (programme) to which the student has been admitted. Admission is dependent on a detailed proposal comprising a plan for the completion of the project with deadlines, an account of project funding, a description of necessary infrastructure, an account of the need for academic advising and so on.

### **3.6. CURRENT STATE OF SWISS DOCTORAL EDUCATION**

The two existing Federal Institutes of Technology (EPF)<sup>43</sup> and the ten cantonal universities are the only HEI entitled to award doctorates. In 2006, they awarded 3,198 doctorates. In the academic year 2006/2007, 17,640 doctoral students are enrolled in the twelve HEIs (4,196 in the EPFs). It is difficult to say how many of them follow an organised doctoral programme. At the moment, no official numbers exist. Being completely decentralised, no national regulation exists about this issue. HEIs' regulations handle this question very differently. Certain require from their doctoral students a precise number of credits to collect through course work in a precise programme, whereas others recommend following some courses or do even not mention it at all.

This diversity is also reflected in the different offers in terms of doctoral education and the deriving organisational forms. The traditional “apprentice-ship model” is still strongly widespread. Regarding organised doctoral education, the EPF of Lausanne can be cited as one institution that has its own, all disciplines covering, doctoral programmes, which resemble the American graduate school model.<sup>44</sup> Most other programmes are based on inter-institutional networks, sometimes also comprising foreign universities. In some cases, doctoral programmes work in collaboration with non-university partners from industry and the financial domain. Generally, doctoral programmes exist more often in engineering and natural sciences and are more strongly formalised, for instance regarding controls by exam, than in social sciences and humanities.

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<sup>43</sup> In French: Ecoles Polytechniques Fédérales.

<sup>44</sup> However, compared to the American Graduate School model, the EPFL doctoral school varies in one important point, which is that the master degree is not part of the doctoral school.

## 4. Comparison of organisational forms and implications

What is the answer to the question whether Norwegian and Swiss doctoral educations adopt the US model? At the beginning of the new doctorate's establishment in Norway, the American graduate school served as model and structured doctoral education with coursework was introduced at the faculty's or even institute's level. However, for a few years, some HEIs have already been establishing research schools based on a network-logic. Furthermore, if the UHR's and Research Council's intentions are implemented, further (national) research schools constructed by networks, are going to be created as a supplementary offer to the hitherto existing faculty and institute based doctoral education. Hence, a co-existence of two different organisational models seems to characterise the current and also middle-term state. This is also true for Switzerland. The Confederation promotes the inter-institutional network based model whereas some individual HEIs choose to have a more "Graduate school" like structure within their own institution. However, a big majority of all doctoral programmes include at least some collaboration between different HEIs.

What are the possible implications of the different organisational models of organised doctoral education? The graduate school model was and still is a clear sign of distinction within the competitive environment of American HE. A good reputation related to a strong graduate school helps attracting research funding, the "best" researchers and doctoral students. What about these related elements in the case of doctoral programmes based on a network of universities? A fundamental question is to what extent a doctoral programme is perceived as "autonomous". In other words, is it a doctoral programme as such, one particular university or all implied universities that attracts funding, researchers and students? A FNS manager estimates that it is easier for a strong doctoral programme based on a network of several universities rather than for the doctoral programme of a single small university to attract an internationally recognised researcher for a one week lasting course. On the other side, one may raise the following question: who takes the credits for a doctoral programme with a good reputation? All implied universities, a particular university or the programme as such? Hence, to what extent is a single HEI capable of taking advantage of its participation in a network based doctoral programme for its own competitive force? In the case of the state promoted research schools and doctoral programmes in Norway and Switzerland one more critical point must be interrogated concerning reputation and visibility, *i.e.* to what extent, *a priori*, limited life duration of school or programmes may be hindering. In other words, how much time does a doctoral school or programme need to become visible and competitive?

Besides the question of competitiveness, the way doctoral education in inter-institutional networks is suggested and carried out relates to another issue, that is to say the

organisation of research. Within the federally funded doctoral programmes Pro\*Doc and CRUS, there is not only an offer of education as such but there are also research projects and research funding resources at play. This is similar for the Norwegian project of national research schools suggested by the RCN and UHR, to which not only doctoral students but also researchers should belong (with the related financial resources). Hence, what does this type of doctoral education organisation mean in terms of the organisation of research between different HEIs? Moreover, in the cited projects, it is precisely the – in the case of the American graduate schools often underlined – link between doctoral education and research, which shall be established. What about disciplines where doctoral theses are traditionally not part of a broader research project? To what extent will this organisational form influence for instance the choice of doctoral thesis topics? One thing is clear, changes in doctoral education's organisation must also be observed with regard to research organisation.

The current organisation of doctoral organisation is, among others, a result of the manner the central state intervenes in these three HE systems. Therefore, we shall develop a first analysis of the state's type of intervention in the next section.

## 5. The states' manner of intervention

The example of doctoral education's development illustrates very well broader characteristics of the three discussed HE systems, for instance the role of the state. In the American case, doctoral education emerged in a context of competition between American and European universities. In a bottom-up development and independently of any state influence, the colleges that were already the strongest ones have developed the vertical university with a second tier, the graduate school. This was created in order to dispose of an appropriate organisational form for research and research education offering a competitive position *vis-à-vis* European universities. Then, again as a self-organisational act among universities, the AAU – comprising a very limited number of HEIs – was founded and determined some rules related to the doctorate. A concentration of research funding and the so-called best researchers within these institutions strongly limited the number of doctorates' awarding and research producing universities. Generally, national planning and coordination played a minimal role in the development of the graduate school and the academic department. The federal state began to intervene strongly on the content of research and therefore also on the production of doctorates since the post-world war period. Today, it still concentrates its resources on research in natural and life sciences. Accordingly, conditions of doctoral students vary a lot. On the one side, one finds the paid employee integrated in a research project, on the other side, the self-funded or loan-dependent isolated student.

Compared to the Swiss and American states, the Norwegian state's degree of intervention is quite strong. It controls not only the (almost) totality of funding resources<sup>45</sup> but also an important part of regulation power. The fact that, after a bottom-up project coming from engineering and natural sciences, the Norwegian Ministry for Education and Research could introduce strong regulations valuable for all disciplines – and hereby also for social sciences and humanities that were and partly still are against them – illustrates its power. This strong type of intervention also clearly exemplifies the Norwegian government's interest concerning the doctorate. All governmental measures related to the doctorate target at making Norway a leading research nation.

The Swiss federal state also tries to intervene in doctoral education. Yet, its power is clearly limited. Lacking the monopoly of financial resources and regulative power (for cantonal universities), it intervenes step by step with different special programmes. Each time it intervenes by single incentive programmes, the Confederation offers supplementary money.

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<sup>45</sup> In 2002, public funds accounted for 96% of all expenditure on tertiary education, which is one of the highest proportions in the OECD (Clark et al. 2006).

“In exchange”, the Confederation can define the rules of the game. The case of doctoral education illustrates that the Confederation intervenes more and more often and with more and more clearly defined rules. Yet, it seems to be forced not only to act by incentive programmes but also to act via other actors, such as the National Science Foundation and the CRUS. The relation between the state and intermediary actors, such as research councils, deserves certainly more specific observation, in Switzerland as well as in Norway.

A closely related question to states’ intervention is the one about the goals behind their intervention. Official discourses about research nations, economic growth and so on may be part of goals, yet, often very broadly defined ones. Others, less obvious ones, may also come to the surface. Thus, all<sup>46</sup> four federal initiatives concerning doctoral education had one common condition, *i.e.* the “Network-condition”. In each case, funding was only provided if several HEIs collaborated. Concerning the Swiss HE system, this philosophy corresponds clearly to the federal HE policy “Swiss Higher Education Landscape” targeting strong cooperation between and integration of Swiss HEIs. Such possible implications must also be taken into consideration regarding the future developments in Norway where the Network logic has already been used in the framework of “Network Norway”. The latter is aimed at more cooperation within the HE system, by upgrading vocational schools to HEIs and integrating them into the HE system with the Higher Education Act of 1995.

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<sup>46</sup> In the case of NCCR doctoral education, inter-institutional collaboration is not a formal condition, however it is strongly recommended.

## **6. Conclusion: factors structuring doctoral education**

As a conclusion, we notice that the role of the state does matter in the shaping of the current doctoral education of the three countries studied. Federalism is visible in the manner the central state intervenes in Switzerland and also in the USA, whereas Norwegian doctoral education is characterised by the unitary state.

Generally, American doctoral education is shaped by competition and decentralisation. The federal government does not intervene by determining general rules related to the doctorate. It does not offer special money for educational programmes at doctoral level either. Regulation and funding of doctoral education are issues handled within and between universities themselves. Nevertheless, that does not mean that the American Government is completely passive: it shapes doctoral education by concentrating its research funding on physical and life sciences.

The case of doctoral education shows very well to what extent the Swiss central government is able to act. The cantonal universities being principally in the cantons' field of competence, the Confederation is forced to intervene from case to case and step by step instead of by taking a global initiative applicable to the whole HE system. As a consequence, the current doctoral education offer is very heterogeneous. Besides the different state interventions, HEIs also contribute to this highly diversified range by creating their own programmes, almost each time combined with varying degrees of regulation. Coursework, which until recently had distinguished doctoral education of the USA and Europe, is still not standard in all Swiss HEIs and disciplines. American influence is structuring in single cases, for instance in the doctoral school of the EPF Lausanne.

The Norwegian government's higher funding and regulating power are clearly visible in current doctoral education. By introducing common rules valuable for all disciplines, it imposed its will even against resistance coming, for example, from humanities. As a consequence, like in the USA, each doctoral student has to do coursework in addition to the doctoral thesis. Generally, the American influence is certainly a structuring factor, especially regarding the initial and still principal organisational form resembling the Graduate school. However, the government intervenes now in favour of more diversity by stimulating experiences with other organisational forms of doctoral education. In addition to the initial organisational form, national research schools based on inter-institutional cooperation should be built up. However, the implementation of this new organisational type is not exclusively the result of state intervention but also of HEIs' own initiatives. Some "network doctoral programmes" do already exist. Therefore, we can note that although the state has quite a lot of

power – especially compared to the two federal states studied – there remains some room for manoeuvre for HEIs.

We notice that political developments at a European level were not the trigger for the emergence of organised doctoral education in Norway and Switzerland. Yet, it seems that Bologna was an argument, may be even a pretext, for the definitive abandonment of the Norwegian *dr.philos.* and for further development of organised doctoral education in Switzerland. Again, more investigation is needed to confirm this impression.

Although I did not discuss this matter thoroughly in this paper, disciplines, a second element of the “university configuration” seem to matter too. Resistance from humanities against a homogenised three years lasting doctorate, is clearly visible in Norway. The fact that in Switzerland – where the state intervened only relatively recently and just selectively – organised doctoral education exists especially in natural sciences, can be seen as another indicator for relative reluctance of social sciences and humanities regarding changes towards a standardised shorter doctorate, comprising coursework. As a consequence, there is a strong hypothesis that cultural or other differences between disciplines also structure doctorates. Yet, it seems that disciplines are not always capable of imposing themselves against other structuring forces like a strong central state. However, further work is necessary to clarify this hypothesis in more detail. Moreover, this ongoing explorative study will also examine other potential structuring factors, like the characteristics of the national (higher) education system and its institutions (third element of “university configuration”), research funding through private economy, academic and non-academic job markets and so on.

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