

DOCTORAL PROGRAMMES IN EUROPE'S UNIVERSITIES: ACHIEVEMENTS AND CHALLENGES

REPORT PREPARED FOR EUROPEAN UNIVERSITIES AND
MINISTERS OF HIGHER EDUCATION

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□ FOREWORD AND ACKNOWLEDGEMENTS

Doctoral education is a major priority for European universities and for EUA. In the context of the Bologna Process the importance of doctoral education as the third cycle of higher education and the first stage of a young researcher's career, and thus in linking the European Higher Education and Research Areas, was first highlighted in the 2003 Berlin Communiqué. EUA's first project "Doctoral Programmes for the European Knowledge Society" (2003 – 2005) then opened a dialogue between universities and policy makers on the reform of doctoral programmes and enabled the adoption, in a Bologna Seminar held in Salzburg in February 2005, of "ten basic principles" for the future development of doctoral programmes.

The subsequent Bergen Communiqué (May 2005) further stressed the importance of enhancing synergies between higher education and research, and gave a mandate to EUA to prepare a report on the further development of the basic principles for doctoral programmes for the 2007 London Conference of Higher Education Ministers.

This report presents the main findings of the project. It summarises the results of several workshops and a Bologna Seminar held in Nice in December 2006 that brought together more than 400 academics from across Europe. It also includes the results of a survey on the funding of doctoral education using data received from national Ministries through the Bologna Follow-Up Group.

EUA would like to thank all the members of the project Steering Committee which included EUA, ESIB, EURODOC, and representatives of the Ministries of Education of Austria and France. We are grateful to the Ministries of both countries for providing funding for the core activities of the project.

We also extend particular thanks to Yukiko Fukasaku of Innovmond, France, who collated all the replies from the 37 responding countries and distilled them into the financing report included as Annex 3 to the Report.



Professor Georg Winckler
EUA President

1. INTRODUCTION

1.1 The importance of doctoral programmes for European higher education and research

Promoting “closer links between the European Higher Education and Research Areas as a means of strengthening Europe’s research capacity, and improving the quality and attractiveness of European higher education” has been a major priority for the European University Association (EUA) since 2003¹. These objectives have been translated into action through a focus on doctoral programmes and researcher careers that led to the adoption of the Salzburg principles in February 2005 (Annex 1) that have become the framework for the intense discussion on the development and future direction of doctoral programmes that has been gathering momentum over the last two years.

Growing awareness of the importance for Europe of increasing its research potential and the increasing spotlight on the role of universities as the providers of doctoral programmes and responsible for providing the unique environment in which young researchers are trained by and through research, has served to highlight still further the crucial role of doctoral programmes for Europe.

1.2 The Bergen Communiqué

Specifically in relation the Bologna Process, the Ministers meeting in Bergen in May 2005 recognised that in order to *improve the synergies between the higher education sector and other research sectors and between the EHEA and the European Research Area* “doctoral level qualifications need to be fully aligned with the EHEA overarching framework for qualifications using the outcomes-based approach. The core component of doctoral training is the advancement of knowledge through original research. Considering the need for structured doctoral programmes and the need for transparent supervision and assessment, we note that the normal workload of the third cycle in most countries would correspond to 3-4 years full time. We urge universities to ensure that their doctoral programmes promote interdisciplinary training and the development of transferable skills, thus meeting the needs of the wider employment market. *We need to achieve an overall increase in the numbers of doctoral candidates taking up research careers within the EHEA. We consider participants in third cycle programmes both as students and as early stage researchers.*”

1.3 EUA mandate

The Ministers furthermore gave a mandate to the European University Association, together with other interested partners, “to prepare a report under the responsibility of the Follow-Up Group on the further development of the basic principles for doctoral programmes, to be presented to Ministers in 2007.”

¹ EUA Graz Declaration, June 2003.

2. METHODOLOGY

2.1 Terms of Reference

Terms of Reference for the project were submitted to and endorsed by the October 2005 meeting of the Bologna Follow-Up Group.

2.2 Steering Committee

A project Steering Committee was formed including EUA, ESIB, EURODOC, and representatives of the Ministries of Education of Austria and France. EUA is grateful to the Ministries of both countries for providing funding for the core activities of the project. The Steering Committee met twice (November 2005 and August 2006) to discuss activities, methodology and time schedule of the project, and came together with other representatives of the BFUG in June 2006 for a specific discussion of issues related to the financing of doctoral programmes.

2.3 Workplan and activities

The project focused predominantly on following three clusters of issues, taking account of the Salzburg Principles and the Bergen Communiqué, and building on the outcomes of the EUA Doctoral Programmes Project²:

- *The quality of doctoral programmes*: with an emphasis on the nature of training by research, questions of supervision, monitoring and assessment, and on transferable skills development and its relation to employability;
- *The role of higher education institutions*: in particular in creating critical mass through developing new structures such as research/graduate/doctoral schools or structured programmes; linking the Master and PhD level, and promoting internationalization and mobility;
- *Defining public responsibility and the role of the state*: in particular in relation to the funding of doctoral education and other aspects of legal and regulatory frameworks.

An overview of the different events and other activities that were organized in relation to these themes is included in Annex 2.

² Doctoral Programmes for the European Knowledge Society, EUA Report, 2005.

3. DOCTORAL PROGRAMMES IN THE BOLOGNA PROCESS

Doctoral programmes are the third cycle of the Bologna process and at the same time constitute the first phase of a young researcher's career.

The core component of the third cycle is the advancement of knowledge through original research. This makes the third cycle unique and different from the first and second cycles. For this reason the doctoral training phase constitutes the main link between the EHEA and the ERA. High quality doctoral programmes are crucial in achieving Europe's research goals.

The specific character of the third cycle needs to be taken into consideration in the Bologna context. However, this does not mean that doctoral programmes should be seen in isolation, but rather as part of a continuum, closely linked to and following on from the first and second cycles, and in the context of the implementation of the three Bologna cycles as a whole. It is important for all institutions offering research based higher education to ensure that a research component is included and developed in all cycles thus allowing students to acquire research experience and encouraging an interest in research as a possible career. Particular attention should be paid to the articulation between the second and third cycles. This applies also in relation to the acquisition of transferable skills.

The articulation between the three cycles is underlined by the inclusion of descriptors for doctoral programmes as level 8 of the Framework for Qualifications of the European Higher Education Area, as agreed by Ministers in Bergen in 2005. These descriptors – the so-called "Dublin Descriptors" – are increasingly being used at national and institutional level. It is important for national governments when they are developing National Qualifications Frameworks, and higher education institutions when they are considering entrance requirements and the definition of learning outcomes for doctoral programmes to take account of and make use of these descriptors.

4. THE ROLE OF UNIVERSITIES

Universities have the main responsibility for the development of high quality doctoral programmes. Providing training in and through research is one of their core tasks, both to prepare young researchers for careers in academia but also increasingly to be able to play a significant role in other areas of society, be it in the public sector or other research agencies, in industry, commerce or the service sector. This requires autonomous institutions able to act responsibly, and develop and implement institutional strategies for doctoral programmes in a number of different areas.

4.1. Embedding in institutional strategies and policies - organisational structures

One of the key questions being debated in institutions across Europe, and much discussed during the present project relates to the choice of structures within the institution best suited to providing high quality programmes. Organisational structures chosen must demonstrate added value for the institution and for doctoral candidates, in particular in seeking to counteract the isolation of the early stage researcher from other disciplines, or from the larger peer group, or the larger scientific community; to improve transparency, quality, and admission and assessment procedures; create synergies regarding transferable skills development.

Different solutions may be appropriate to different contexts and the choice of structure is a matter for each institution, based upon the specific institutional aims which these structures are supposed to meet.

■ Recent developments and an analysis of practice across Europe points to the emergence of **doctoral/graduate/or research schools**. The EUA TRENDS V Report (2007)³ reports that 30% of European higher education institutions surveyed say they have now established some kind of doctoral, graduate or research school. This question was also asked in the survey of Bologna Process member countries carried out specifically for this project⁴. Out of the 37 countries that responded, 16 countries reported that their institutions have introduced doctoral, graduate or research schools, alongside existing models such as traditional individual training or 'stand alone' structured doctoral programmes (Table 1).

The responses thus show an increasing trend towards the development of structured programmes and doctoral/graduate/or research schools in addition to individual training. However, a mix of different organisational types seems to be common practice in most countries. This reflects the need to achieve a critical mass of doctoral candidates in many cases, but also the existence of disciplinary differences that need to be taken into consideration in the organisation of doctoral training.

Table 1 - Organisation of doctoral education

Organisation of doctoral education	Number of countries	Countries
Individual education only (1)	5	Bosnia-Herzegovina, Cyprus, Georgia, Malta, Montenegro
Structured programmes only (2)	4	Croatia, Estonia, Lithuania, Spain
Doctoral/graduate research schools only (3)	3	France, Liechtenstein, Turkey
Mixed (1) and (2)	12	Andorra, Austria, Belgium-Flanders, Czech Republic, Greece, Iceland, Ireland, Latvia, Poland, Romania, Russia, Slovak Republic
Mixed (2) and (3)	2	Italy, Norway
Mixed (1) and (3)	2	Belgium-Wallonia, Netherlands
Mixed (1), (2) and (3)	9	Albania, Armenia, Germany, Denmark, Finland, Sweden, Switzerland, UK and Scotland

³ TRENDS V: Universities shaping the European Higher Education Area by David Crosier, Lewis Purser & Hanne Smidt, 2007.

⁴ Results of questionnaire sent to BFUG members in September 2006. In the case of the United Kingdom (UK) a separate survey response was also received from Scotland. In the case of Belgium two separate responses were received: one from Belgium-Flanders and the other from Belgium-Wallonia.

A doctoral, or graduate, or research school is an independent organisational unit with effective administration, strong leadership and specific funding supporting this structure.

An analysis of trends across Europe shows two main organisational models emerging as vehicles for promoting high quality, internationally oriented and networked doctoral/research/graduate schools:

- **Graduate school** – an organisational structure that includes doctoral candidates and often also Master students. It provides administrative, development and transferable skills development support, organises admission, courses and seminars, and takes responsibility for quality assurance;
- **Doctoral/Research school** – an organisational structure that includes only doctoral students. It may be organised around a particular discipline, research theme or a cross-disciplinary research area and/or it is focused on creating a research group/network and is project-driven. It may involve one institution or several institutions and organise co-operation among them.

These models are not mutually exclusive and often have shared characteristics. Countries or institutions may adopt both models within their systems and/or structures.

The advantages and added value of doctoral/graduate/research schools may be summarised as follows:

- Define a mission or vision shared by all partners that facilitates the process of turning doctoral candidates into excellent researchers;
- Provide a stimulating research environment and promote cooperation across disciplines;
- Provide a clear administrative structure for doctoral programmes, candidates and supervisors, and offering a clear profile and status for doctoral candidates;
- Ensure critical mass and help to overcome the isolation of young researchers;
- Bring junior and senior researchers together;
- Support and facilitate the task of supervising candidates and the role of supervisors;
- Organise admission with transparent rules and regulations;
- Provide teaching and transferable skills training;
- Provide enhanced career development opportunities, including advice on funding opportunities (scholarships, projects);
- Guarantee quality assurance and monitoring;
- Provide a framework allowing the development of codes of practice, procedures and mechanisms within the university structure and act as an independent arbitrator or ombudsman where necessary;
- Enhance opportunities for mobility, international collaboration and inter-institutional cooperation.

4.2. Access and admissions

In a fast-changing environment, it is essential to maintain flexibility in admissions to doctoral programmes, and full institutional autonomy: diversity of institutional missions and context, and the growing importance of lifelong learning mean that there are good reasons for different access requirements in different institutions and for different programmes provided fairness, transparency and objectivity is ensured.

The Bologna commitment that the second cycle gives access (= right to be considered for admission) to the third cycle should be maintained, but access to the third cycle should not be restricted to this route.

Higher Education Institutions need to pay greater attention to the social dimension of the third cycle. Equality of access to the third cycle is a major concern, whether inequality derives from gender, ethnicity, social or other disadvantage.

4.3 Supervision and assessment

The crucial question of supervision, monitoring and assessment of doctoral researchers has been a major topic of discussion for universities in the course of this project. Already a major issue in 2005, and included in the Salzburg Principles, it is important that discussion continues, and that universities encouraged and supported in the development and dissemination of good practices in the management of research degrees. Not only recent debates but also the publication of several national evaluation reports shows that there is a great need to develop new supervision practices in doctoral training.

Arrangements need to be developed based upon a transparent contractual framework of shared responsibilities between doctoral candidates, supervisors and the institution, and, where appropriate other partners as mentioned in the Salzburg Principles. Attention should be paid in particular to ensuring: multiple supervision arrangements, the continuous professional skills development of academic staff, and performance reviews of supervisors. Multiple supervision arrangements should be encouraged also at international level through tutoring and co-tutoring by supervisors from academic and research institutions in different European countries.

The importance of ensuring good supervision needs to be properly recognised as a task of staff supervising doctoral candidates, should be included in their workload and task descriptions, and thus also taken into consideration in academic career structures and decisions on promotion. Some universities report that it is useful to develop workload models to ensure that a supervisor dedicates enough time in support of each doctoral candidate.

As doctoral programmes change in response to changes in the labour market, thus also the role of the supervisor. This has led to a growing awareness of the importance of ensuring professional skills development for supervisors. This discussion is, however, in its early stages and has not yet begun in many European countries. The UK successfully introduced professional skills development of supervisors in 2004 on the basis of a Code of Practice developed specifically for research programmes by the UK Quality Assurance Agency⁵. Such training is usually organised in an informal way, as one-day-out meetings, based on case studies, discussions, sharing of good practices and experience. Innovative ways of motivating supervisors to introduce effective and high quality practices of supervision also include practices such as annual awards/incentives for the best supervisors.

The final stage of the doctorate, i.e. the assessment of the thesis, is crucial, and assessment procedures should be based on objective and transparent criteria. Due recognition should be given to the original research contribution made by the doctoral candidate. Assessment should be done by an expert university

⁵ The Quality Assurance Agency for Higher Education, Code of practice for the assurance of academic quality and standards in higher education, Section 1: Postgraduate research programmes, UK, 2004.

committee with external representation, preferably chosen at international level. The impact of the supervisor on the outcome of the process should be limited. This does not preclude participation of the supervisor in the examining body, especially when this is a large body, or when the thesis defence is public. Models of organisation of the assessment of the thesis and the composition of the committee differ significantly from country to country and further discussion at European level is needed.

4.4 Transferable skills development

Transferable skills development should be an integral part of first, second and third cycle programmes. The main goal at the level of the third cycle should be to raise awareness among doctoral candidates of the importance of both recognising and enhancing the skills that they develop and acquire through research, as a means of improving their employment prospects both in academia and on the wider labour market.

Courses should be offered in the context of whatever overarching institutional support structures are in place at doctoral level. Training can be organised in different ways ranging from traditional courses and lectures to more student-centered methods, especially through learning by doing at institutional, inter-institutional and international summer schools or through specialised institutional or inter-institutional support and personal development centres, as offered in the UK by the UK GRAD programmes and the UK Council on Graduate Education. An important element of transferable skills development is bringing together doctoral candidates from different disciplines and different levels (1-3 year) to encourage interdisciplinary dialogue and foster creative thinking and innovation.

Ensuring that adequate funding is devoted to transferable skills development is crucial. It is likewise important to ensure that reference to transferable skills development is embedded in institutional quality assessment procedures. Academic staff involved in skills development should include both academics that are active in research and understand the need to teach other skills, and external consultants (e.g. industry, companies). Teaching transferable skills should be recognised in evaluation and promotion of academic staff involved.

4.5 Duration

Full time doctoral programmes are usually of 3 – 4 years' duration. Part time studies take longer. In most countries time to degree (TTD) tends to be longer than the average duration of funding for doctoral candidates and programmes. This is an important issue in relation to the funding of doctoral programmes. It will become increasingly important for universities to monitor carefully the development of time to degree for doctoral candidates. Experience in North America suggests that this can be done most successfully within the graduate or research school structure.

4.6 Researcher careers

Universities, together with public authorities in Europe, share a collective responsibility for promoting attractive research careers and career perspectives for doctoral and post-doctoral researchers. This should be done in collaboration with partners outside academia in order to facilitate the development of clear career paths inside and outside academia, and between academia and other sectors of employment. It is also the responsibility of universities to create attractive conditions for research, taking account of the European Researchers' Charter & the Code of Conduct for the Recruitment of Researchers.

4.7 Including doctoral programmes in institutional strategies for enhancing internationalisation

Doctoral programmes are a key component of the discussion on European higher education in a global context, while at institutional level, attracting the best doctoral candidates from all over the world, encouraging mobility within doctoral programmes and supporting European and international joint doctoral programmes and co-tutelle arrangements, are central to the development of any international strategy. Universities are encouraged to enhance their efforts to support mobility at doctoral level within the framework of inter-institutional collaboration as an element of their broader international strategy. International mobility, including transsectoral and transdisciplinary mobility should be recognised as having an added value for the career development of early stage researchers.

For some institutions and indeed, some smaller countries, mobility may also be a means of training their own young researchers in disciplines and transdisciplinary research areas where a critical mass of doctoral candidates, or capacities or infrastructure does not exist or is not available at home.

Higher education institutions, and public authorities at national and European level, should offer funding instruments facilitating the mobility of doctoral candidates from all 45 Bologna countries, and with the objective of increasing mobility. Legal, administrative and social obstacles, for example concerning visas, work permits and social security issues should be addressed by all partners in the process.

Finally increasing internationalisation inside universities, especially at doctoral level is also important, and should not be forgotten. Doctoral training is per se international in nature and sufficient opportunities should be provided for doctoral candidates to engage internationally. This can be done, for example, through the recruitment of more international staff; the organisation of international workshops, conferences and summer schools; the development of more European and international joint doctoral programmes and co-tutelle arrangements. The use of new technologies, such as using teleconferences, e-learning etc. should also be used to foster the internationalisation of doctoral programmes.

5. NEW DEVELOPMENTS IN DOCTORAL PROGRAMMES

A range of innovative doctorate programmes are emerging to respond to the changing demands of a fast-evolving labour market. Employability of doctoral candidates within and outside academic institutions, as well as individual and societal needs for lifelong education and training, have acted as a catalyst to the development of new programmes, including professional doctorates, more university - industrial collaboration based doctorates and increased European and international cooperation, often leading to joint or European doctorates. Diversity of doctoral programmes and doctorates reflects the increasingly diversity of the European Higher Education landscape in which higher education institutions have the autonomy to develop their own missions and profiles and thus their own priorities in terms of programmes and research priorities.

Nevertheless, all the discussion on different new developments has led to the consensus that there should be no doctorate without original research and that all awards described as doctorates (no matter what their type or form) should be based on a core of processes and outcomes. Original research has to remain the main component of all doctorates.

Core processes and outcomes should include the completion of an individual thesis (based upon an original contribution to knowledge or original application of knowledge) that passes evaluation by an expert university committee with an external representation.

5.1 Professional doctorates

Programmes known as “Professional doctorates”, or practice related doctorates, are doctorates that focus on embedding research in a reflective manner into another professional practice. They must meet the same core standards as “traditional” doctorates in order to ensure the same high level of quality. It may be appropriate to consider using different titles to distinguish between this type of professional doctorates and PhDs.

In order to develop a broad discussion on this topic it will be important to ensure the dissemination of information from those European countries that have experience in this area, and particularly the UK, where the number of professional doctorates is growing rapidly across the European higher education sector.

5.2 Inter-sectoral collaboration and mobility

Universities are increasingly involved in cooperation at doctoral level with other sectors such as industry, business, independent research organisations or public services. Inter-sectoral mobility and in particular doctorates earned through intensive university – industry collaboration and the placement of doctoral candidates in industrial and other laboratories enhances university industry cooperation and adds value to the individual researchers concerned, enhancing their experience, skills and employment prospects. Building strong links between universities with other sectors thus ultimately supports efforts to strengthen the transmission of knowledge as a determining factor in innovation.

6. STATUS AND CAREER DEVELOPMENT OF DOCTORAL CANDIDATES AND OTHER EARLY STAGE RESEARCHERS

Ensuring career opportunities for early stage researchers is not the responsibility of higher education institutions alone but needs to be regarded a collective effort if Europe is to meet its goals. In reaching these goals a particular emphasis is put on increasing the number of researchers as highly skilled young researchers make a significant contribution to the production of knowledge and innovation. Ensuring appropriate working conditions, rights and career prospects for young researchers, both in academia and in a range of other sectors is thus of the utmost importance and one of the crucial preconditions for success. This has been underlined in particular in the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers (2005) that stresses the importance of sustainability and continuity of career development for researchers at all stages of their career including early stage researchers (doctoral candidates and post-doctoral researchers).

6.1 Status of doctoral candidates

Doctoral candidates are early stage researchers who are vital to Europe's development and, as stated in the Salzburg Principles, should have all commensurate rights. Universities and public authorities in Europe share a collective responsibility to address the status and conditions of doctoral researchers.

The results of the EUA survey among the Bologna Process member countries focusing on funding of doctoral candidates and programmes indicates that, out of 37 participating countries, in 22 countries the status of a doctoral candidate is mixed, which means that doctoral candidates are considered both as students and employees (Table 2). In 10 countries doctoral candidates are seen only as students and in 3 countries only as employees. Whatever the status of a doctoral candidate is, it is crucial that s/he is given all commensurate rights including healthcare, social security and pension rights.

Table 2 - Status of doctoral candidates

Status	Number of countries	Countries
Students only	10	Czech Republic, Estonia, Georgia, Iceland, Ireland, Italy, Latvia, Russia, UK and Scotland
Employees	3	Bosnia-Herzegovina, Denmark, Netherlands
Mixed	22	Albania, Andorra, Armenia, Austria, Belgium-Flanders, Belgium-Wallonia, Croatia, Cyprus, Finland, France, Germany, Greece, Liechtenstein, Lithuania, Malta, Norway, Poland, Romania, Slovak Republic, Spain, Sweden, Switzerland, Turkey

6.2 Post-doctoral researchers

Appropriate status and working conditions should be also recognised as essential for post doctoral researchers for whom clear academic structures and a variety of career perspectives are also needed. Post-doctoral researchers must be recognised as highly skilled professionals with a key role in developing the European knowledge society, as underlined in the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. This implies that:

- The duration of the post doctoral phase without a clear career perspective should be limited to five years;
- They should be eligible to apply for national and international grant schemes to fund their research;
- Initiatives like the Independent Researcher grant scheme of the ERC should be encouraged;
- If the number of researchers is to rise and be covered by appropriate salaries, governments should invest more into research and social infrastructure for researchers in order to make the European Research Area more attractive.

7. FUNDING OF DOCTORAL PROGRAMMES AND EARLY STAGE RESEARCHERS⁶

Ensuring appropriate and sustainable funding of doctoral programmes and doctoral candidates as well as greater and targeted investment in higher education institutions and their infrastructure is the 10th and final Salzburg Principle, and quite simply needs to be implemented, given the crucial role of doctoral education and training as the key formative stage of a research career in both academia and non-academic sectors of employment and that because the attractiveness of a future career in research is determined largely at the doctoral stage; hence the importance of ensuring status and financial support of the doctoral candidate, and of offering adequate incentives.

On the basis of the analysis of the questionnaires received from the BFUG member countries it is clear that scholarships/fellowships/grants are the main mode of funding doctoral candidates, although in about half of the countries, salaries or teaching assistantships are also offered, in the Slovak Republic only salaries. In most cases, a mix of modes is used to fund doctoral candidates (Table 3). When grants are made to doctoral programmes, more often these are given to research projects rather than to higher education institutions (Table 4), but here again, the majority of countries use a mixture of funding modes.

Table 3 - Modes of fund allocation for doctoral candidates

Allocation mode	Number of countries	Countries
Salaries only (1)	1	Slovak Republic
Scholarship/fellowship/grants (2)	8	Bosnia-Herzegovina, Czech Republic, Georgia, Lithuania, Poland, Russia, UK and Scotland
Teaching assistantships (3)	0	
Mixed (1) and (2)	5	Austria, Croatia, Denmark, Finland, Sweden
Mixed (1) and (3)	1	Montenegro
Mixed (2) and (3)	7	Albania, Andorra, Armenia, Ireland, Latvia, Romania, Spain
Mixed (1), (2) and (3)	11	Belgium-Flanders, Cyprus, Estonia, France, Germany, Greece, Iceland, Liechtenstein, Malta, Switzerland, Turkey

Table 4 - Modes of fund allocation for doctoral programmes

Allocation mode	Number of countries	Countries
Grants for research projects	11	Albania, Belgium-Flanders, Croatia, Estonia, Finland, Malta, Montenegro, Romania, Russia, Spain, Turkey
Grants to institutions/academic units	4	France, Georgia, Liechtenstein, Scotland
Both	17	Andorra, Armenia, Austria, Czech Republic, Denmark, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Poland, Slovak Republic, Sweden, Switzerland, UK

⁶ This section is based upon the analysis of the questionnaires received from the Ministries of education/science in 37 Bologna Process member countries in September 2006. In the case of the United Kingdom (UK) a separate survey response was also received from Scotland. In the case of Belgium two separate responses were received: one from Belgium-Flanders and the other from Belgium-Wallonia.

Tables 3 and 4 show the different funding allocation models for individuals and programmes. There are considerable differences from country to country in the proportion of overall resources being allocated to candidates and programmes/schools. Estonia, for example, gives one third to candidates and two thirds to programmes while in France 30% is paid as individual allocations, whereas 70% goes in bulk funding to institutions or doctoral schools. Latvia cites 43.33% for individual support and 54.67% to programmes in 2005. Romania gives 40% to individuals and 60% to programmes. In Italy, funding is not given to individual doctoral candidates, but exclusively to doctoral programmes. The trend therefore appears to be that more support is given to programmes/schools than to individuals. However, a contrary trend is indicated by Germany where 85% of funding goes to candidates and 15% to programmes. It may be that the share is linked to the degree of centralisation of higher education and research in a given country.

Table 5 refers to the overall funding mechanisms used by governments. Two thirds of the respondent countries allocate funds as lump sum payment from the government. Competitive grants are used in half of the countries. But in one third of the countries, the mechanism is mixed. National or private foundations or other entities, as well as the European Science Foundation (ESF) mentioned by some countries, provide additional funding sources. Some of the countries that have doctoral/graduate/research schools have specific funds for them, for example the 'Deutsche Forschungsgemeinschaft' in Germany. France has a dedicated budget line for funding doctoral schools while in the UK, Research Council funds allocated to post graduate education can be allocated for this purpose. In Switzerland an inter-institutional agency, and the Swiss National Science Foundation, provide funds for the introduction of structured doctoral programmes.

Table 5 - Funding mechanisms

Funding mechanism	Number of countries	Countries
Lump sum from government	11	Bosnia-Herzegovina, Croatia, Cyprus, Greece, Latvia, Montenegro, Norway, Poland, Russia, Scotland, Slovak Republic
Competitive grants	6	Albania, Andorra, Armenia, Finland, Malta, Turkey
Mixed	13	Austria, Czech Republic, Denmark, Estonia, Germany, Iceland, Ireland, Italy, Lithuania, Romania, Spain, Sweden, UK
Special funds for doctoral programmes/schools	10	Andorra, Estonia, France, Germany, Netherlands, Norway, Romania, Switzerland, UK and Scotland

As for foreign sources of funding, many countries cited the EC Framework Programmes and specific European schemes including Marie Curie Research Training Scheme, but also Erasmus Mundus and TEMPUS. Nordic countries cite regional programmes such as the NordForsk. Smaller countries cite ESF or larger countries' programmes such as Fulbright, DAAD and British Council programmes as support mechanisms.

Thus there is great diversity in the funding channels, mechanisms and modes. A number of different types of organizations provide funding in many countries. As we move towards the knowledge society, it may be expected that this diversity is likely to increase, as more types of organisations may want to fund doctoral education. As with organizational types, diversity in funding sources, channels, mechanisms and modes is not a bad thing. As this is probably an irreversible trend, co-ordination among the diverse modes to bring about optimum mode of funding for the candidate, quality control in doctoral education and training will become an increasingly important, but complex issue.

On the basis of the analysis of the EUA survey among the Bologna Process member countries it is recommended that:

- Funding for doctoral candidates should be stable, covering the full period of the doctoral programme, and provide sufficient means to live and work in decent conditions;
- Funding should be sufficiently attractive to encourage suitably-qualified candidates from lower income groups, as well as sufficiently flexible to support the needs of part time students over a longer period of study;
- More information on funding mechanisms and funding levels of doctoral candidates and doctoral programmes/schools is needed in order to create a vision of doctoral education within a European Higher Education Area that is attractive and competitive on a global scale;
- There is an urgent need for greater consultation and coordination at the regional, national and European levels between government ministries, research councils and other funding agencies on doctoral education funding and career development.

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9. ANNEXES

9.1 Salzburg Principles (Conclusions and recommendations of the Bologna Seminar on “Doctoral programmes for the European knowledge society”)

1. Ministers meeting in Berlin in September 2003 added an Action Line to the Bologna process entitled “European Higher Education Area and European Research Area – two pillars of the knowledge based society” that underlines the key role of doctoral programmes and research training in this context.

“Conscious of the need to promote closer links between the EHEA and the ERA in a Europe of Knowledge, and of the importance of research as an integral part of higher education across Europe, Ministers consider it necessary to go beyond the present focus on two main cycles of higher education to include the doctoral level as the third cycle in the Bologna Process. They emphasise the importance of research and research training and the promotion of interdisciplinarity in maintaining and improving the quality of higher education and in enhancing the competitiveness of European higher education more generally. Ministers call for increased mobility at the doctoral and postdoctoral levels and encourage the institutions concerned to increase their cooperation in doctoral studies and the training of young researchers.”

2. Research training and research career development – and the need to increase the number of highly qualified graduates and well trained researchers – are also becoming increasingly important in the debate on strengthening Europe’s research capacity and in the discussions on FP7.
3. In order to raise awareness of the issues and provide a solid basis for the discussions the EUA launched in 2004 a Socrates funded Doctoral Programmes Project to analyse key issues related to structure and organisation, financing, quality and innovative practice in doctoral programmes. 49 Universities from 25 countries are involved in this project that demonstrates the commitment of the universities and their desire to contribute directly to the wider policy debate on this important issue.
4. Aware of the importance of this topic for both governments and universities and bearing in mind that research training forms a core mission of universities across Europe, the Austrian Federal Ministry of Education, Science and Culture, the German Federal Ministry of Education and Research and the European University Association have taken the initiative to organise a ‘Bologna Seminar’ in Salzburg on doctoral programmes in order to reach a set of conclusions, identify key challenges and make recommendations for action to be undertaken (in the period 2005-2007).
5. The enormous interest in and presence at the Seminar of the academic community further demonstrates the ownership felt by universities across the continent for the organisation of doctoral programmes and research training.
6. Furthermore, participants welcomed the initiative of the European Commission to draft a ‘European Charter for Researchers’/Code of Conduct for the Recruitment of Researchers’.
7. From the discussions in Salzburg a consensus emerged on a **set of ten basic principles** as follows:
 - I. **The core component of doctoral training is the advancement of knowledge through original research.** At the same time it is recognised that doctoral training must increasingly meet the needs of an employment market that is wider than academia.
 - II. **Embedding in institutional strategies and policies:** universities as institutions need to assume responsibility for ensuring that the doctoral programmes and research training they offer are designed to meet new challenges and include appropriate professional career development opportunities.

- III. **The importance of diversity:** the rich diversity of doctoral programmes in Europe – including joint doctorates – is a strength which has to be underpinned by quality and sound practice.
- IV. **Doctoral candidates as early stage researchers:** should be recognized as professionals – with commensurate rights – who make a key contribution to the creation of new knowledge.
- V. **The crucial role of supervision and assessment:** in respect of individual doctoral candidates, arrangements for supervision and assessment should be based on a transparent contractual framework of shared responsibilities between doctoral candidates, supervisors and the institution (and where appropriate including other partners).
- VI. **Achieving critical mass:** doctoral programmes should seek to achieve critical mass and should draw on different types of innovative practice being introduced in universities across Europe, bearing in mind that different solutions may be appropriate to different contexts and in particular across larger and smaller European countries. These range from graduate schools in major universities to international, national and regional collaboration between universities.
- VII. **Duration:** doctoral programmes should operate within an appropriate time duration (three to four years full-time as a rule).
- VIII. **The promotion of innovative structures:** to meet the challenge of interdisciplinary training and the development of transferable skills.
- IX. **Increasing mobility:** doctoral programmes should seek to offer geographical as well as interdisciplinary and intersectoral mobility and international collaboration within an integrated framework of cooperation between universities and other partners.
- X. **Ensuring appropriate funding:** the development of quality doctoral programmes and the successful completion by doctoral candidates requires appropriate and sustainable funding.

Recommendations

Participants recommend to the BFUG:

- That the ten principles outlined above provide the basis for the further work of the BFUG and thus feed into the drafting of the Bergen Communiqué.
- That the Ministers in Bergen then call on EUA **through its members** to prepare a report under the responsibility of the BFUG on the further development of these principles to be presented to Ministers in 2007.

Salzburg, 3-5 February 2005

9.2 List of project events and other activities

- Two thematic workshops (cluster 1 and cluster 2) were organised in Brussels (23-24 March 2006, 26-27 October 2006) for a wide academic audience. The main aim was to share good practices and to further discuss the Salzburg principles in order to improve understanding of issues related to development of doctoral programmes in Europe.
- Workshop related to Cluster 3 on “Doctoral candidates as young professionals: funding and supporting mechanisms” was organised during the EUA/Austrian Presidency/DG Research Conference in Vienna, 1-2 June 2006.
- Questionnaire was sent to the BFUG governmental representatives on the funding of doctoral programmes & candidates.
- A Bologna Seminar “Doctoral programmes in Europe” was organised in Nice, France, on 7-9 December 2006 with the support of the French Ministry of Education. 400 participants attended the Seminar. The conclusions and recommendation have provided major input to this report.
- A workshop “Graduate Schools in Europe: How can they enhance university research?” was organised at the Imperial College in London on 11-12 November 2005 as a part of leadership seminars organised by the EUA.

9.3 Report on the EUA survey on doctoral education funding, by Yukiko Fukasaku, Innovmond, France, 2007

Introduction

This study on funding of doctoral education is a part of the EUA project that was carried out in 2006 under the responsibility of the Bologna Follow-Up Group on the further development of the basic principles for doctoral programmes. Its aim is to examine how doctoral education is structured and funded in the countries of the Bologna Follow-Up Group (BFUG). The funding project takes up one of the ten principles adopted at the Bologna Seminar in Salzburg in February 2005 that “the development of quality doctoral programmes and the successful completion by doctoral candidates requires appropriate and sustainable funding”.

The EUA survey on funding of doctoral education was based upon a purpose-designed questionnaire that was sent to the BFUG representatives from national ministries responsible for higher education in October 2006. The data presented in this study follow responses from thirty seven countries that participated in the survey¹. Not all countries replied to all questions and responses could not be verified.

The questionnaire consisted of four parts each with several questions that related to:

1. Structure of doctoral education;
2. Status of doctoral candidates;
3. Funding channels, mechanisms and methods;
4. Funding levels.

1. Structure of doctoral education

Doctoral education differs from other levels of higher education mainly in its emphasis on research as the main component of doctoral studies. Doctoral candidates are trained to be researchers, and the research that a candidate undertakes in the course of doctoral education should be an original piece of research that contributes to the knowledge base of a particular discipline or research area.

Responsibility for doctoral education

The first part of the questionnaire was intended to determine what kind of bodies have jurisdiction over doctoral education. In most countries, the ministry that has jurisdiction over both education and research is also responsible for doctoral education. In many countries, in fact, education and research are grouped under one ministry (Table 1).

Nine countries cited the Ministry of Education. UK and Scotland cited the Higher Education Funding Councils and Research Councils in addition to the Ministry of Education. Only one country cited the Ministry of Research (Denmark). One country cited the Rector's Conference (Switzerland). For France, Germany and Italy, the education part covered by the relevant ministry is higher education or universities.

The results reveal variety in the types of ministries having jurisdiction over doctoral education. However, the fact that in the majority of the countries, (higher) education and research are overseen by one ministry implies that the governments recognise the close link between them. Such an administrative structure would facilitate any necessary reforms to move towards the knowledge society, especially at the level of doctoral education.

¹ In the case of the United Kingdom (UK) a separate survey response was also received from Scotland. In the case of Belgium two separate responses were received: one from Belgium-Flanders and the other from Belgium-Wallonia.

Table 1 - Ministry or other public bodies having prime responsibility for doctoral education

Type of ministry or other bodies	Number of countries or country names	Countries
Education and research	22	Andorra, Albania, Armenia, Austria, Croatia, Estonia, France, Georgia, Germany, Iceland, Ireland, Italy, Latvia, Lithuania, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Spain, Sweden
Education	9	Belgium-Flanders, Cyprus, Czech Republic, Finland, Greece, Liechtenstein, Malta, Slovak Republic, Turkey
Research	1	Denmark
Education and HEFCs and RCs	2	UK and Scotland
Rectors' conference	1	Switzerland
Other agencies	Ministère de la Communauté Française and Fonds National de la Recherche Scientifique (Belgium Wallonia); Ministry of Civil Affairs (Bosnia-Herzegovina)	

Organisation of doctoral education

Three organisational types were reported in the questionnaire:

- doctoral education organised on an individual (one to one) basis;
- structured programmes in faculties or departments;
- doctoral/graduate/research schools.

Only twelve countries have a uniform type of organisation. Most countries have a mix of different organisational types, usually of individual education and structured programmes, but Albania, Armenia, Denmark, Finland, Germany, Norway, Sweden, Switzerland, the UK and Scotland have a mix of all three. This could point to a similarity in the organisation of doctoral education in these countries, or that they were built upon a common model. It is interesting that four Nordic countries are found in this category. Only France, Liechtenstein and Turkey have dedicated doctoral/graduate/research schools and no other organisational types. Bosnia Herzegovina, Cyprus, Georgia, Malta, and Montenegro only have individual doctoral education. Estonia, Lithuania and Spain have structured programmes only (Table 2). In Estonia, doctoral programmes exist as inter-university co-operation platforms.

The results may imply that traditionally, individual doctoral education predominated, and in more recent years the trend is to develop structured programmes or organise doctoral/graduate/research schools. Ireland clearly indicated that structured doctoral programmes are currently being developed, while Norway pointed out that doctoral schools are a recent trend. Italy also mentioned that some of their eleven doctoral schools have been founded very recently with the aim of extending the experience to other universities. The most recent legislation governing doctoral schools in France was introduced in 2006. The results could also indicate that the trend is towards a mix of different organisational types. The evolution of organisational types in the BFUG countries warrants further investigation.

Table 2 - Organisation of doctoral education

Doctoral education in or as	Number of countries	Countries
Individual education only (1)	5	Bosnia-Herzegovina, Cyprus, Georgia, Malta, Montenegro
Structured programmes only (2)	4	Croatia, Estonia, Lithuania, Spain
Doctoral/graduate research schools only (3)	3	France, Liechtenstein, Turkey
Mixed (1) and (2)	12	Andorra, Austria, Belgium-Flanders, Czech Republic, Greece, Iceland, Ireland, Latvia, Poland, Romania, Russia, Slovak Republic
Mixed (2) and (3)	2	Italy, Norway
Mixed (1) and (3)	2	Belgium-Wallonia, Netherlands
Mixed (1), (2) and (3)	9	Albania, Armenia, Germany, Denmark, Finland, Sweden, Switzerland, UK and Scotland

Looking in more detail at the countries that have doctoral/graduate/research schools², we see that the name used differs across countries. Some institutions have doctoral schools, whereas others have graduate or research schools. Whatever the name, most of these schools cover only the third cycle. Germany, Switzerland, the UK and Scotland have different types of doctoral/graduate/research schools with some schools covering the third cycle only, whereas others covering both the second and third cycles.

Six countries (Austria, Belgium-Wallonia, Ireland, Montenegro, Norway and Romania) plan to introduce doctoral/graduate/research schools, or in cases where these already exist, a different type of school. Austria mentions a scheme that is currently under consideration which takes into account the European standards including the Bergen Communiqué, Salzburg Principles and the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. Norwegian universities have doctoral schools, but now the Ministry of Education and Research and the Research Council of Norway plan to introduce doctoral schools at the national level. On the other hand, ten countries specifically mentioned that they do not intend to introduce doctoral/graduate/research schools (Table 3). Hence, the direction of planned reform is not uniform. Iceland indicates that while there is no plan to set up schools, under the new laws on higher education adopted in 2006, there are legal foundations for the existing institutions that currently do not have doctoral programmes to establish them.

Table 3 - Countries (not) planning to introduce doctoral/graduate/research schools

	Number of countries	Countries
Planning to introduce	6	Austria, Belgium-Wallonia, Ireland, Montenegro, Norway, Romania
Not planning to introduce	10	Andorra, Belgium-Flanders, Cyprus, Czech Republic, Estonia, Georgia, Greece, Iceland, Lithuania, Russia

² Sixteen countries on the table plus Estonia, which has state or university funded doctoral schools that are co-operation or co-ordination platforms without being empowered to award degrees.

Most countries have national legislation that governs doctoral education. Although elements covered by these legislations vary from country to country, many cover elements including duration of study period, admission requirements, terms of supervision, conditions for approval of doctoral thesis, conditions of accreditation of institutions for awarding doctoral degrees, rights and obligations of students (especially in countries where doctoral candidates are employed), and in some cases curriculum and syllabus. The number and kind of elements covered by national legislation seems, in turn, to reflect the difference in degree of autonomy given to institutions that award doctoral degrees.

It may be noted that Germany, Ireland, Netherlands and Switzerland do not have national legislation that govern doctoral education. In Germany, the Netherlands and Switzerland it is universities that take full responsibility for doctoral education. Ireland indicates that although there is no national legislation, universities formulate policy collectively through the Irish Universities' Association and the Council of Directors (for the institutes of technology). UK and Scotland have national legislation that assures autonomy of universities. Ireland and the UK also have a Code of Practice adopted by higher education institutions which set standards for the quality of education (Good Practice in the Organisation of PhD Programmes in Irish Universities, and Code of Practice for the Assurance of Academic Quality and Standards in Higher Education: Postgraduate Research Programmes in the UK). The results seem to imply that there are basically two models of governing doctoral education: one in which the governance framework is decided at the national level, and the other in which governance is left largely up to the autonomous universities and the central government only does the minimum.

Three to four years is the normal duration of funding for doctoral programmes or schools in many countries³. The duration of funding is linked to the period of accreditation of the programmes or schools. A few countries mentioned specific funding schemes for doctoral programmes or schools. Finland has a specific scheme for funding of graduate schools with a fixed time duration of four years on a competitive basis funded by the Ministry of Education. Norway is considering introducing a national funding scheme. It may be noted that specific funding schemes are very limited.

A final point that emerges from the responses is that higher education in general and postgraduate/doctoral education in particular, has undergone or is undergoing reforms in recent years in most of the BFUG countries. Many of the national legislations that govern doctoral education are relatively new. Switzerland, for example, specifically mentioned that its university system is undergoing reform.

2. Status of doctoral candidates

In those countries where a uniform system is adopted, more countries (thirteen countries) enrol doctoral candidates in structured programmes or schools rather than for individual education (four countries). However, here again, fourteen countries have a system of enrolment that is a mixture of the two (Table 4). On the other hand, most countries select candidates on a competitive basis.

³ It may be noted that some responses were on the duration of funding of doctoral studies rather than for doctoral programmes or schools.

Table 4 - Enrolment of doctoral candidates

Enrolment in	Number of countries	Countries
Individual doctoral education only (1)	5	Bosnia-Herzegovina, Cyprus, Ireland, Montenegro, Netherlands
Programmes/schools only (2)	13	Belgium-Wallonia, Croatia, Estonia, France, Italy, Latvia, Liechtenstein, Lithuania, Malta, Norway, Romania, Spain, Sweden
Mixed (1) and (2)	14	Andorra, Austria, Czech Republic, Denmark, Finland, Germany, Greece, Iceland, Poland, Russia, Slovak Republic, Switzerland, UK and Scotland

In most countries doctoral candidates are students rather than employees. But in many of them, the status is mixed. Bosnia-Herzegovina and Denmark indicate that the status is purely an employee. Norway indicates that their candidates are 'mostly' employees (Table 5). In others, the status is mixed. However, it is not clear for many of the countries where the status is mixed, whether the mix means co-existence of pure students and pure employees or that there are students who are employed at the same time.

Belgium-Wallonia adds some explanations. In this country, being registered as a doctoral candidate automatically makes the person a student regardless of his/her funding. A large number of doctoral candidates are recruited as university researchers through fixed term employment contracts – a fact that makes these people employees at the same time as students thus endowing them with a mixed status. Also, between pure students (i.e., self-financing) and university employees, there are scholarship/fellowship financed students, who are usually obliged to perform some tasks in the institution they are registered in. In a nutshell, there are students as well as employees and those who are mainly students, but employed in the sense that their funding arrangements oblige them to be partially 'employed'. This could describe the mixture of status of doctoral candidates in other countries as well.

In Sweden, the status of being a doctoral candidate does not entail social benefits; therefore they are considered "students". About half of the doctoral candidates get "anställning som doktorand", employment with full social benefits, and another 20-30% have some kind of employment that allows them time for their studies. So these students are employed simultaneously. In any case in that country, institutions admitting doctoral candidates are obliged to make assessments of adequate funding for the entire study period.

Table 5 - Status of doctoral candidates

Status	Number of countries	Countries
Students only	10	Czech Republic, Estonia, Georgia, Iceland, Ireland, Italy, Latvia, Russia, UK and Scotland
Employees	3	Bosnia-Herzegovina, Denmark, Netherlands
Mixed	22	Albania, Andorra, Armenia, Austria, Belgium-Flanders, Belgium-Wallonia, Croatia, Cyprus, Finland, France, Germany, Greece, Liechtenstein, Lithuania, Malta, Norway, Poland, Romania, Slovak Republic, Spain, Sweden, Switzerland, Turkey

The fact that in most countries the status of the doctoral candidate is mixed, means that there is quite a broad variation in what a doctoral candidate is required to do during the study period leading to a doctorate – doing full time studies and research leading to the degree only, working in addition as a research assistant on other research, or having obligation to teach.

As for time to degree (TTD), many countries expect three to four years, but often give a broader range of time length. As the maximum number of years that some countries indicate is 7-8 years, TTD tends to vary quite a bit. The Netherlands and the UK indicate that about half finish in less than five years. Some countries specifically indicate longer TTD for employed and/or part-time students.

The duration of public funding for doctoral candidates tends to be somewhat less than TTD in many countries. A number of countries indicate different durations of funding according to the funding agency or types of funding provided (e.g. scholarship or contract). These trends may indicate that the length of public funding, at least for some types of funding may not cover all the expenses of the candidate during the entire study period. The duration of public funding, however, could influence the students to finish their studies shortly after the funding stops. The Slovak Republic has a system in which the duration is a minimum of three years and a maximum of four years, but the students are funded through the entire study period.

As for young postdoctoral researchers – ‘postdocs’, while there are more countries that do not recognise the status officially than those that do, more than two thirds of the countries have some kind of funding available for those who have completed doctoral studies, but are as yet not employed (Table 6). Lecturer, assistant lecturer, assistant professor, research assistant, young researcher, or ‘docent’ are the names of the status given to people employed after completing a doctorate, whether the person has been recognised as a ‘postdoc’ or not. A recent OECD survey also shows that introducing the position of a postdoc is becoming a growing trend and that its duration can be long (OECD forthcoming).

Table 6 - Recognition and funding of a ‘postdoc’

	Number of countries
‘Postdoc’ officially recognised	14
Not officially recognised	17
Funding for postdocs	26

3. Funding channels, mechanisms and methods

Although the first question in this part of the questionnaire assumed different sets of agencies as funders of doctoral candidates on one hand and programmes and schools on the other, no distinctive trend as funders of one or the other emerged from the responses. Many countries cited the same set of agencies for both, although in general, the number of agencies that fund candidates tends to be more numerous than those that fund programmes or schools. Foundations and enterprises as well as foreign agencies are more frequently listed as funders of doctoral candidates. The agencies listed in the questionnaire, i.e. ministries, research councils, public and private foundations, industry are cited by many countries. However, one ministry or public agency in any one country seems to be responsible for the basic funding of doctoral candidates or programmes/schools.

A few countries indicated the share of funding given to either candidates or programmes/schools. Estonia gives one third to candidates and two thirds to programmes. In France 30% is paid as individual allocations, whereas 70% goes as bulk funding to institutions or doctoral schools. Latvia cites 43.33% for individual support and 54.67% to programmes (in 2005). Romania gives 40% to individuals and 60% to programmes.

In Italy, funding is not given to individual doctoral candidates, but exclusively to doctoral programmes which means that more support is given to programmes/schools than individuals. The contrary trend is indicated by Germany where 85% of funding goes to candidates and 15% to programmes. This distribution probably reflects the extent to which doctoral education is organised into programmes or schools. It may also be that the distribution depends on the degree of centralisation of doctoral education in a given country.

Two thirds of the respondent countries allocate funds as a lump sum payment from the government. Competitive grants are used in half of the countries. But in one third of the countries, the mechanism is mixed (Table 7), that is both lump sum allocation and competitive grants are used. Public research institutions, academies and research councils are also sources of funds in some countries. Other sources of funds include European Science Foundation (ESF) in some countries as well as national or private foundations. Some of the countries that have doctoral/graduate/research schools offer specific funding for them, such as DFG (Deutsche Forschungs Gemeinschaft, German Research Society) and the 'Exzellenzinitiative' in Germany. France has a dedicated budget line for funding doctoral schools. This fund contributes to the functioning of doctoral schools, organising trans-disciplinary training, international activities and preparing candidates for their professional careers. In the UK, the Research Council funds allocated to postgraduate education can be allocated for this. In Switzerland, an inter-institutional agency and the Swiss National Science Foundation provide funds for the introduction of structured doctoral programmes.

Table 7 - Funding mechanisms

Funding mechanism	Number of countries	Countries
Lump sum from government	11	Bosnia-Herzegovina, Croatia, Cyprus, Greece, Latvia, Montenegro, Norway, Poland, Russia, Scotland, Slovak Republic
Competitive grants	6	Albania, Andorra, Armenia, Finland, Malta, Turkey
Mixed	13	Austria, Czech Republic, Denmark, Estonia, Germany, Iceland, Ireland, Italy, Lithuania, Romania, Spain, Sweden, UK
Special funds for doctoral programmes/schools	10	Andorra, Estonia, France, Germany, Netherlands, Norway, Romania, Switzerland, UK and Scotland

Scholarships/fellowships/grants are the main means of funding doctoral candidates although in about half of the countries, salaries or teaching assistantships are also given. In the Slovak Republic only salaries are given. In most cases, a mix of means is used to fund doctoral candidates (Table 8). In Italy funds are not allocated to candidates, but to programmes only. When grants are given to doctoral programmes, more often these are given to research projects (26 countries) rather than to institutions (16 countries) (Table 9), but here again, more countries use a mixture of funding methods.

Table 8 - Methods of fund allocation for doctoral candidates

Allocation method	Number of countries	Countries
Salaries only (1)	1	Slovak Republic
Scholarship/ fellowship/grants (2)	8	Bosnia-Herzegovina, Czech Republic, Georgia, Lithuania, Poland, Russia, UK and Scotland
Teaching assistantships (3)	0	
Mixed (1) and (2)	5	Austria, Croatia, Denmark, Finland, Sweden
Mixed (1) and (3)	1	Montenegro
Mixed (2) and (3)	7	Albania, Andorra, Armenia, Ireland, Latvia, Romania, Spain
Mixed (1), (2) and (3)	11	Belgium-Flanders, Cyprus, Estonia, France, Germany, Greece, Iceland, Liechtenstein, Malta, Switzerland, Turkey

Table 9 - Methods of fund allocation for doctoral programmes

Allocation method	Number of countries	Countries
Grants for research projects	11	Albania, Belgium-Flanders, Croatia, Estonia, Finland, Malta, Montenegro, Romania, Russia, Spain, Turkey
Grants to institutions/ academic units	4	France, Georgia, Liechtenstein, Scotland
Both	17	Andorra, Armenia, Austria, Czech Republic, Denmark, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Poland, Slovak Republic, Sweden, Switzerland, UK

As for foreign sources of funding, many countries cite the European Union Framework Programmes and other European schemes including Marie Curie Research Training Scheme, Erasmus Mundus and TEMPUS. Nordic countries cite regional programmes such as the NordForsk. Smaller countries cite ESF or larger countries' programmes such as Fulbright, DAAD and British Council programmes.

Thus, there is great diversity in the funding channels, mechanisms and methods. A number of different types of organisations provide funding in many countries. As we move towards the knowledge society, the diversity is likely to increase, as more types of organisations may want to fund doctoral education. As with organisational types, diversity in funding sources, channels, mechanisms and methods is probably an ongoing and irreversible trend. This means that co-ordination among the diverse methods to bring about the optimum method of funding for the candidate, quality control in doctoral education and training will become an increasingly complex, but important issue.

4. Funding levels

Not many countries provided responses in a comprehensive manner on questions related to funding levels. Regarding annual spending on doctoral education, it is clear from the responses that governments at this point do not have disaggregated data for spending on doctoral education. Several countries indicated specifically that they do not have separate data for doctoral education. The eleven countries that gave figures for this vary considerably in scope. In some cases scholarships are included, in others not. In some countries the figures indicate only scholarship funding to candidates. Some countries have data that include all levels of university education or the two levels of postgraduate education. Other countries have data for funding research and postgraduate education.

The figure indicated by France of 374.8 million euros per year indicates the most comprehensive expenditure. This amount includes financing of doctoral schools, funding of doctoral candidates, supervision costs and specific programme for international co-supervision of thesis. This figure does not, however, seem to include funding by agencies other than the central government (such as public research institutions, foundations and regional governments).

Because what is included in the annual spending amounts on doctoral education differ considerably across countries, there is no way of comparing or assessing the level. It may be noted that for those countries that indicated sums for more than two years, it can be seen that the spending is increasing, whatever the figure may include.

On the question on the number of publicly funded doctoral programmes and/or doctoral/graduate/research schools, seventeen countries gave numbers of programmes or schools. Only four, Armenia, Estonia Finland, and Romania indicated the amount of public expenditures on them, with Armenia and Romania not indicating the number of programmes or schools. The figures indicated by Estonia and Finland show that the spending per programme or school can vary greatly. Estonia spends about 50,000 euros per PhD programme and Finland spends more than 360,000 euros for each of their graduate schools funded by the Ministry of Education. The UK has given figures for the Higher Education Funding Councils' (England and Wales) funding for supervision of research degree programmes in the higher education institutions. The figures of 1.9M euros for England and more than 800,000 euros for Wales per institution are considerably higher than the figure indicated by Finland. It is likely that the figures include different costs of doctoral programmes or schools. The small number of countries that reported on the spending on doctoral schools or programmes indicates that most governments do not collect funding data focused on spending for doctoral programmes or doctoral/graduate/research schools.

Twenty countries reported on the number of doctoral candidates, and about the same number of countries reported on the number of publicly funded students. It can be seen that for countries that reported on both numbers, not all doctoral candidates are publicly funded. This number seen in proportion to the number of doctoral candidates varies considerably across countries. In general, former socialist countries, where they report, fund a larger proportion of the candidates, with the Czech Republic, Poland, Romania and Russia reporting 100% or close to it. In other countries, the proportion varies more. For example, in France, the percentage is about 20%, in Italy, close to 60%.

Eleven countries⁴ reported on the disciplinary breakdown of the publicly funded doctoral candidates. The largest proportion of candidates is in the natural science and engineering disciplines in most of the countries. The distribution is between 40% and 70%, except in Iceland and Sweden where it is 33% and 23% respectively. Humanities show a distribution of between 16 and 23%, social sciences varies between 8% and 33%, and medicine between 9% and 23% with the exception of Sweden which shows a high proportion of 39%.

As for the proportion of self financing students and part time students, few countries reported back, but for those that did, the proportion again varies greatly. Two countries (Bosnia-Herzegovina, Malta) report that most of their doctoral candidates are self-financing. In some of the ex-socialist countries the proportion is very low, although Romania and Russia report existence of 15-20% self-financing students. Italy indicates a figure of about 40%. Fewer countries reported on the number of part-time students. These numbers also vary considerably. For example, 70% is reported for the Slovak Republic, 21% for Scotland, and 2.3% for Estonia.

The responses to these questions again indicate that governments do not collect data systematically on the funding status of doctoral candidates. In fact most countries did not provide data for all four indicators requested (number of doctoral candidates in programmes or schools, doctoral candidates funded per year, self-financing doctoral candidates, part-time doctoral candidates), but for a differing combination of one, two or three across countries. This makes any comparison or assessment extremely difficult and points to the urgent need for more systematic information.

In contrast to the responses obtained for questions in this section thus far, a significant number of countries supplied information about the proportion of non-national doctoral candidates. The responses vary from less than one percent to more than forty percent, indicating great diversity in the extent of 'internationalisation' of doctoral education in the BFUG countries. Roughly speaking the countries can be categorised into those that indicated proportions of less than 10%, those that cited proportions of between 10% and 20%, and those that indicated shares of more than 30%.

The new EU member countries where they report at all, indicate proportions of less than 10%. The exception is Finland which indicates a proportion of 7.1%, and Italy which cites 2%. Other Nordic countries, Austria, Belgium (Flanders), Germany, Russia and Spain report numbers in the second category. Three Nordic countries, Denmark, Norway and Sweden indicate proportions of around 20%. Whether this is a spontaneous outcome or a result of some kind of policy intervention may be an interesting question to investigate further. France, the UK, Switzerland and Liechtenstein belong to the third category, with the latter three indicating figures of more than 40%. Size of the country, language, the tradition of playing major role in educating foreign students could all have implications in the high proportions indicated by these countries (Table 10).

Table 10 - Share of non-national doctoral candidates

	Number of countries	Countries
Less than 10%	13	Albania, Armenia, Croatia, Cyprus, Czech Republic, Estonia, Finland, Italy, Latvia, Lithuania, Malta, Poland, Slovak Republic
10 – around 20%	9	Austria, Belgium-Flanders, Denmark, Germany, Iceland, Norway, Russia, Spain, Sweden
30% or more	4	France, Liechtenstein, Switzerland, UK

⁴ Belgium-Flanders, Estonia, Iceland, Ireland, Liechtenstein, Lithuania, Netherlands (only for employed doctoral candidates in universities), Romania, Sweden, Switzerland and UK.

A number of countries reported on the minimum amount of public grants for doctoral candidates. Here again the amounts indicated vary considerably. The non-EU and the new EU member countries generally have low levels of funding of less than 5000 euros per year/per candidate. In the 'old' EU member countries, the amounts indicated range from 7000 euros to 21,000 euros. The higher amounts of 24,000 euros indicated by the Netherlands, and more than 30,000 euros indicated by Denmark and Norway seem to correspond to salaries of the candidates. In fact the variation in the second category of countries may indicate variations according to the extent of the 'mix' in the status of doctoral candidates, that is, the extent that they are students or 'employed'. Also, Austria indicated large variations in the grants given by the Study Grant Authority from 180 to 7272 euros. This indicates that there could be different levels of grant funding by the same funding body. Austria also indicated that candidates with employment contracts receive 30,000 euros per year including social security (Table 11).

Eighteen countries reported increases in the level of grant funding in recent years. A few countries reported about the same level of funding. It should be noted that some countries' interpretation of 'grant' funding may vary.

Table 11 - Minimum annual grant to doctoral candidates

	Number of countries	Countries
Less than 5000 euros	9	Austria ⁵ , Croatia, Czech Republic, Estonia, Latvia, Lithuania, Romania, Russia, Slovak Republic
7000 – 21000 euros	13	Andorra, Austria, Belgium-Flanders, Finland, France, Iceland, Ireland, Italy, Liechtenstein, Spain, Sweden, UK and Scotland
More than 22000 euros	5	Austria, Denmark, Netherlands, Norway, Switzerland

Eighteen countries, i.e. half of the respondent countries, reported that the completion rate of doctoral candidates is monitored. The reporting is usually done by the universities and reported to the government ministry concerned or the national statistical office. France and the UK have specialised agencies that deal with statistics or the evaluation of higher education. In Ireland, funding agencies do the monitoring on an ad hoc basis.

5. Main findings

The following findings emerge from the results presented above.

1. Great diversity in the structure of doctoral education, status of doctoral candidates, funding channels, mechanisms and methods for doctoral candidates and programmes.

The most salient feature of doctoral education in the BFUG countries is the existence of great diversity in the aspects surveyed: structure of doctoral education, status of doctoral candidates, funding channels, mechanisms and methods. As far as structure is concerned, only one third of the countries have a uniform structure. Two thirds of the countries have a "mixed" structure, where individual doctoral education, structured programmes and doctoral/research/graduate schools co-exist. Although a recent trend seems to be the establishment of doctoral/research/graduate schools, this direction of reform is not necessarily commonly shared across the BFUG countries. Structural diversity is likely to be a long-term trend.

⁵ Austria is categorized in all three ranges. Explanation is given in the text.

Although most countries have national regulations that determine structure and content of doctoral education and terms of state accreditation to award doctorate degrees, there are countries that have higher education institutions that are autonomous in governing doctoral education.

Considerable diversity is found in the status of doctoral candidates. They could be enrolled in individual doctoral education, or in structured programmes or schools. In other countries they can be enrolled in either. In some countries they are students, in others employees, but much more often they are students as well as employees, and these doctoral candidates have some kind of 'employed' status. These variations also imply diversity in what a doctoral candidate is required to perform during the study period.

There is diversity in the way doctoral education is funded. Some countries give funds in a lump sum to institutions, in others, institutions are funded by competitive grants, and one third of the countries channel government funds through the two mechanisms. Doctoral candidates receive their funding as salaries or scholarships/fellowships/grants, but more often countries have multiple channels for funding candidates and use combinations of salaries, scholarships/fellowships/grants and teaching assistantships. When funds go to doctoral programmes, in some countries they are channelled as grants for research projects, in others as grants to institutions or academic units, but many governments channel funds in both ways.

2. Lack of disaggregated quantitative data on the level of funding of doctoral education

A key finding of this survey is that many BFUG governments do not collect disaggregated quantitative data on the level of funding of doctoral education. To the question on the level of annual spending on doctoral education and amount of public funds to doctoral programmes or doctoral/graduate/research schools, countries indicated figures that include different aspects of funding doctoral education, such as scholarships, supervision of candidates, or funding of programmes. Other countries gave government funding figures including all levels of university or post graduate education. In some cases these figures included research funding as well as education. Some countries did mention that they do not have data specifically on doctoral education.

3. Large variation in public funding of doctoral candidates

The responses to the question on minimum amount of annual grant funding to doctoral candidates revealed a large variation across countries, or even within one country as in the case of Austria. The fact that in a few countries candidate funding is given mainly as salaries would mean that spending per candidate is more than in those countries where other types of funding is used, since salaries would include payment of social benefits. And of course, costs of education as well as the cost of living vary across BFUG countries, but the range of variation is nonetheless large.

4. Indications that public funding of doctoral education is probably not adequate

In part this is a corollary to the above finding, but other indications can be picked up from this survey that the public funding of doctoral education is short of being adequate in many countries. Average time to degree is usually longer than the period of public funding. There is a large variation in the proportion of publicly funded students to the number of doctoral candidates across the countries that responded to the question. Also, although only a few countries responded, there is large variation in the share of self-financing students.

5. Diversity in degree of internationalisation of doctoral education

As indicated by the share of foreigners among doctoral candidates in the responding countries there is diversity in the degree of internationalisation of doctoral education. While the optimal degree of 'internationalisation' is not easy to determine, and indeed for some countries such as the UK, a figure of more than 40% may be excessive, for many countries, there is room to improve mobility.

6. Concluding remarks and areas in need of further investigation

The global trend is a sweeping shift towards a knowledge society, in which knowledge plays a growing role in contributing to our wealth and welfare. European Union Member countries, the EHEA and the ERA countries need to co-operate to move collectively to a knowledge society. As stated clearly in the recent EUA report on doctoral programmes (EUA 2005), to achieve this goal, Europe needs to increase the number of researchers and research-related careers, and doctoral training can be seen as a cornerstone in reaching this goal. This clearly implies increasing funding for doctoral education as stipulated in the tenth Salzburg Principle. However, in order to increase funding in an appropriate manner, each country would need to examine carefully how their doctoral candidates and doctoral programmes or schools are in fact funded. Also, what the "knowledge society" demands in terms of researchers or research-related careers needs to be assessed carefully to adapt doctoral education to changing demand.

1. Diversity and the direction of structural and organisational reform

The survey and other studies have revealed a diversity or mix in the structure of organisational types of doctoral education (individual, structured programmes or doctoral/research/graduate schools). One clear trend is a move away from the apprentice model to a more structured doctoral education including the establishment of doctoral/research/graduate schools. This direction of reform is resulting in increased diversity of organisational structures in many countries since reforms do not completely replace existing models.

Great diversity is found in the status of doctoral candidates. The diversity in status leads to variation in the duration of doctoral studies; also, diversity in funding channels, mechanisms and methods, also confirmed the survey and in other studies. While competitive funding seems to be the most favoured method of financing, most countries channel funds to candidates and institutions in multiple ways, with the combination of methods differing across countries.

The move to a more structured doctoral education is reflected in the organisation of new doctoral programmes or doctoral/graduate/research schools. Common characteristics of these new structures are that they are often inter-faculty or inter-university structures facilitating training in transferable skills and interdisciplinary training through structured programmes of studies. In some cases the aim is to build critical mass in some disciplines or new areas of research. They are associated specifically with centres of excellence in some cases. Also, there is a clear move towards international co-operation in doctoral education and enhancing mobility. There is a distinct trend towards a networked organisation of doctoral education. So the new programmes and schools respond to the requirements of the Bologna process, in which training in transferable skills, inter-disciplinary research and mobility experiences should be assured. Whether they can also assure solid disciplinary training at the same time needs to be carefully assessed.

Still other new experiments include new types of doctoral degrees that involve considerable industrial experience, or professional doctorates. Some funding schemes, such as the CIFRE in France, while being a public funding scheme, involve partnership with industry. These reflect a change in demand for doctoral education. Now, doctoral education also needs to prepare candidates for careers other than in the academia.

Diversification itself is probably inevitable as we move towards the knowledge society, where more professions require employees with doctorate level qualifications. Diversity presents challenges for the funding of doctoral education. More and diverse organisations, especially business, would channel funds for doctoral education. This implies the importance of sound management and co-ordination of diverse funding streams, so as to assure quality doctoral education, and adequate and appropriate funding for the doctoral candidate.

As the trend is towards structured programmes or schools, the new structures should be examined carefully to assess if they indeed respond to the requirements of the knowledge society and facilitate appropriate and adequate funding for doctoral education.

2. Need for more systematic information, especially disaggregated data on funding of doctoral education

The survey results did not provide adequate quantitative information on recent evolutions in levels of funding going into doctoral education to enable comparison or assessment. Governments should be encouraged to make systematic efforts to collect data on funding specifically focused on doctoral education. The significant variation across countries for some of the reported figures may imply the inclusion of different elements of funding according to countries. This indicates the need to establish a more common approach to the collection of funding data. The information should be focused on doctoral candidates as well as programmes and schools. Information about who funds whom, through what mechanisms and how much through each mechanism is basic in order to compare and assess whether doctoral education is funded adequately.

3. Adequate funding and best way to deliver funding to the candidate needs to be explored more

Although there are indications of inadequate funding for doctoral education, optimum funding for a student in amount and method is still an open question. This would inevitably vary between countries and disciplines or research areas, but needs to be assessed by governments and funding bodies as well as universities. Also, which funding mechanism is best suited in each country under a variety of disciplinary or research area contexts need to be explored. Country case studies could be useful to arrive at some best practices.

4. Need for better coordination

At the threshold of the knowledge society the diversity in organisation of doctoral education, status of the doctoral candidates, and the funding mechanisms is likely to be a sustained trend.

The country reports in the OECD Tertiary Education Reviews indicate increase in funding from business and other external sources for most countries reviewed. Diversity raises the question of co-ordination of different agencies involved in funding of doctoral education and the institutions that provide doctoral education, so as to optimise it. The government, funding agencies and institutions need to act collectively to assure co-ordination.

Mobility, as the EUA report states, can be an important strategic tool of doctoral training, leading to wider research experience and career development opportunities of doctoral candidates and better research co-operation and networking between institutions. Mobility is also a means of training candidates in disciplines and research areas where “critical mass” of capacities and infrastructure is lacking, especially in small countries. However, mobility poses additional challenges for funding doctoral education, since co-ordination of funding needs to take place at the international level. Engagement in consultation and dialogue at the international level will be of increasing importance.

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