

Developing Doctoral Degrees and Qualifications in Europe. Good Practice and Issues of Concern*

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Main challenges, needs and trends in the field of doctoral studies in Europe and the United States from the perspective of the requirements of the Bologna Process are identified. A set of recommendations for further developments are formulated in the general context of the envisaged convergence of the European Higher Education Area and the European Research and Innovation Area.

1 Introduction

This article presents an international comparative analysis of doctoral training based on 13 country reports which have been commissioned by UNESCO-CEPES (European Centre for Higher Education/Centre Européen pour l'Enseignement Supérieur) – a decentralized office of the United Nations Educational, Scientific and Cultural Organization Secretariat.¹ The countries involved in this study were Austria, France, Germany, Italy, The Netherlands, Norway, Poland, Romania, the Russian Federation, Spain, Sweden, The United Kingdom, and The United States of America (*Sadlak 2004*).

In all these countries, doctoral education or training is an issue of concern and scrutiny. In many of them, reforms were introduced recently or are being currently introduced. The reasons for this vary somewhat; however, a number of issues come up in all or most of them. There are frequent references to the European Higher Education Area and to the European Research and Innovation Area, on the one hand, and to the role of universities and doctoral education in the knowledge society, on the other hand. These references remain rather vague and tend to serve as metaphors of legitimization for national concerns. Still, the issues are very similar.

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¹ The country reports were discussed in the framework of an International Seminar, organized by UNESCO-CEPES and the ELIAS Foundation of the Romanian Academy on "Doctoral Degrees and Qualifications in the Context of the European Higher Education Area and the European Research and Innovation Area". The Seminar took place from 12 to 14 September 2003 in Bucarest.

The following analysis consists of four parts. First, there is a recapitulation of the requirements for the creation of a European Higher Education Area and a European Research and Innovation Area, as they have been formulated and discussed in the policy arena. Second, a list of ten issues is identified, around which current debates of the reform of doctoral education are focused. Third, a number of concerns and the problems encountered in reforming doctoral education are identified. In the fourth part, the role of the Bologna Process and the plans to create a European Higher Education, Research and Innovation Area are discussed with respect to the challenges these attempts pose for the reforms of doctoral education.

2 Requirements of the European Higher Education Area (EHEA) and the European Research and Innovation Area (ERIA)

Already, during the first half of the 1990s, Antonio Ruberti, the European Commissioner for Research from 1993 to 1994, had developed a vision for a European area of research in which doctoral education was meant to play an important role. At an international seminar held at the University of Twente in the Netherlands, Ruberti presented a paper in which he stated that "as regards the creation of a common European space for science and technology, a strategically important role, and in some respects, a decisive role, is played by the acquisition of a 'European dimension' in research training – that is doctorates."² Ruberti's idea was not only to create a European support programme for mobility and exchange of doctoral students but also aimed at achieving a convergence in the financial support offered to them. Ruberti assumed a continuous diversity in doctoral studies but wanted to improve the quality of training and the usefulness of the doctoral degree for the professional labour market. In his short term of office, he did not manage to create such a programme for mobility and the exchange of doctoral students; however, the issue is currently taken up again in the discussions to create a European Area for Research and Innovation. Doctoral studies in Europe were discussed at the Bologna follow-up conference that took place in Berlin in October 2003.

Doctoral studies were also an issue in a number of background papers, declarations and communications, which were published in the context of the Conferences of Ministers responsible for Higher Education, held in Bologna in 1999 and in Prague in 2001, but

² Antonio Ruberti: „The Role and Position of Research and Doctoral Training in the European Union.“ Manuscript of a presentation given at the University of Twente on 7 April 1997.

the matter only became an official item on the agenda in Berlin in 2003.³ The initiative of the Ministers at first purposely excluded representatives of the European Commission, but the European Commission supported the initiative of the Ministers by complementing the agenda for the creation of a European Higher Education Area with the initiative to create a European Area of Research and Innovation.⁴ In March 2000, the European Council held a special meeting in Lisbon to "agree [on] a new strategic goal for the Union in order to strengthen employment, economic reform and social cohesion as part of a knowledge-based economy."

The Presidential conclusions defined a strategic goal for the next decade, "to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and a greater social cohesion."⁵

At the intersection of both these initiatives lies the issue of doctoral education and research training. Not only will universities have an important role to play in achieving the goal of becoming the most competitive and knowledge-based economy in the world, but they also are the most important institutions in which doctoral studies take place.

The communication of the European Commission of February 2003 about the "Role of the Universities in a Europe of Knowledge" (*COM (2003) 58 final*) is considered to be one of the most important policy papers with regard to the topic at hand. The document not only acknowledges the importance of higher education institutions in the creation of a Europe of knowledge, but it also identifies a number of factors still preventing higher education institutions from fulfilling this role in an adequate way.

For the purposes of this analysis, a short overview of the document is given. It opens by identifying five basic challenges with which universities are currently confronted:

³ „The European Higher Education Area.“ Joint Declaration of the European Ministers of Education convened in Bologna on 19 June 1999. “Towards a European Higher Education Area.” Communiqué of the meeting of European Ministers in charge of higher education in Prague on 19th of May 2001. “Realising the European Higher Education Area.” Communiqué of the Conference of Ministers responsible for Higher Education in Berlin on 19 September 2003.

⁴ Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee, and the Committee of Regions: “Towards a European Research Area.” COM (2000) 6, Brussels, 18 January 2000.

⁵ Presidency Conclusions. Lisbon European Council. 23 and 24 March 2000. URL: http://www.europarl.eu.int/summits/lis1_en.htm accessed on 22 November 2003

- dealing with increased demand for higher education in the face of reduced resources (staff and funding);
- dealing with increased competition, not only from outside Europe but also within Europe;
- increasing and strengthening co-operation with enterprises and businesses and contributing more effectively to technological innovation;
- finding a new balance between basic or pure and applied research;
- providing better access for atypical groups of students and including more persons from outside universities in their governing boards.

One characteristic that can be observed, when reading the case studies (country reports), is a lack of balance regarding the issue of co-operation *versus* competition. On the one hand, the creation of a European Higher Education, Research and Innovation Area is aimed at creating more unity and transparency within this space to enhance mutual trust and co-operation while becoming a stronger competitive force on the global scale. On the other hand, issues of "brain drain" and "brain gain", as well as the generating of income through the provision of doctoral education continue to be an underlying but important issued creating competition within the European Higher Education, Research and Innovation Area.

Interestingly, this issue is also taken up in the document produced by the Commission and discussed in terms of the tension between the continuing national base and structure of higher education in the face of an increasing European dimension. From this tension three more challenges have arisen:

- the need to further improve recognition so that a European labour market can be established;
- the need to improve competitiveness on a global scale so that Europe can become increasingly attractive for students and researchers;
- the need to deal with the expected increase in heterogeneity of the European higher education landscape owing to the enlargement of the European Union.

After having identified these challenges, the document formulates three goals and proposes a number of measures as to how to achieve them, asking the Member States and other interested stakeholders to discuss them and to come up with additional and/or different proposals for achieving the goals. The three goals are the following:

- (1) to secure sufficient funding and to utilize available resources more efficiently;
- (2) to strengthen excellence and performance;

- (3) to open up to the environment and to the world outside as well as to secure increased international/global attractiveness.

The measures and requirements proposed to achieve these goals are held together by the one overarching and extremely ambitious aim formulated at the meeting of the European Council in Lisbon in 2000: "To make Europe the most competitive and most dynamic knowledge-based economy in the world (by) the year 2010." In this economy, the European systems of education are supposed to become a "worldwide reference for quality".

This document is not only one which – finally (if one can say that) – acknowledges the important role of the universities, and certainly other higher education institutions, for social, cultural and economic development at a national and a global level, it is also a document which leaves no doubt that the education and training of a highly qualified workforce, including the teaching and research staff of the higher education institutions themselves, is an issue on the forefront of concern if these goals are to be achieved.

In July 2003, the European Commission's communication about the role of universities in a Europe of knowledge was complemented by another communication to the Council and the European Parliament on "Researchers in the European Research Area: One Profession, Multiple Careers."⁶ This communication notes the continuing diversity and variety of research training and conditions of doctoral education and identifies a tendency towards deregulation in the academic career system. It also calls for "making the training of researchers of greater relevance for a wider variety of careers than in the past" and enumerates a number of consequences for doctoral programmes which should:

- enhance the employability of researchers by including in the training both core skills and wider employment related skills;
- review the structure of training for researchers and integrate doctoral programmes into the Bologna Process;
- develop more organized training within the framework of doctoral programmes;
- pay attention to the quality of supervision and provide access to a supervisor at all levels of the training;
- integrate doctoral students into a research environment but also highlight alternative careers and provide doctoral students with as many contacts as possible;

⁶ COM (2003) 436 final. Brussels, 18 July 2003

- assure the financial situation and the social security rights of doctoral students;
- analyze the status of doctoral students and provide a better overview about the characteristics of doctoral education and research training opportunities in Europe.

The aim of this synthesis report as well as the country case studies is to contribute to the tasks listed above.

3 Issues

3.1 Institutional Structures and the Shape of Doctoral Education

The trend in most of the countries represented in this study is to establish a relatively formal structure for doctoral education, i.e., abolishing the traditional "apprenticeship model", consisting of a professorial supervisor and independent research, in favour of more structured research education and training within disciplinary or interdisciplinary programmes or graduate schools.

The programmes that have been created or are currently under discussion are intended to reduce the duration of doctoral education, to reduce dropout rates, and to provide more targeted research training. Typically, they include course work plus a plan for undertaking supervised research for a thesis. Often, both systems of doctoral education still exist in parallel (e.g., in Germany, Austria, the Russian Federation, Poland, Italy and Norway). While the traditional apprenticeship model relies on a personal relationship between the doctoral student and the supervisor, the structured programme model has a more regulated and standardized approach.

As many of the countries included in this analysis are currently redesigning their degree structures as well, the shape of a doctoral programme is also dependent, to some extent, on whether the new Master's degrees already include or will include a research option, which may represent the taught part of doctoral studies (or some part of them). This option is being debated in France and Spain. Its aim is to reduce the length of doctoral training.

Some country studies (Sweden, Spain and the United States) report two phases in their doctoral education, the first phase consisting mostly of coursework and concluding with a candidate degree or a certificate in advanced studies, while the second phase consists more or less of research and the writing of a thesis.

A number of countries included in this analysis have detailed regulations concerning the institutions that are authorized to offer doctoral education or to set up graduate schools and the requirements that institutions and doctoral candidates must meet in order to embark on doctoral education. Such regulations are most developed in the Russian Federation, Sweden, Norway and the United Kingdom, but for different reasons in each country. Only a few countries, in particular the Netherlands, Norway and Sweden, but also Italy, have some kind of contractual relationship between the doctoral student and the institution, regulating the rights and obligations on both sides. As a rule, institutions offering doctoral education and awarding doctoral degrees must either be accredited by the State to do so or be a certain type of institution (i.e., a university). In most countries, private institutions and the non-university sector institutions cannot award doctoral degrees. Again, in most countries, selected extra-university research institutes and/or academies of science have been granted either the right to confer doctoral degrees or the right to train doctoral students in co-operation with a university which then confers the degree. In several countries (e.g., the Netherlands, Spain and Sweden), higher education institutions not having university status can co-operate with universities in the framework of graduate schools or, as is the case for Sweden and Norway, may even award doctoral degrees in specified subjects. Only in the Russian Federation are doctoral degrees awarded by a governmental body rather than by the institutions. In Romania, doctoral degrees have to be validated by a national body.

Several countries included in this study report an emerging distinction between research doctorates and professional doctorates (the United Kingdom, Austria and the United States of America). This distinction also shapes some elements of the programmes for doctoral studies. There is still a problem of definition and distinction in most countries in terms of doctoral education *versus* research training. Closely related to this issue is the status of doctoral candidates who range from fully salaried employees, via a hybrid status in-between, that of an employee and a student, to that of a grant holder and a fee paying student (see below for more details on this question).

The American pattern of BA/MA/Ph.D. tends to be considered as "the gold standard" to which European universities aspire or should aspire. However, even if the pattern of BA/MA/Ph.D. and a structure of coursework followed by more or less independent research are eventually adopted all over Europe, requirements, contents and regulations will vary.

3.2 Admission to Doctoral Studies

Admission procedures range from being highly regulated and highly competitive to being rather informal and unregulated. The apprenticeship model is very informal and unregulated – i.e., a student does not have to do any course work and can choose his or her own thesis topic but has to find a professor who accepts the task of supervision and the chosen topic. The programme model, on the other hand, tends to be highly regulated and contractual in a variety of aspects. Some countries included in this study admit only a fixed number of doctoral candidates, a situation that makes admission highly selective, for there are usually more applicants than openings. Such a situation characterizes Italy, Sweden, Romania and the United Kingdom. The reasons for restricting the numbers of doctoral candidates are typically the requirement to guarantee adequate resources and to support, as in the case of Italy, the numbers of available tenured positions for post-doctoral academic staff. The Swedish report indicates that a sharp decline in the numbers of applications occurred, when admissions to doctoral programmes were restricted in 1998. The reason was that admission became dependent on available funding for the entire postgraduate period that the university had to guarantee. In disciplines with less access to external funding (e.g., the Humanities and the Social Sciences), this stipulation led to a considerable decrease in the numbers of postgraduate students.

As a rule, all doctoral programmes have admission procedures. Entrance examinations, however, are required in the Russian Federation, Italy and Romania. Sweden, Norway and the Netherlands have introduced or are currently introducing official admissions procedures, i.e., rules for application, eligibility, selection and decision about candidates applying for participation in a doctoral programme. In the United Kingdom, a code of ethics and minimum threshold standards, including good practice guidelines for doctoral programmes, have been introduced, which also regulate the selection, admission, enrolment and induction of doctoral students.

It is also noteworthy that admission to doctoral programmes or acceptance as a doctoral student is possible in some countries without having earned a previous degree. Other countries require at least a Bachelor's degree (or the equivalent), and again, others, a Master's degree (or the equivalent). If one considers that, by far, not all countries included in this analysis have established the pattern of 3 + 2 + 3 (denoting the number of years to earn, respectively, a Bachelor's, a Master's and a doctoral degree, which has been proposed in the framework of the debates on the creation of a European Higher Education and Research Area), the requirements for access to doctoral studies in terms

of number of years of previous study and previous formal qualifications vary considerably. In addition, efforts are underway in a few countries to open access to doctoral programmes for professionals with practical experience, so that diversification in terms of access and admission requirements will continue to increase.

3.3 Status of Doctoral Students and Requirements

In most of the countries under consideration here, the status of a doctoral student is that of a student being enrolled at a university and affiliated to a department, a research institute, a research team or a laboratory in his or her field of specialization. In addition, a doctoral student might also be a member of a graduate school or participate in a cross-disciplinary doctoral programme. Such schools and programmes frequently charge tuition fees. There are, however, several exceptions.

In Poland, many doctoral students have the status of junior scholars through employment in their universities as teaching assistants. This status provides them with faculty privileges but no regular salaries. Currently, a new draft law envisages giving doctoral candidates a student status rather than continuing their status as faculty members. In France, doctoral students enter into a contractual relationship with their university, by signing a "Thesis Charter", which defines the responsibilities on both sides. Doctoral students have student status and must be enrolled so that they can be eligible for social security benefits. In the Netherlands, a new system of doctoral training was introduced in 1986 giving doctoral students the status of doctoral trainees being employed and salaried by the university on a temporary basis. Training and supervision fees are deducted from the salary. Dutch doctoral students also have a contractual relationship with their university establishing a plan for training and supervision. The Dutch report actually characterizes the status of doctoral students as hybrid, being neither one of full salary, nor one of full student status. This situation has led to an emerging shift away from research training towards doctoral education but within a framework of regular employment. Romania as well has a somewhat hybrid position for doctoral students, who can hold a teaching or laboratory position for up to half of the regular workload of a university assistant. Sweden and Norway are probably the most advanced of all countries included in this study concerning the contractual relationship. They require the guaranteed funding of doctoral students during their entire period of doctoral study. Usually, doctoral students are appointed to a postgraduate studentship, which includes course work as well as certain teaching or research obligations which may not exceed 20 or 25 percent of a regular workload. They work on the basis of individual study plans that are approved by a faculty board. Annual follow-up of the plan is part of the individual agreement.

3.4 The Funding of Doctoral Studies

The funding of doctoral studies is another issue of great diversity. In some countries, doctoral programmes require the payment of tuition fees; others offer stipends to their doctoral candidates. Frequently doctoral students are offered positions as paid teaching or research assistants. Such positions constitute an additional workload and usually lengthen the time-to-degree. Many countries provide a range of state grants or scholarships that usually have no social security benefits included. In many of the countries under consideration here, there is also a possibility for part-time doctoral studies so that funding can be secured through an outside job or through a university job. The tendency of the financial situation of doctoral students to be insecure has led to a number of concerns in terms of status, time-to-degree and dropout rates. Several countries have tried to remedy this situation by establishing rules and regulations for doctoral training and supervision, restricting doctoral training and education to certain institutional frameworks and availability of resources, and by entering into a contractual relationship which defines the rights and obligations of both sides.

3.5 Increasing Numbers of Doctoral Students

Most countries included in this study have experienced an increase in the numbers of doctoral students over the last ten years or more. In Spain, the numbers of students enrolled in doctoral studies as well as the numbers of students awarded a doctoral degree doubled between 1990 and 2000. Numbers in Sweden increased by 35 percent during the 1990s and then stagnated between 1998 and 2000. A similar development is noted in Austria: a tenfold increase in the numbers of doctoral students between 1980 and 2000 and then a sharp decline reducing the numbers to the level of 1990, owing to new state regulations. Between 5 and 9 or 10 percent of all students having successfully completed their undergraduate studies go into doctoral training (the United Kingdom, 5 percent; Italy, 6 percent; Germany, 8.9 percent; the Netherlands, 9 percent). An exception in this respect is Spain, where 30 percent of all graduates go into doctoral studies.

In the majority of the countries under investigation, Medicine and the Sciences continue to have the highest numbers of doctoral candidates. However, the increases over the last decade have often been due to an increase in the proportion of women going into doctoral training – e.g., in Italy, 53.1 percent of the doctoral students during the 1999/2000 academic year, were women; in Spain, the percentage of doctoral students who are women is currently 51 percent; in France, in 1998, 40 percent of doctorates

were awarded to women. Also, increases in enrollment can be attributed to increases in the proportion of part-time doctoral students and to a higher number of persons returning to universities for doctoral studies after a period of employment.

If one looks at subject distribution, the picture is more varied. In some countries, the increases in the numbers of doctoral students have been in the Humanities and the Social Sciences as well as in what have been called "professional subjects", e.g., Management and Education, while in other countries, these fields have experienced a decline in favour of the Natural and the Medical Sciences.

Most countries also report an increase in the numbers of foreign doctoral students. France, for example, awarded 25 percent of its doctorates to foreign students in 1998. In Germany, in 2000, the proportion was 7.5 percent. The United Kingdom boasts a proportion of 44 percent international students in doctoral education, 13 percent of whom come from the European Union member states and 31 percent from other countries.

3.6 The Duration of Doctoral Programmes, Time-to-Degree and Dropout Rates

The majority of the countries included in this study have certain stipulations in terms of the duration of doctoral programmes. As a rule, duration is between two and four years. However, in recent years, many reforms and further regulations have been introduced because of concerns about the actual time-to-degree and high dropout rates. Still, in many countries, the average age at the award of the doctoral degree has been increasing, or, despite a variety of measures, has not been sufficiently reduced. The mean age at the time of the defence of the thesis varies according to subject, but certain country reports included in this study give an overall indication. In Germany, the mean age at thesis defence was 31.9 years in 1990. In 1995, it was 32.0 years, and in 2000 it was 32.7 years. In Norway and Sweden, the mean age at thesis defence was even higher (around 37.7 in Norway in 1995 and 37.9 in Sweden, in the same year) and has not been much reduced in recent years (37.4 years in Norway in 2000 and 37.2 years in Sweden in 2001). The reasons are basically insecure funding and the need to earn money, lack of supervision, additional research and teaching duties, and, last but not least, the insufficient structuring of doctoral programmes. As this latter problem is not characteristic of Sweden and Norway, one must assume that doctoral education generally starts at a later age in these countries than in other countries.

Those countries having two phases of doctoral training – be it two degree levels or course work followed by the writing of a thesis – tend to complain about the fact that the second phase is often not completed. "ABD" – "all but the dissertation" is the American expression characterising this situation. The Netherlands have introduced a type of honorary title (*Doctorandus*) denoting the fact that a person has completed part of a doctoral programme at one stage in his or her life. A few countries (e.g., Spain, Sweden and the Russian Federation) have an intermediary degree (Diploma of Advanced Studies, Licentiate and Candidate) indicating that a part of doctoral training has been completed. Those country reports that included some figures on this aspect mentioned between three and up to five or six years on average for writing the thesis after having completed the first part, i.e., either a degree or required coursework. Even in the United States, coursework takes two years on average, but completion of the degree takes between six and nine years with high dropout rates.

Countries having introduced relatively structured programmes for doctoral education, including an official part-time status, and having regulations and opportunities for obtaining funding, are usually more successful in reducing duration and preventing dropout. Typically, dropout rates are higher in the Humanities and in the Social Sciences than they are in the Natural Sciences and in Engineering. Most country reports have not included statistics on dropout rates, some of them indicating that no statistics are available. In France, for example, dropout rates vary on average between 12 percent in Science subjects and 51 percent in the Humanities and in the Social Sciences. The Netherlands have a dropout rate of about 8 percent, and the dropout rate in the Russian Federation is estimated at about 10 percent.

3.7 Supervision and Quality Control

Most country reports noted that the long duration required for the completion of a doctoral degree is assumed to be directly related to a lack of proper supervision and insufficient quality assurance mechanisms. Austria, in particular, pointed out that "overcrowding" in some undergraduate programmes (e.g., a staff-student-ratio of 1:355 at the Institute for Political Science of the University of Vienna) seriously threatens the quality of doctoral education owing to a lack of supervision. But even in those countries that have a more structured doctoral education in a framework of proper programmes or graduate schools, insufficient supervision has been a continuous concern. Only four country reports mention regular, i.e., at least annual, follow-ups of agreed study and supervision plans (the Netherlands, Sweden, Norway and the Russian Federation). However, only those countries

providing a contractual relationship between the institution and the doctoral candidate or a code of ethics, which includes the rights and obligations of both sides and have some kind of appeal mechanism (the United Kingdom, the Netherlands and Sweden), seem to be able to achieve better results in terms of time-to-degree and the reduction of dropout.

Quality assurance mechanisms for doctoral studies seem to be most pronounced and highly regulated in the United Kingdom. The establishment of these mechanisms was due to concern about poor completion rates. As of January 2001, the British Quality Assurance Agency for Higher Education (QAA) established a framework for all degrees, including the doctorate, which defines the required skills and competencies which must be demonstrated in order to be awarded the respective degree. It has also put a new emphasis on minimum standards, facilities and support structures that must be in place before an institution is granted the right to award a doctoral degree.

In Sweden, postgraduate education is evaluated every six years by the National Agency for Higher Education. In the Netherlands, the research schools are subject to quality assessment as well. However, there is an additional financial incentive as universities are allocated extra funding for each doctorate that is awarded. In Spain, doctoral programmes are evaluated annually by a University Commission. In addition, external evaluation of doctoral programmes is required to obtain state funding. In France, postgraduate or doctoral schools are only recognized for four years, which is the length of the contract between the individual institution and the State. After four years, an evaluation takes place and – depending on the outcome – the contract can be renewed or not. Italy has only recently introduced certain quality mechanisms for doctoral education, and Germany and Austria are still rather dependent on the traditional model of individual acceptance of a doctoral candidate and his or her topic by a professor who agrees to supervise the research and thesis.

The Central and East European countries included in this study (Poland, Romania and the Russian Federation) tend to rely on state regulations and governmental bodies. In Romania and the Russian Federation, in particular, over-regulation seems to be the rule, including extensive accreditation and validation measures as well as process control. In Romania, all doctoral degrees have to be validated by a National Council. In the Russian Federation, all procedures of accreditation, licensing and certification are carried out by Federal bodies.

Despite the fact that all countries have either *ex ante* or *ex post* quality assurance mechanisms in place, there is great variation and no optimal model can be identified as yet.

3.8 Mobility and International Exchange

Only a minority of the country reports provides information about issues of mobility and the international exchange of doctoral students. In fact, several studies have pointed to low mobility rates. Central and Eastern European countries continue to suffer from brain drain, even though they often want to give their students opportunities to study or do research abroad. The Netherlands and the United Kingdom report that there is scouting for talent and guarding it, often trying to provide a variety of incentives for doctoral students, from within as well as from outside their countries, to complete a whole programme at one university. This effort is related to funding and income generation on the part of the institutions as well as competition for best talent. The American case study notes that almost half of all American doctorates in Engineering, Mathematics and Computer Sciences are awarded to international students, many of whom intend to remain in the United States. The Netherlands, as well, report that in some technical sciences up to 50 percent of doctoral students come from abroad, in particular from Asia and Eastern Europe. In the United Kingdom, the proportion of British doctoral students has fallen from 64 percent, in 1994–1995, to 56 percent, in 2001–2002. Accordingly, the proportion of doctoral students from other European Union countries ranges between 8 and 13 percent, depending on the field of study, and the proportion of other international students in doctoral programmes ranges from 28 to 31 percent. The proportion of foreign doctoral students in Spain is also quite considerable, with 16 percent in 2000. The percentage of doctoral degrees awarded to foreigners in Germany was about 7.5 percent in 2000. In addition, 26 (9 percent) of the 286 graduate colleges funded for doctoral students by the German Research Foundation in 2001 were international ones.

All countries have mechanisms in place to receive doctoral students from abroad and to recognize their previous qualifications. In most countries, with the exception of Spain, the thesis may be submitted in a language other than the host country language (basically French, English or German). However, Spain has joint doctoral programmes with institutions abroad that include periods of study and research abroad and the award of a double degree or a joint degree.

In general, exchanges of doctoral students for a limited period of study or training abroad tend to be more problematic in Engineering and in the Natural Sciences, as doctoral students in these fields are more often integrated into groups of researchers engaged in applied research or working on a topic with a competitive aspect. As European patenting

and intellectual property rights are not, as yet, wholly regulated, certain research groups feel that they might lose their competitive edge if they send their doctoral students abroad.

3.9 Award of Titles and Degrees

The main task in earning a doctoral degree is writing the thesis or dissertation and defending it publicly before a commission. The procedure is the same in all the countries under review. Other aspects of the process of earning a doctoral degree vary to a considerable extent. A number of countries require successfully completed course work as part of earning the degree. Some countries require additional written or oral examinations. Finally, many rules and regulations can be found that deal with the composition of the commission as well as the process of the thesis defence. As a rule, the doctoral degree continues to be considered as a degree qualifying its holder to undertake independent research. Accordingly, the thesis must consist of a piece of original research on a chosen and approved topic in a particular field or discipline. However, the traditional perception of the doctoral thesis as a "masterpiece" is changing in some countries to a perception of writing an "apprenticeship piece", thus embodying the idea that the completion of a phase of research training should not be considered equal to the work of a researcher with many years of experience.

The Russian Federation probably has the most complex set of regulations concerning the doctoral thesis. It consists, altogether, of four steps. The first is a preliminary defence of the thesis in the responsible department. The department evaluates and recommends the work for the final defence. The candidate then submits his or her dissertation to the University Dissertation Council. The Dissertation Council again undertakes a preliminary evaluation and assigns a so-called "leading organization", i.e., a second university, to referee the thesis as well as two opponents for the defence. The final defence of the thesis is carried out before a public audience and consists of a debate between the candidate and the members of the Dissertation Council and the opponents. This event is followed by a secret ballot on the success or the failure of the candidate. In case of success, the dissertation and all supporting documents are submitted to the Higher Certification Commission of the Ministry. This Commission will evaluate all documents, and after final consideration, award the degree. It is unusual that the outcome of a defence is achieved by a secret ballot rather than by open acknowledgement that a candidate has or has not demonstrated sufficient research capabilities.

Many countries (Poland, Romania, Spain and Sweden) include external examiners in the process of conducting a thesis defence. These can be from another university within the same country but also from foreign universities. In all countries included in this study, there is a trend to include more examiners or referees from abroad, or alternatively, to co-operate with overseas universities in doctoral programmes, including the award of a joint degree. This indicates a move towards increased international co-operation and validation of doctoral degrees.

With the exception of Germany, Austria and the United States, most other countries included in this study have implemented regulations to make certain that the examinations and the defence of the thesis are refereed by panels or examination boards that have no direct or personal relationship with the respective doctoral candidate. Typically, the supervisor of the thesis evaluates the work before it is officially submitted, but after that stage, the supervisor has little or no influence on the process and the decision to award the degree.

Despite attempts to de-personalize the process of earning a doctoral degree by setting up doctoral programmes and graduate schools, Germany and Austria still follow the tradition that a doctoral student chooses his or her supervisor, who has often been the main examiner for the candidate's first degree. This supervisor also acts as the main referee of the doctoral thesis, selects a second referee, and is the main examiner in the oral defence of the thesis. This configuration can become very personal and be shaped by dependency of the candidate on the supervisor. However, it is also possible for the doctoral candidate to change his or her supervisor.

3.10 Professional Doctorates as a New Trend

Several countries included in this study (the United States, the Netherlands, the United Kingdom and Austria) have begun to introduce what is being called a "professional doctorate", which is distinct from the traditional research-oriented doctorate. Professional doctorates (e.g., in Management Studies, Education, Applied Sciences, Public Services) tend to be somewhat less demanding as regards the requirement to produce an "original piece of research". They are often related to projects carried out within an enterprise and jointly supervised by the home university and the respective enterprise, and the course work emphasizes more generic skills and interdisciplinary approaches. The inception of such professional doctorates is closely linked to a growing concern about the employability of doctoral degree holders in the labour market outside academe.

A number of countries, for example Poland, Italy and Spain, reported that the employment of doctoral degree holders outside research institutes and academe is still atypical. Employers in most countries continue to fear that doctoral degree holders are too narrowly specialized and lack generic and transferable skills. The new development of professional doctorates is intended to remedy this situation by paying more attention to the issue of the employability of doctoral students outside academe. In some fields of study and scholarship (e.g., Medicine and Chemistry), this approach is not new and has been in effect for quite some time, but there are new aspects to this issue. In the Netherlands, the United Kingdom and also in the United States, the emerging knowledge economy more and more frequently requires a workforce having research skills. In the United Kingdom, this development is debated in terms of constructing a "professional doctorate" (e.g., in fields such as Economics and Business Studies or in Education). The United States offers professional doctorates, which are somewhat less demanding than research doctorates as regards the dissertation.

First ideas in the development of professional doctorates include the definition of standards, quality and skills, and entail more regulation in terms of necessary support structures and supervision. In the Netherlands, growing attention is being paid to the employability of doctoral degree holders outside academe as well. The first pilot projects are on their way to achieving stronger co-operation with industry and business (e.g., through project work in industry or joint supervision of research) and to establishing research schools in applied sciences (e.g., in Chemistry, Physics, Biology and Public Services). It is as yet unclear whether or not this development will eventually lead to a training status or to an employment status for the doctoral students concerned. Overall, the numbers of programmes for professional doctorates are growing.

3.11 Transition to an Academic Career

Basically, most doctoral degrees continue to be considered as research degrees preparing for a career in universities or research institutes. Poland, Italy and Spain stated that this characteristic still very much predominates in their respective countries, and that employers outside academe are not very interested in hiring doctoral degree holders. But there are exceptions to this rule. In Germany and Austria, there have always been possibilities for doctoral degree holders to find appropriate employment outside academe without there being a pronounced distinction between research doctorates and professional doctorates.

The example of Chemistry in Germany might illustrate this situation. A doctorate in Chemistry is almost always required to find employment in this field. A similar case is Medicine. Most medical students earn a doctorate because it belongs to the prestige and social status of this professional group. In Germany and Austria, quite a few teachers at upper secondary schools which prepare students for access into higher education also have doctoral degrees.

A contrasting example is Italy, where the number of doctoral students is limited in relation to the available positions within universities and research institutes. However, in most other countries included in this study, the number of doctoral students has increased over the last ten to fifteen years, and in some countries, efforts to raise their numbers still continue. In several countries, the number of staff positions in research and academe has not increased to such an extent that all doctoral degree holders will immediately find employment. Therefore, post-doctoral fellowships provide a possibility, to those awarded doctoral degrees, to extend their periods of transition to an academic career. As the transition period has become markedly more difficult and/or prolonged in several of the countries under review, the post-doctoral period has become an issue of concern and scrutiny. The "overproduction" of holders of doctoral degrees has basically led to various types of post-doctoral fellowships, which can be characterized as "holding positions" until proper employment is found. But this possibility also prolongs the time until the beginning of a career and introduces an additional layer of uncertainty. Seen from a perspective of return on investment and productivity, this situation is not very viable economically.

4 Concerns, Problems, Reforms

In trying to summarize a large variety of problems and concerns currently voiced in connection with doctoral studies, there are two main issues that are noted in the majority of the country reports. The first issue can be summarized under the heading of "time-to-degree". It is composed of questions like quality and structure of programme, supervision, funding and additional duties. The second issue can be summarized under the heading of "transition to employment". It includes aspects of acquisition of generic skills, utilization of qualifications on the labour market, career prospects inside and outside academe, and research *versus* the professional orientation of doctoral studies.

The country reports discuss a number of concerns related to these two issues and show that each country varies slightly in terms of where the emphasis is placed. For each of the two main issues indicated above, a few examples will be given.

4.1 Concern over "Time-to-Degree"

No country report fails to express some concern over the duration of study and research leading to the successful completion of a doctorate. Many reports noted that the duration of doctoral studies has been increasing over the last decade or more and consequently the average age upon completion of the degree. The report about doctoral education in the United States cites six to nine years, on average, until completion and high dropout rates. In other countries, the duration is often four to six years. In Germany, the duration of doctoral studies varies, and students are between 31.8 years old in Mathematics and Sciences and 36.5 years old in the Arts, upon completion and award of the doctoral degree. In France, more than half of the doctoral students in the Humanities drop out. The reasons associated with this group of problems are numerous and need, eventually, to be addressed individually. Here, they are enumerated as follows:

- insufficient supervision, lack of time on the part of supervisors, no regulations and standards in place for proper supervision;
- insecure funding of doctoral students so that they have to engage in outside employment; sometimes, no official part-time status in place; doctoral students on contract with the respective university department are often overburdened with teaching or research assistance, not all of which is related to their own research; the use by universities of doctoral students as a cheap resource;
- lack of quality and structure of doctoral programmes; in the absence of graduate schools, often personal and rather informal relationships with the supervisor and hardly any attachment to the university; separation of course work and thesis research, with the latter being independent and insufficiently structured or supervised work; in many countries, no proper and clear regulations or standards in place concerning the definition of what constitutes a successful and acceptable thesis ("original research", research-based problem solving); often no regular follow-up on the progress of the doctoral students.

These problems are not new. Rather, they have come into the forefront in recent years. In many countries, the solution to the problem was deemed to be the establishment of

graduate colleges or schools or at least proper programmes for doctoral studies, so as to provide better supervision and more structure. Often scholarships or stipends are provided. However, owing to funding constraints, scholarships and stipends have been reduced, and more and more frequently fees are being introduced for doctoral students. Regardless of whether or not a country has defined an official status as part-time doctoral student, one must assume that a growing proportion of doctoral candidates today are actually studying or undergoing training part-time, while working part-time or even full-time.

But, it is necessary to focus the problem on one of the core aspects that will have to be discussed at European level: that of funding linked to status. Are doctoral candidates fee-paying students who provide an important part of the income of an institution but can also demand a certain amount of services and support for their money, or are doctoral students junior research and teaching staff who are fundamentally involved in the research output and teaching provision of their institutions and should therefore be paid for their contributions?

4.2 The problem of Transition to Regular Employment

The second issue that has come up in a number of country reports is the question of the kind of career and work for which doctoral candidates should be trained. Here, there is a geographical split. The Central and East European countries as well as the South European countries are experiencing a continuous lack of interest on the part of employers outside academe in hiring doctoral degree holders. If in these countries – as is the case, for example, in Italy, Poland and Romania – the academic labour market is either closed or unattractive as a means of transition to work for doctoral degree holders, the latter face a serious problem. But also in Germany and Austria, doctoral degree holders in some subjects (mostly the Humanities and the Social Sciences) experience difficulties leading to the proverbial taxicab driver with a doctoral degree. From a certain perspective, this situation would be considered a waste of resources and of one's life, because income and rates of return are what counts. Other views, based on longitudinal studies of graduate careers, have come to the conclusion that high qualifications are never a waste and eventually lead to jobs in which these qualifications can be utilized, even if transition periods tend to become longer. Only Sweden reports a continuously favourable labour market for doctoral degree holders.

But, returning to the country reports, many of them have pointed out a growing disjunction between the traditional purpose and the actual use of the doctorate. This situation tends to be linked to a growing concern about the high level of specialization and the limited number of skills of doctoral degree holders. Doctoral studies are considered to be too narrow or even increasingly irrelevant for a rapidly changing job market. With limited and/or unattractive employment opportunities in academe in some countries, doctoral students are forced to seek employment outside higher education institutions without having appropriate training. In addition, an uncertain future also affects the quality of candidates who are taking up doctoral studies. Two solutions to this problem have been mentioned: the concentration of doctoral training in centres of excellence and/or the introduction of professional doctorates oriented to careers outside academe. Even in countries in which the distinction between a research and a professional doctorate is not made, there is a growing attention to the employability of doctoral degree holders for jobs outside academe. As a consequence, there is a gradual, but visible trend toward increased codification and regulation of standards and requirements as well as the duties and obligations of doctoral candidates, on the one hand, and of higher education institutions training doctoral candidates, on the other. Developments in this direction seem to be most advanced in the United Kingdom, but the Netherlands are following, and other countries are debating higher degrees of regulation including a growing scrutiny of the post-doctoral phase.

5 Conclusions: Doctoral Education within the European Higher Education and Research Area

Comparing the five basic challenges listed in the document of the European Commission about the role of universities in a Europe of Knowledge with the issues and concerns that have been reported in the case studies in this volume, four aspects of reform and change begin to emerge.

- (1) Almost all countries under consideration in this study report an increasing duration of *time-to-degree*. Even those countries that have a more structured doctoral training system are included. First debates are beginning about the possible inclusion of doctoral training into the process of establishing a common architecture of degrees in Europe. Although no country as yet has reported a degree structure, including doctoral degrees, that is compatible with the Bologna model, reforms of doctoral education aim at shortening this period of research and study to three years, following the Master's degree or even following the Bachelor's degree. In particular,

the United Kingdom reports for Engineering and the Sciences a model of 3 + 3, while for the Humanities and Social Sciences, it is typically 3 + 1 + 3.

- (2) The second aspect is related to the *quality* of doctoral studies, which not only includes proper supervision and structured programmes, but also the issue of training for employment outside academe, i.e., emphasis on applied research and models of professional doctorates. Inherent in this rather complex issue are also debates about ways to deal with heterogeneity including atypical groups of doctoral candidates as well as co-operation with industry and enterprises in the supervision and setting of research problems for doctoral theses. The quality of doctoral education tends to be increasingly measured along the lines of skills acquisition that also qualifies for careers outside academe.
- (3) A third aspect is that of the *status* of doctoral candidates. All countries have faced an increasing demand for doctoral studies, while at the same time having to deal with declining resources. Some countries have chosen to introduce or to increase tuition fees for doctoral students. Other countries have acknowledged their contribution to ongoing research and teaching and offer doctoral students regular, although temporary, employment as junior academic staff members.
- (4) The fourth and final aspect is *mobility* and international co-operation in doctoral training, also including issues of recognition of previous qualifications and qualifications acquired during periods of doctoral training abroad. Most countries have recognition procedures in place for doctoral candidates coming from abroad. But these procedures are sometimes very complicated and highly bureaucratic (e.g., the Austrian *Nostrifikation* procedure or the role of the Russian Department of Credential Evaluation). What interferes most seriously with the issue of mobility and co-operation are trends in certain countries (mainly the United Kingdom and the Netherlands) to scout for best talent internationally and to structure doctoral education in such a way that there are powerful incentives for doctoral students not to be mobile at all but rather to remain in one programme. Doctoral students from abroad are welcome in these countries but basically as fee paying students and as strategic resources, not to be shared with others, in order to gain a competitive advantage. So brain gain in some countries is brain drain in others. As a counter movement, one observes that, within the framework of creating a European Area of Higher Education and Research, increased international co-operation among institutions and programmes is taking place. It remains to be seen whether or not joint or

double degrees in Bachelor's and Master's degree programmes will eventually lead to joint awards of doctoral degrees as well.

Another aspect of the problem, for which it is still too early to arrive at a final conclusion, should be mentioned here. The Russian Federation and the United States are two countries, included in the analysis, which are not members of the European Union. They can, however, serve as examples for forming certain hypotheses about how the Bologna Process and the activities to create a European Higher Education and Research Area might relate to or even impact on other UNESCO Member States.

A first hypothesis might be that other UNESCO countries, which are not part of the European Higher Education and Research Area, will take up the challenge and start to compete more fiercely, trying to scout for best talent as well and making attractive offers for doctoral students from abroad.

A second hypothesis might be that a larger degree of harmonization and co-operation in doctoral education will be triggered by this process, which will eventually include countries that are not part of the European Higher Education and Research Area.

Finally, a third hypothesis might be one of seclusion and a new nationalism, i.e., building up a distinctive national system of doctoral studies and separating from European developments in order to emphasize a different national and cultural identity.

Certainly, the decision taken with the Bologna Declaration to introduce a common architecture of degrees and to give up traditional national degrees will not only change the European higher education landscape but also the relationships between higher education and the world of work. The ambitious goal formulated by the Council of Europe at its Lisbon meeting in 2000, namely, to make Europe the most dynamic and competitive knowledge-based economy in the world, will complement and reinforce the Bologna Process. Eventually, all parts and stages of education and training will be drawn into these developments. Despite the fact that education and training will continue to be a national affair and responsibility, and despite the fact that cultural diversity will continue to be upheld, it will be necessary to pull together all available resources and all available talent to realize the ambitious goals. Doctoral education has been put on the agenda and is currently scrutinized in terms of what it can contribute to these developments.

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