

Research Careers in Europe Landscape and Horizons

A report by the ESF Member Organisation Forum
on Research Careers



European Science Foundation

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Member Organisation Fora

An ESF Member Organisation Forum is an output-oriented, issue-related venue for the Member Organisations, involving other organisations as appropriate, to exchange information and experiences and develop joint actions in science policy.

Typical subjects areas discussed in the Fora are related to:

- Joint strategy development and strategic cooperation with regard to research issues of a European nature.
- Development of best practices and exchange of practices on science management, to benefit all European organisations and especially newly established research organisations.
- Harmonisation of coordination by MOs of national programmes and policies in a European context.

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Preface

Launched in November 2007, the *ESF Member Organisation Forum on Research Careers* has served as a joint platform for the exchange of views and experience and for the development of strategy concepts to be applied at national and supranational level. The Forum has provided an interface for ESF Member Organisations (MOs), the European Commission and universities in Europe represented by the European University Association and the League of European Research Universities. The Forum main objectives has been to:

- develop a roadmap for research career development in Europe and by this means
- create new and improve existing European-level and coordinate national policies and programmes aimed at promoting different career stages, and
- raise the international visibility of the ERA as a common labour market for researchers.

The idea to establish the Forum stemmed from building on existing experience and previous successful interactions between MOs. The initiative to start the Forum was taken by members of the international Management Committee of the European Young Investigator (EURYI) Award and the informal European Network on Research Careers (ENRC). It also built on the observation that the promotion of research careers is key to the activities of all ESF Member Organisations, research-funding as well as -performing. However, research career policy in Europe is largely determined at national, regional and even single university level, therefore fragmentation remains widespread.

In order to address the complexity and breadth of this topic the Forum organised its work between different working groups, each of which defined its own focus areas, developing differentiated workshops, meetings, surveys, etc. The outcomes of the mapping exercises and identification of good practices are built around those subgroups. The Forum has developed an implementation plan which will form the backbone of its future activities, in particular, it has recommended a set of joint actions to be taken:

- structuring of research careers;
- improving the attractiveness and competitiveness of European research careers;
- providing “equal playing fields” for researchers of all backgrounds;
- supporting the development of “portfolio careers”;
- developing and implementing European policies for research career development.

I wish to thank the hosts of the workshops and all the members of the working groups. On behalf of the ESF the Forum was coordinated in a professional and dedicated manner by Neil Williams and subsequently by Laura Marin. Last, but not least, the material presented in this report is due to the special engagement of the Chairs of the working groups; Beate Scholz (Scholz – consulting training coaching, formerly German Research Foundation, Germany), Eero Vuorio (University of Turku), Susanne Matuschek (Swiss National Science Foundation) and Iain Cameron (Research Councils UK), who together invested a lot of work and fruitful energy.

The work of the ESF MO Forum, the conclusions and recommendations of which are documented in this report, can be regarded as a milestone. Its future perspectives are included in the *EUROHORCs and ESF Vision on a Globally Competitive ERA and their Road Map for Actions* in a dedicated chapter on the promotion of European research careers. We hope and wish that the cooperation will continue in order to provide shape to the Forum recommendations.

Dr. Marc Heppener

Director of Science and Strategy Development,
European Science Foundation

1. Introduction

1.1 Executive summary

- **Rationale of the Member Organisation Forum on Research Careers:** The promotion of research careers is key to the activities of research-funding and -performing organisations in Europe. However, for the European Research Area to remain competitive in qualifying, retaining and recruiting the brightest and most creative researchers there is an urgent need to adopt a common strategy to ensure the attractiveness of research careers. Currently, research career policy in Europe is very largely determined at national, regional and even single university level – fragmentation remains widespread. Neither just overcoming fragmentation, nor merely creating uniformly structured career paths are sufficient to ensure the attractiveness of research careers. Creativity and originality in approaches, taking account of specific needs, are required, allowing capable scientists to pursue their careers in a variety of ways.
- **Aims:** Launched in November 2007, the ESF Member Organisation Forum on Research Careers serves as a joint platform for the exchange of views and experience and for the development of strategy concepts to be applied at national and supranational level. It provides an interface for ESF Member Organisations, the European Commission and universities in Europe represented by the European University Association and the League of European Research universities.
- **Objectives:** The ESF Member Organisation Forum on Research Careers seeks:
 - to develop a roadmap for research career development in Europe and by this means
 - to create new and improve existing European-level, including coordinated national, policies and programmes aimed at promoting different career stages, and
 - eventually to raise the international visibility of the ERA as a common labour market for researchers.
- **Actions:** In order to address the complexity and breadth of the topic most effectively the Forum organised its work between two working groups each of which defined its own focus areas. The outcomes of the mapping exercises and identification of good practices are built around those subgroups. The Forum has worked out an implementation plan which will form the backbone of its future activities. We have identified five fields in which we think joint actions have to be taken:
 - structuring of research careers;
 - improving the attractiveness and competitiveness of European research careers;
 - providing ‘equal playing fields’ for researchers of all backgrounds;

- supporting the development of ‘portfolio careers’;
- developing and implementing European policies for research career development.

1.2 Declaration

- **Structuring of research careers with the help of a joint taxonomy:** Extreme heterogeneity of career steps and confusion about terminology are major factors distracting researchers from a career in the public research sector. The Member Organisation Forum on Research Careers has thus developed a taxonomy for research careers with the aim of describing the academic research career structure in Europe. This concern is shared by the League of European Research Universities (LERU) and the European Commission’s Steering Group on Human Resources and Mobility who have set up their own working groups to this end. It will be to the benefit of researchers that in the future, research organisations, universities and the EC speak with one voice.

Knowledge about the career paths of researchers in non-academic R&D professions is still very limited. It will therefore be an important next step to identify appropriate partners from the private sector who could help to complete the picture of research career destinations and to identify good practice examples for intersectoral mobility.

Recommended action:

- *We advocate the formation of a working group by the Research Careers Forum incorporating representatives from universities, the European Commission and businesses to work out a joint taxonomy for research careers in the public and the private research sector.*

European added value:

- *Realising the European Partnership for Researchers.*

- **Improving the attractiveness and competitiveness of European research careers:** Although an increasing number of organisations in Europe have managed to introduce new funding schemes which offer salaried positions or stipends with social security benefits, this issue still needs to be addressed in many European countries. In addition, any remaining financial obstacles preventing the intersectoral mobility of researchers need to be studied.

Several research organisations in Europe have developed programmes to support research career development. However, not all of them meet the

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demands of their respective target groups in terms of reliable career prospects, scientific independence and flexibility, especially when it comes to cross-border mobility. In order to realise the ‘European Grant Union’ and to offer highly effective programmes it will be important for research organisations in Europe to learn from the research community’s feedback and to build on existing good practice.

Recommended actions:

- *The issue of ‘flexicurity’ is addressed by working groups at the level of the European Commission (EC). We suggest that the EC include experts from the Research Careers Forum in order to benefit from the joint knowledge and experience of research organisations in Europe.*
- *In addition, we suggest the formation of a working group by the Research Careers Forum with the aim of revisiting and advancing Member Organisations’ programmes for research career development. It should involve representatives of the ESF Member Organisation Forum on Programme Evaluation and researchers from the public and the private sector.*

European added value:

- *Realising the European Partnership for Researchers and the EUROHORCs/ESF ERA Roadmap.*
- **Providing ‘equal playing fields’ for researchers of all backgrounds through a new ‘scientific quality’ approach:** Inherent or hidden biases in the peer-review system potentially create obstacles to the career advancement of researchers who have left the (European) academic research system, e.g. for family reasons, to work in industry or to go abroad, and to researchers with especially risk-taking and innovative approaches.

Almost all obstacles and bottlenecks identified during a research career affect the careers of women scientists more severely than those of men. Therefore, the gender issue has to be kept in mind in all aspects of research career development in Europe, especially when it comes to mobility, working arrangements and peer review.

Recommended action:

- *We propose the formation of a working group by the Research Careers Forum in cooperation with the ESF Member Organisation Forum on Peer Review, and Evaluation of Funding Schemes and Research Programmes with the aim of preparing a new scientific quality approach (integrating a gender equality*

strategy) to be built on firm scientific quality standards. Notably, it should create transparency, e.g. on the share and success rates of women in research funding.

European added value:

- *Benchmarking for ESF and its Member Organisations; Enhancing the quality of European research by feeding into the strategies of ESF Member Organisations.*
- **Supporting the development of ‘portfolio careers’ by introducing a joint skills statement:** In order to give orientation to researchers qualifying for a successful career in the public or private sector we propose a joint skills statement. It includes the following definition and an agreed list of transferable skills:

Definition of transferable skills in a research context:

“Transferable skills are skills learned in one context (for example research) that are useful in another (for example future employment whether that is in research, business etc). They enable subject- and research-related skills to be applied and developed effectively. Transferable skills may be acquired through training or through work experience”.

Yet we still lack knowledge as to which kinds of skills are especially beneficial for the career development of researchers at a given stage and which attributes are asked for on the employers’ side. A coherent policy on continuous professional development therefore needs to be evidence-based.

Recommended actions:

- *We invite the ESF and its Member Organisations to adopt the joint skills statement and to provide the (financial) means for continuous professional development addressing researchers at all career stages.*
- *We stipulate the formation of a working group by the Research Careers Forum in cooperation with the ESF Member Organisation Forum on Evaluation of Funding Schemes and Research Programmes with the twofold aim of conducting a training-needs analysis and to study the impact of transferable skills on researchers’ career development in the public and the private sectors.*

European added value:

- *ESF Member Organisations can demonstrate the value of investing in continuous professional development (e.g. vis-à-vis their governments).*

- **Developing and implementing European policies for research career development by establishing a European Alliance for Research Career Development:** The increasing complexity of research career development in the era of globalisation and the accelerating dynamics in the global competition for talent demands immediate concerted action by the key players in Europe. In order to develop joint strategies for career development and to implement corresponding activities we see the necessity for ongoing exchange and interaction between research organisations¹, universities, the European Commission and the private enterprise sector. The Research Careers Forum has laid the foundations and will prepare the ground for setting up a 'European Alliance for Research Career Development'.

Recommended action:

- *We encourage ESF and EUROHORCs to establish and take ownership of the European Alliance for Research Career Development which should build on the competence and experience of the ESF Member Organisation Forum on Research Careers.*

European added value:

- *Strengthening the cohesion and thereby the competitive position of the ERA.*

1.3 Motivation of the Research Careers Forum

*'... the XXIst... will be the century of science and technology. More than ever, investing in research and technological development offers the most promise for the future. In Europe, however, the situation concerning research is worrying. Without concerted action to rectify this, the current trend could lead to a loss of growth and competitiveness in an increasingly global economy'*²

(Philippe Busquin, 2001)

It is vital that we realise that the world has entered a post-industrial era. The characteristics of this new era, referred to as the 'Knowledge Society', are quite different to those in the earlier cycles of economic growth and change. In this context, Europe has set itself the ambitious goal to become 'the most dynamic and competitive knowledge economy in the world' (Lisbon, March 2000)³.

1. I.e. research funding and non-university research-performing organisations.

2. Brussels, 18.1.2000. COM(2000) 6 final, Communication from the Commission, Towards a European Research Area.

3. Brussels, 11.9.2002, COM(2002) 499 final, Communication from the Commission. More research for Europe. Towards 3% of GDP.

To achieve this goal, the European Council agreed a spending target approaching 3% of GDP on European research and development (R&D) by 2010. As a consequence, the European Commission stated that Europe would need to make strong efforts to build additional research capacity in the near future:

*'Increased investment in research will raise the demand for researchers: about 1.2 million additional research personnel, including 700 000 additional researchers, are deemed necessary to attain the objective'*⁴

Despite the aspirations of governments and businesses alike, the outcome of investment in research careers in this new world of mobility and opportunity are poorly understood. The mechanisms by which graduates decide for, or against, a research career (whether in academia, business, the public sector etc.) are not well studied across Europe and the appropriateness and impact of policy instruments is not systematically analysed.

Individual research councils have designed strategies to develop research careers and have set up appropriate mechanisms and funding instruments within their own countries. However, considering the global competition for researchers, the approach has to encompass Europe as a whole and should accommodate both new measures and those which have proven their validity with respect to the challenges. It is not necessary to reinvent the wheel. Since some of the solutions are already existent they just need to be recombined, others still wait to be discovered. To quote the American economist, Paul M. Romer, *"Possibilities do not add up. They multiply."*⁵

The ESF Member Organisation Forum could indeed build on existing experience and previous successful interaction of its founders: The initiative to start the Forum was taken by members of the international Management Committee of the European Young Investigator (EURYI) Award⁶ and the informal European Network on Research Careers (ENRC)⁷. The EURYI Management Committee has been responsible for developing and handling the EURYI Award Programme which has been jointly carried out by around twenty research organisations⁸ in Europe under the umbrella of the European Heads of Research Councils (EUROHORCs) and the ESF. The ENRC, established in 2003 from an initiative by the German Research Foundation (DFG), likewise consists of experts in the field of research career development.

4. COM(2003) 226 final/2, Communication from the Commission, Investing in research: an action plan for Europe

5. Paul Romer: Economic Growth, The Concise Encyclopedia of Economics: Library of Economics and Liberty.

6. For more information on the EURYI Award, cf. www.esf.org/activities/euryi.html.

7. Cf. http://www.dfg.de/en/research_careers/focus/european_network_12/index.html.

8. I.e. research funding and non-university research-performing organisations.

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1.4 Mission and objectives

The promotion of research careers is key to the activities of research-funding and -performing organisations in Europe. However, for the European Research Area to remain competitive in qualifying, retaining and recruiting the brightest and most creative researchers there is an urgent need to adopt a common strategy to ensure the attractiveness of research careers. Currently, research-career policy in Europe is very largely determined at national, regional and even single university level – fragmentation remains widespread.

The ESF Member Organisation Forum on Research Careers serves as a joint platform for the exchange of views and experience and for the development of strategy concepts to be applied at national and supra-national level. It provides an interface for ESF Member Organisations (i.e. national research-funding and -performing agencies and academies), the European Commission and universities in Europe represented by the European University Association (EUA) and the League of European Research universities (LERU).

The importance and relevance of the Research Careers Forum is underlined by two recent documents:

- In their 'Vision on a Globally Competitive ERA and their Road Map for Actions' EUROHORCs and ESF attribute the ESF Member Organisation Forum on Research Careers a key role in
 - *'Developing a common vision on the research career structure for the ERA;*
 - *Ensuring ongoing career development for the individual researcher, including international or intersectoral mobility;*
 - *Creating attractive conditions for a research career;*
 - *Creating equal opportunities for male and female researchers from all backgrounds;*
 - *Ensuring that transferable skills are developed.'*⁹
- The strategy paper concerning a 'European partnership to improve the attractiveness of R&D careers and the conditions for mobility of researchers in Europe' written by the research ministers of Luxembourg and Portugal, François Biltgen and José Mariano Gago.¹⁰

In line with these visions and action plans the long-term goals of the Forum are:

9. EUROHORCs and ESF's 'Vision on a Globally Competitive ERA and their Road Map for Actions, 2009'.

10. A European partnership to improve the attractiveness of RTD careers and the conditions for mobility of researchers in Europe. Proposed Priority Actions, by François Biltgen and José Mariano Gago, 30 April 2009.

- to develop a roadmap for research career development in Europe and **by this means**
- to create or improve European-level, included coordinated national, policies and programmes aimed at promoting different career stages and
- eventually to raise the international visibility of the ERA as a common labour market for researchers.

1.5 Scope and structure

The work of the Research Careers Forum was directed by the chair (Beate Scholz) together with the ESF coordinator (Neil Williams, succeeded by Laura Marin in April 2009), in cooperation with the Steering Group, see the organisational chart of the Member Organisation Forum, Figure 1.1. The Steering Group encompassed the subgroup chairs (Eero Vuorio, Susanne Matuschek and Iain Cameron), two advisers (Martin Hynes and Zsolt Kajcsos) and permanent guests (Massimo Serpieri, European Commission; Lidia Borrell Damian and John Smith, both from EUA).

The Research Careers Forum started its activities at its Launch Conference in Brussels on 9 November 2007. In order to address the complexity and breadth of the topic most effectively the Forum identified three main topics and organised its work between two groups, one of which further divided into two subgroups. Each has defined its own focus areas:

Working Group 1: Conditions of a Research Career in Europe

Subgroup 1A: Research Career Structure and Development (Chair: Eero Vuorio)

Considering the confusing variety of career paths and the unpredictability of a research career in Europe many young researchers are led to either opt for a different career choice or to seek better conditions in a different research system. However, looking at the different national research environments many similarities and examples of good practice can be found.

It was thus central to ask:

- How could a common research career structure for the ERA be defined?
- How to ensure ongoing career development for the individual researcher including international or intersectoral mobility? How to allow for flexibility and security in this respect?
- How to create appealing (e.g. social, economic or funding) conditions for a research career?

As a number of these issues transcend the scope of research organisations and have to be tackled both at

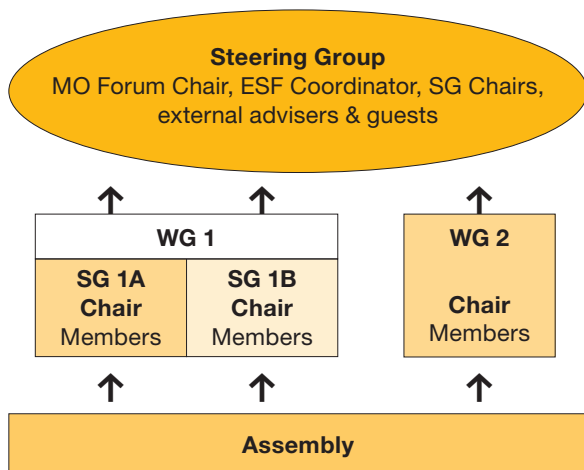


Figure 1.1: Organisational structure of the ESF Member Organisation Forum on Research Careers

the political level and at the level of universities, close interaction has been taking place with the European Commission especially in view of its recommendation on ‘Realising a Single Labour Market for Researchers’ and the ‘Partnership for Researchers’ strategy as well as with the EUA and LERU in view of their respective recommendations and ongoing activities.

Subgroup 1B: Gender Issues

(Chair: Susanne Matuschek)

In order to meet its ever increasing demand, the knowledge-based economy of Europe has to have access to the full potential of human capital, especially by attracting more women to the top jobs in research. Although the number of women entering universities and achieving academic degrees has exceeded the number of men in many European countries during recent years, there is still a significant gender gap as far as career advancement and the higher level of the research career ladder are concerned.

Therefore, it was crucial to analyse:

- What can be done to avoid negative effects on a woman research career after career breaks due to family reasons?
- How to provide adequate organisational structures in order to embed paternity or maternity leave as one measure to increase gender equality?
- How to encounter inherent or hidden gender biases and thus to provide ‘equal playing field’¹¹ for women’s research careers?

11. A state of equal opportunities for women and men in respect of a career in science and research

Working Group 2:

Human Resources Development

(Chair: Iain Cameron): **Transferable skills**

As only a small fraction of doctoral candidates choose an academic career and given the fact that researchers in academia also require competencies beyond being a good researcher, it is essential for researchers throughout their careers to acquire transferable skills. Understanding how these skills for researchers are developed in different countries and with what effects, has therefore been a central aim.

Key questions in this respect are:

- Which policies on transferable-skill provision are in place in the different European countries and how are they implemented? Which aspects of transferable skills are included?
- Which organisations are responsible for delivering the agenda in each country and how do they interact with each other and the research base?
- What is the particular policy and role of the respective research-funding or -performing organisation in this regard?

The Steering Group of the Forum held nine meetings on a bi-monthly basis assessing the overall progress, the initiatives and results of the subgroups and ongoing developments outside the Forum (e.g. at the level of the European Commission or within the EUA).

After its launch conference in November 2007, the Research Careers Forum organised two Annual Assemblies, the first in November 2008, the second in September 2009. The first Assembly aimed at presenting the preliminary findings of the Forum. Selected stakeholders were invited to provide feedback on the achievements and input to the further work. The second Assembly formally concluded the first phase of work of the Forum by adopting this report and submitting a renewal proposal to the ESF Governing Council which was adopted on 1 October 2009.

1.6 Methodology

(a) Joint selection of topics: In their first meetings the respective working groups/subgroups defined common points of interest and thereby developed an agenda for their future work. Some working groups/subgroups dropped or changed individual topics, e.g. if abundant evidence was already available.

- Subgroup 1A on Research Career Structure and Development focused on six topics:
 - Attractiveness of a research career;

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- Harmonisation of career steps;
 - Job status (fellowships versus salaries, open-ended versus fixed-term contracts);
 - Career breaks due to intersectoral mobility (academia ↔ industry ↔ public sector);
 - Predictability of research career (tenure track system) and
 - Independency/autonomy.
- Subgroup 1B on Gender Issues identified four topics:
 - Leaky pipeline;
 - Maternity/paternity/parental leave;
 - Career breaks due to family reasons;
 - Equal playing fields.
 - Working Group 2 on Human Resources Development elaborated the following key points with a special focus on the provision of transferable skills:
 - Government or other policy in each country, when it started, what is expected and how it is implemented;
 - Which aspects of transferable skills are included;
 - Which organisations are responsible for delivering the agenda in each country and how they interact with each other and the research base (universities, research organisations etc.);
 - The particular policy and role of the research councils or other ESF Member Organisation.

(b) Mapping: As a second step the respective subgroups/working groups conducted a mapping exercise which was based on surveys involving ESF Member Organisations and/or on the analyses of national and international surveys, policy papers and statistics. The analyses of the mapping results were undertaken by the respective subgroups or working group and the structure of the groups' reports jointly approved.

- Subgroup 1A on Research Career Structure and Development carried out a survey among the member organisations represented in the subgroup (see Annex 4.3). Although the geographic coverage of the nine replies was very limited, it was possible to identify a number of common trends and examples of good practice. Additional information has been obtained from members of the subgroup and from meetings with stakeholders, as well as from earlier surveys conducted in the EU.
- Subgroup 1B on Gender Issues analysed the gender policies and measures in 19 countries in a mapping exercise based on published reports, own knowledge and enquiries performed via the Internet as well as by personal contacts. Based on the preliminary findings, six countries (Germany, Ireland, Norway, Spain, Switzerland and UK) of special interest were identified for a deeper analysis.

- Working Group 2 on Human Resources Development conducted a survey addressing all ESF Member Organisations represented in the Research Careers Forum. In total 18 questionnaires were returned to the Working Group. Respondents had in many cases consulted other experts so that the answers did not necessarily represent only the Member Organisation's view, but allowed for a broader national perspective.

(c) Preparation of the report: The subgroup/working group chairs worked out reports for their respective group. These reports served as basis for working out the cross-cutting conclusions and recommendations. They were written by the Forum's chair in cooperation with the members of the Steering Group.

(d) Way forward: The Research Careers Forum has worked out a set of conclusions and recommended actions together with an implementation plan. As a next step it will develop a proposal to the ESF and EUROHORCs for renewing the Research Careers Forum in the shape of the European Alliance for Research Career Development. It will serve as a joint platform for interaction, exchange and (joint) policy development of its stakeholders.

1.7 Conclusions, recommendations and actions

Beate Scholz, Chair of the Research Careers Forum

The ESF Member Organisation Forum on Research Careers has based its work on the assumption that the mechanisms by which graduates decide for, or against, a research career (whether in academia, business, the public sector etc.) are not well studied across Europe and that the appropriateness and impact of policy instruments is not systematically understood. Even though individual organisations, ministries or advisory groups have designed strategies to develop research careers and set up corresponding funding instruments within their own countries, an approach which encompasses Europe on a broader scale is still missing.¹² Given the global competition for talent, Europe needs to remain competitive in attracting the brightest and most creative researchers as well as in training and developing the next

12. To name just a few: in the UK the reports by Sir Gareth Roberts 'SET for success' of 2002 and by Nigel Thrift 'Research Careers in the UK' of 2009, in Sweden the 'Karriär för kvalitet' report by Ann Numhauser-Hennig of 2007, in Germany the 'Bundesbericht für den wissenschaftlichen Nachwuchs' published by the Federal Ministry of Education and Research in 2008, in Ireland the report 'Towards a Framework for Researcher Careers' published by the Advisory Council for Science, Technology and Innovation in 2008.

generation of researchers. Therefore, we see an urgent need to adopt a common strategy to ensure the attractiveness of research careers in Europe as a whole.

In the course of its activities the Research Careers Forum was able to identify a number of challenges, gaps and bottlenecks within the research system which might induce researchers to leave. Taking into account recent findings and ongoing research on the ‘future of work’¹³ we did not confine ourselves to academic research careers in a narrow sense. We tried to enlarge our scope by analysing individual needs and organisational constraints which would have to be addressed in order to keep qualified knowledge workers in the research system – even beyond academia. In this regard we did not limit ourselves to the entry stage of a research career, the doctoral phase, but considered career development in research all along the line.

It has been our aim to go beyond exploring the current status of research career development. We also tried to identify policies and programmes which have proven their validity in responding to current challenges and needs which research-funding and -performing organisations should tackle in the future. Yet, we are aware that our mapping of existing (good) practices and our analysis of earlier reports and recommendations has to remain limited. Based on the expert knowledge of Member Organisation Forum participants and their collaborators we still believe that we can offer a set of recommendations and pinpoint future issues to ESF, its Member Organisations and other (political) actors who may be able to pave the way for more attractive research careers in Europe.

Structuring of research careers with the help of a joint taxonomy

Conclusions

Extreme heterogeneity of career steps and confusion about terminology are major factors to distract researchers from a career in the public research sector. The Member Organisation Forum on Research Careers has thus developed a taxonomy for research careers with the aim of describing the academic research career structure in Europe. Our intention is to allow orientation and comparability, not to achieve uniformity. Hence, the attributes of each stage have to be seen as descriptors and not as determinants.

Figure 1.2 shows the four-stage model of an academic research career, as it has been developed by Working Group 1 on Conditions of a Research Career

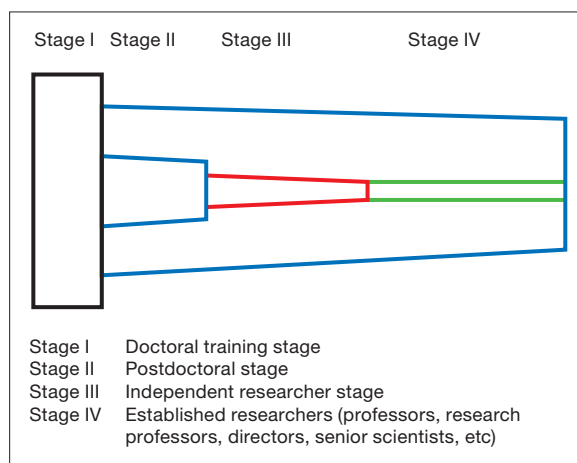


Figure 1.2. Schematic presentation of a four-stage research career

in Europe. The details of the model, including for each stage such features as the specific taxonomy, the job status, career perspectives, bottlenecks and examples of good practice, are described in the report by Subgroup 1A on Research Career Structure and Development (see Section 2).

Issues to be addressed

- The concern of providing orientation to researchers by working out a research career taxonomy is shared by the League of European Research universities (LERU) and the European Commission’s Steering Group on Human Resources and Mobility who have set up their own working groups to this end. It will be to the benefit of researchers that, in the future, research organisations, universities and the EC speak with one voice.
- Knowledge about the career paths of researchers in non-academic R&D professions is still very limited. It will therefore be an important next step to identify appropriate partners from the private sector who could help to complete the picture of research career destinations and to identify good practice examples for intersectoral mobility.

Defining a research career structure is clearly an important goal in itself. In order to provide orientation and guidance to the individual researcher, we see the need to get the message across by finding adequate communication channels. One of the end products of the process initiated by the Forum could be thus a ‘Handbook for Researchers’. It could be a web-based resource which includes the requirements and criteria of the different phases of a research career, an outlook on what happens after each phase and information on the roles, rights and responsibilities as well as the legal

13. Research projects on the ‘future of work’ are carried out in a number of countries. To name just a few: e.g. <http://www.leeds.ac.uk/esrcfutureofwork/index.html>, <http://www.iza.org/>

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and ethical framework of a research career with reference to The European Charter for Researchers and the Code of Conduct for Recruitment of Researchers of the European Commission.¹⁴

Recommended actions:

- *We advocate the formation of a working group by the Research Careers Forum incorporating representatives from universities, the European Commission and businesses to work out a joint taxonomy for research careers in the public and the private research sector.*
- *We invite the EURAXESS network under the auspices of the European Commission to produce the proposed 'Handbook for Researchers'.*

European added value:

- *Realising the European Partnership for Researchers.*

Improving the attractiveness and competitiveness of European research careers

Conclusions

Even if research organisations and universities in Europe manage to define a career structure for researchers we see a number of challenges remaining for research careers tracks in the European Research Area. Many of these refer to salary and job-security issues. We found that some national systems offer open-ended contracts already at an early stage sometimes coinciding with limited mobility and competition. In other systems short-term contracts prevail. In this case the very limited availability of permanent positions can lead to fierce competition and a high level of (social) insecurity which particularly induces women to leave the system. In addition, we can see a wide variation regarding the demand for and supply of researchers in different fields of research: Whereas some disciplines struggle to attract enough highly skilled applicants others – e.g. some humanities – have to cope with an oversupply of qualified personnel for too few positions in academia. This again underlines the need to endorse intersectoral mobility and to actively inform researchers about the range of their career options.

Of course we are aware that not all of these challenges can be solved at the level of research organisations and universities. Most of these call for concerted political action. In this regard we see the European Partnership for Researchers as an important step in the right direction. However, ESF Member Organisations could play

their part in creating more attractive social, economic or funding conditions for research careers, e.g. by

- Offering salaried positions or stipends supplemented by social security benefits,
- Enabling early scientific independence through targeted funding schemes and career development programmes,
- Achieving supranational agreement on entry conditions for similar programmes supporting different stages of research careers,
- Allowing more mobility within the ERA by enabling the portability of grants and social security benefits across national boundaries and between sectors,
- Providing reliable career prospects through tenure track offers and transparent criteria for career progression,
- Encouraging the interaction of peer groups of researchers at an early stage,
- Supporting gender equality measures, e.g. flexible research career models especially for women with children.

Issues to be addressed

- Although an increasing number of organisations in Europe have managed to introduce new funding schemes which offer salaried positions or stipends with social security supplements, this issue still needs to be addressed in many European countries. In addition, remaining financial obstacles preventing the intersectoral mobility of researchers need to be studied.
- In order to avoid very short-term contracts for researchers we invite Member Organisations to revisit the funding periods of their projects and make long-term funding (e.g. for three years or more) more easily available.
- Several research organisations in Europe have developed programmes to support research career development. However, not all of them meet the demand of their respective target groups in terms of reliable career prospects, scientific independence and flexibility, especially when it comes to cross-border mobility. In order to realise the 'European Grant Union' and to offer highly effective programmes it will be important for research organisations in Europe to take continuous account of the research community's feedback and to build on existing good practice.
- Especially for early career researchers the interaction in peer networks for the purpose of mentoring and research collaboration seems to be an important step towards achieving scientific independence. Usually, such networks need only a little funding to get started and to subsist. We therefore encourage the ESF and its Member Organisations to provide

14. European Commission: The European Charter for Researchers and The Code of Conduct for the Recruitment (2005) 32 pp. Luxembourg, ISBN 92-894-9311-9.

the necessary seed funding to enable such networks and thereby to foster international and intersectoral collaboration.

Recommended actions:

- *The issue of ‘flexicurity’ is addressed by working groups at the level of the European Commission (EC). We propose that the EC include experts from the Research Careers Forum in order to benefit from the joint knowledge and experience of research organisations in Europe.*
- *In addition, we suggest the formation of a working group by the Research Careers Forum with the aim of analysing and advancing ESF Member Organisations’ programmes for research career development. It should involve representatives of the ESF MO Forum on Evaluation of Funding Schemes and Research Programmes and researchers of different career stages from the public and the private sector.*

European added value:

- *Realising the European Partnership for Researchers and the EUROHORCS/ESF ERA Roadmap.*

Providing ‘equal playing fields’ for researchers of all backgrounds

(a) The ‘rush hour of life’

Conclusions

Research systems around the world and more specifically in Europe face the paradoxical situation that the share of women entering the higher education system increasingly exceeds the share of men, but women are still outnumbered by men in top research positions. The main reason behind this paradox is the increasing drop-out rate of women as they climb higher on the research career ladder which often coincides with the phase of having children, the so-called ‘rush hour of life’. Almost all obstacles and bottlenecks identified in the research career affect the careers of women scientists more severely than those of men. Therefore the gender issue has to be kept in mind in all aspects of research career development in Europe, especially when it comes to mobility, working arrangements and peer review.

The analysis of abundant literature, surveys and in-depth studies of good practice examples at national and international level has led to the following conclusions and recommendations which are described more in detail in the report by Subgroup 1B on Gender Issues (see Section 3):

- It is well known that women tend to drop out of a research career especially at the transition between the different career stages. Permanent statistics on

numbers of women in science (different career stages), applying for and receiving funding are needed to give a sound picture on measures and results for having more women at the top of research.

- Given that women still bear the majority of childcare responsibilities, women’s demand for well-aimed support in developing a research career is surely greater than that of men. The value of individual career development plans and role models which become tangible, e.g. in the framework of mentoring programmes cannot be underestimated in this respect.
- Mobility is often seen as an indicator of success in research careers. However, this mobility expectation is clearly ambivalent for women’s research careers: Either they tend to follow their partners to other destinations which might result in a career break and/or fewer publications, or they stay where they are which is consequently interpreted as a sign of immobility.
- Especially in research careers which are so much associated with the idea of vocation, the concepts of working and private life are often seen as mutually exclusive. By contrast, we advocate the concept of inclusion, in terms of a research policy which includes Work-Life Balance. Such policy could be operationalised, e.g. through part-time positions available to women and men at all different career stages and/or through programme offers which are geared to the needs of Dual Career Couples.

Issues to be addressed

We recommend to ESF and its Member Organisations to

- introduce gender equality targets and measures in their peer-review criteria as part of a ‘new scientific quality approach’;
- establish permanent and public monitoring based on gender-segregated statistics over all applications, allocation of funding and application behaviour at the different career stages;
- implement measures for an increase of applications from women researchers, e.g. by support through networking as well as of mentoring by peers;
- think of an alternative concept of mobility which offers not only stays abroad, but includes international working relations and the option of ‘virtual’ mobility;
- implement funding possibilities for early mobility as part of doctoral education, meaning before the ‘rush hour’, and this to be accepted as equivalent to mobility at the postdoc level in peer-review processes;
- urge for more flexible and affordable childcare facilities especially at universities.

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(b) Towards a new scientific quality approach

Conclusions

Inherent or hidden biases in the peer review system potentially create obstacles to the career advancement of researchers who have left the (European) academic research system, e.g. for family reasons, to work in industry or to go abroad, and to researchers with especially risk-taking and innovative approaches¹⁵. It is of course not our intention to question or replace ‘scientific quality’ as the prevalent selection criterion in peer review or recruitment. We propose a couple of additional features which might help to assure more openness and flexibility:

- In reviewing scientific achievements these should be normalised to the actual research experience which an applicant has gained. This would allow taking into account individual circumstances such as career breaks, e.g. due to family reasons or intersectoral mobility.
- Researchers working in industry often do not have the right to publish their results to the same extent as researchers in public research institutions. Adequate criteria to assess their achievements still need to be developed. In this respect it might help to focus on a researcher’s project proposal rather than to concentrate on his or her past scientific performance.
- In general, quantitative aspects should count less when it comes to analysing a researcher’s publication or track record. It should rather be left to the researcher’s discretion to list a very limited number of relevant publications or grants.
- In dealing with proposals from ‘first applicants’ or with high-risk projects it might be pertinent to attach more importance to the qualified *ex-post* evaluation of the results rather than to the detailed *a priori* assessment of the initial proposal.
- Especially in programmes aiming at researchers’ career development further information (e.g. on an applicant’s potential) might be gained through interviews in addition to written peer review procedures.
- Recruitment and hiring procedures in universities and research institutions need to be transparent and made public. As a principle, positions should be announced through open calls. Sometimes targeted hiring might be equally appropriate or even more feasible. In this case quality standards should be assured, e.g. through external review statements as has been suggested by the European Charter for Researchers¹⁶.

15. Cf. Liv Langfeldt, Nils Henrik Solum: The 2nd evaluation of the European Young Investigator Award Scheme (EURYI), Oslo 2007.

16. Cf. European Commission: The European Charter for Researchers and The Code of Conduct for the Recruitment of Researchers, Brussels 2005, p. 21.

Issues to be addressed

- We invite the ESF and its Member Organisations to revisit their review practices for the purpose of realising a new ‘scientific quality’ approach.
- We recommend highlighting existing good practice in the support of researchers who would like to re-enter an R&D profession after a career break. The integration of Human Resources specialists, especially from the private sector, will be essential at this point.

Recommended action:

We propose the formation of a working group by the Research Careers Forum in cooperation with the ESF Member Organisation Fora on Peer Review and Evaluation of Funding Schemes and Research Programmes with the aim of preparing a new scientific quality approach (integrating a gender equality strategy) to be built on firm scientific quality standards. Notably, it should create transparency, e.g. on the share and success rates of women in research funding.

European added value:

- *Benchmarking for ESF and its Member Organisations.*
- *Enhancing the quality of European research by feeding into the strategies of ESF Member Organisations.*

Supporting the development of ‘portfolio careers’ by introducing a joint skills statement

Conclusions

Research careers nowadays tend to be less path-dependent and to develop more and more into ‘portfolio careers’. In consequence, the traditional career pipeline model is increasingly replaced by the model of a ‘career tree’. It symbolises the decreasing linearity of career paths which is accompanied by the trend to combine several part-time roles building up to one full-time role, e.g. by working part-time in different fields of employment. In addition, globalised labour market developments demand increasing flexibility and (intersectoral) mobility of highly-skilled knowledge workers.

We have based our work on the assumption that only a small fraction of doctoral candidates decide on a career in academia. Given the fact that not only professionals working outside R&D, but also researchers in academia or the private sector require competencies beyond being a good researcher, it is essential for researchers to acquire transferable skills throughout their careers. Understanding how these skills are developed in different countries and with what effects was therefore a central

aim. In particular, we tried to analyse in the framework of a survey/questionnaire (see Annex 4.3):

- which policies on transferable skill provision are in place in different European countries and how are they implemented,
- which aspects of transferable skills are included,
- which organisations are responsible for delivering the agenda in each country, and
- how they interact with the policy and role of the respective research funding or performing organisation.

Our survey needs to be seen as a snapshot of the current situation in a limited number of European countries. However, it has confirmed an increasing awareness in ESF Member Organisations of the need to provide transferable skills in the framework of the research qualification process. We still find a wide spectrum of approaches regarding the delivery and funding of transferable skills, but a strong consistency when it comes to the sets of skills which are provided. Currently, transferable skills training mainly takes place during the doctoral training phase or earlier as part of Bachelor or Master studies. In line with the demand for lifelong learning we see the need for the continuous provision of transferable skills as part of ongoing individual career development.

Issues to be addressed

- In order to give orientation to researchers qualifying for a successful career in the public or private sector we propose a joint skills statement to be adopted by ESF Member Organisations. It includes the following definitions and an agreed list of transferable skills:
 - a) Research-oriented definition of transferable skills
Transferable skills are skills learned in one context (for example research) that are *useful* in another (for example future employment whether that is in research, business etc). They enable subject- and research-related skills to be applied and developed effectively. Transferable skills may be acquired through training or through work experience.
 - b) Generic definition of transferable skills
Transferable skills are necessary for effective performance by individuals in a workplace. They are skills that all types of study, work and career have in common and they can serve as a bridge from study to work and from one career to another. They may be acquired through work experience or by training.
 - c) Transferable skills encompass:
 - Working with others/team working
 - Communication/presentation skills, both written and oral

- Communication/dialogue with non-technical audiences (public engagement)
 - Project and time management skills
 - Research management – research leadership
 - Creativity and the ability for abstract thought
 - Knowledge of research methods and technologies beyond the doctoral project
 - Teaching skills
 - Mentoring and supervisory skills
 - Enterprise skills (entrepreneurship, commercialisation, innovation, patenting and knowledge transfer)
 - Research ethics and research integrity
 - Use of science in policy making
 - Problem solving
 - Negotiation skills
 - Networking skills
 - Grant application writing skills
 - Career planning skills
- In our analysis of transferable skills in Europe we found that only a few ESF Member Organisations base their programmes to support transferable skills provision on a systematic training needs analysis. The same holds true for the quality assurance of transferable skills programmes. Thus, we still lack knowledge of what kinds of skills are especially beneficial to the career development of researchers at a given stage and which attributes are asked for on the employers' side. We are convinced that a coherent policy on continuous professional development needs to be evidence-based.
 - We also share the view that deciding on a career outside the rather narrow academic track should not be considered a failure. Therefore we suggest that ESF prepare a publication which illustrates successful (research and related) careers inside and outside academia and presents role models for the next generation.

Recommended actions:

- *We invite the ESF and its Member Organisations to adopt the joint skills statement and to provide the (financial) means for continuous professional development addressing researchers at all career stages.*
- *We stipulate the formation of a working group by the Research Careers Forum in cooperation with the ESF Member Organisation Forum on Evaluation of Funding Schemes and Research Programmes with the twofold aim of conducting a training-needs analysis and to study the impact of transferable skills on researchers' career development in the public and the private sector.*

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European added value:

- *ESF Member Organisations can demonstrate the value of investing in continuous professional development (e.g. vis-à-vis their governments).*

Developing and implementing European policies for research career development by establishing a European Alliance for Research Career Development

The increasing complexity of research career development in the era of globalisation and the accelerating dynamics in the global competition for talent demands immediate concerted action by the key players in Europe. In order to develop joint strategies for career development and to implement corresponding activities we see the necessity for ongoing exchange and interaction between research organisations, universities, the European Commission and private enterprise. The Research Careers Forum has laid the foundations and will prepare the ground for setting up a ‘European Alliance for Research Career Development’.

Recommended action:

- *We encourage ESF and EUROHORCs to establish and take ownership of the European Alliance for Research Career Development which should build on the competence and experience of the ESF Member Organisation Forum on Research Careers.*

European added value:

- *Strengthening the cohesion and thereby the competitive position of the ERA.*

Vision

With the help of the European Alliance for Research Career Development we would like to help to realise the following vision:

- For our societies to make full use of their intellectual potential by allowing the broadest possible intake into the research system through the most diversified qualification ‘channels’ (symbolised by the roots of the tree) and by enabling the most diversified portfolio career tracks for the benefit of the individual and of society at large (symbolised by the branches of the tree).
- For researchers to be fully aware of their career options and to take self-determined career decisions which allow them utmost flexibility especially in combining a private and a working life,
- For entrepreneurial knowledge institutions – be they public or private – to be aware that having a highly



qualified and motivated staff is their main ‘production factor’ and therefore to pay attention to the best possible development of the individual for the sake of the institution.

References

- EUROHORCs and ESF Vision on a Globally Competitive ERA and their Road Map for Actions, 2009,
- European Commission, Communication from the Commission, Towards a European research area, Brussels 18.1.2000, COM (2000) 6 final,
- European Commission, Communication from the Commission, More research for Europe. Towards 3% of GDP Brussels, 11.9.2002, COM(2002) 499 final,
- European Commission, Communication from the Commission, Investing in research: an action plan for Europe, Brussels, 4.6.2003, COM(2003) 226 final/2,
- European Commission, The European Charter for Researchers & The Code of Conduct for the Recruitment of Researchers, Brussels 2005,
- European Commission, Communication from the Commission to the Council and the European Parliament. Better careers and more mobility: A European partnership for researchers, Brussels, 23.5.2008, COM (2008) 317,
- François Biltgen and José Mariano Gago, An European partnership to improve the attractiveness of RTD careers and the conditions for mobility of researchers in Europe. Proposed Priority Actions, 30 April 2009,
- German Federal Ministry for Education and Research, Bundesbericht zur Förderung des wissenschaftlichen Nachwuchses, Bonn, Berlin 2008,
- Irish Advisory Council for Science, Technology and Innovation, Towards a Framework for Researcher Careers, October 2008,
- Liv Langfeldt, Nils Henrik Solum: The 2nd evaluation of the European Young Investigator Award Scheme (EURYI), Oslo 2007,
- Nigel Thrift, Research Careers in the UK. A Review, 2009,
- Paul Romer: Economic Growth, The Concise Encyclopedia of Economics: Library of Economics and Liberty,
- SET for success. The supply of people with science, technology, engineering and mathematics skills. The report of Sir Gareth Roberts' Review, London April 2002,
- Swedish Government Official Reports, 'Karriär för kvalitet', Stockholm 2007.

2. Working Group 1: Conditions of a Research Career in Europe

Subgroup 1A: Research Career Structure and Development (Chair: Eero Vuorio)

2.1 Goals of Subgroup 1A

The work of the subgroup focused on six themes which were selected by Subgroup 1A (Research Career Structure and Development) as the most important ones: attractiveness of a research career; harmonisation of positions/steps; job status (fellowships versus salaries, open-ended versus fixed-term contracts); career breaks; intersectoral mobility (academia ↔ industry ↔ public sector); predictability of research career (tenure track system); and independence/autonomy. These themes were further developed during the subsequent meetings.

Subgroup 1A organised four meetings (in Helsinki on April 2, 2008, in London on 24-25 June 2008, in Helsinki on 2 October 2008, in Frankfurt airport on 21 January 2009) and participated in one joint meeting organised by Subgroup 1B (Gender Issues) in Zurich airport on 16 April 2009. Many members had also participated in the kick-off meeting in Brussels on 8 November 2007 and in the ESF Member Organisation Forum Annual Assembly in Brussels on 11-12 November 2008. The chair of Subgroup 1A also participated in all Steering Group meetings of the Member Organisation Forum.

2.2 Methodology

To obtain a better understanding of the research career structure in the home countries of ESF Member Organisations, a survey questionnaire was drafted by the subgroup. The questionnaire was initially sent to Member Organisations participating in the work of Subgroup 1A, and later also to other selected organisations. Unfortunately it has not been possible to obtain replies from many Member Organisations contacted. However, the questionnaires which were received allow the identification of common trends although they have to be looked upon as case studies from the participating countries. This report is largely based on answers received from eight countries (Denmark, Finland, Luxembourg, Netherlands, Poland, Sweden, Switzerland, Turkey) and information from LERU (representing 20 universities in eight European countries) which has its own Working Group on Research Career Development. Additional information has been obtained from members of the subgroup and from meetings with stakeholders, as well as from earlier surveys conducted in EU (as summarised in the text).

2.3 A four-stage research career structure

Based on the mapping survey, Working Group 1 has divided the European research career into four stages as illustrated schematically in Figure 2.1. In some countries the post-doctoral and/or independent researcher stages are further divided into two separate stages, whereas some scientists consulted actually expressed their preference for a three-stage research career structure where stages II and III are combined. Subgroup 1A decided to adhere to the four-stage structure as several existing national and international programmes support such staging. Also the LERU Working Group bases its work on a similar four-stage career structure. Stage I, comprising the doctoral training period, and stage II (the post-doctoral period) have relatively uniform definitions. Stage III is the most heterogeneous one: in many scientific fields it is referred to as the 'independent researcher stage' or 'group leader stage', but extends further to encompass senior scientists and assistant professorships. In the academic career, stage IV means full professorships, but also includes other senior positions in academia, research-performing organisations (RPOs)¹⁷, industry and administration.

2.4 Academic and non-academic research careers

Subgroup 1A attempted to look at the European research career structure in the broadest possible context comprising not only the academic career ending in a professorship (in universities and in research-intensive RPOs), but also other academic research and teaching positions, and the different non-academic career alternatives in RPOs, industry, administration etc., although the actual job descriptions may not be directly related to research work. However, this approach faces a number of challenges:

(a) Little systematic data seems to be available on research careers outside academia. Individual universities and graduate training programmes have collected information on their graduates and the DOC-CAREERS survey of EUA provides important information on the employment destinations of doctorate holders in selected EUA universities¹⁸

17. In this report RPO refers to non-university research-performing institutions. In some European countries the RPO concept covers both universities and research institutions involved in the conduct of basic and applied research.

18. EUA: Collaborative Doctoral Education: university-industry partnerships for enhancing knowledge exchange, Brussels 2009, p 116f.

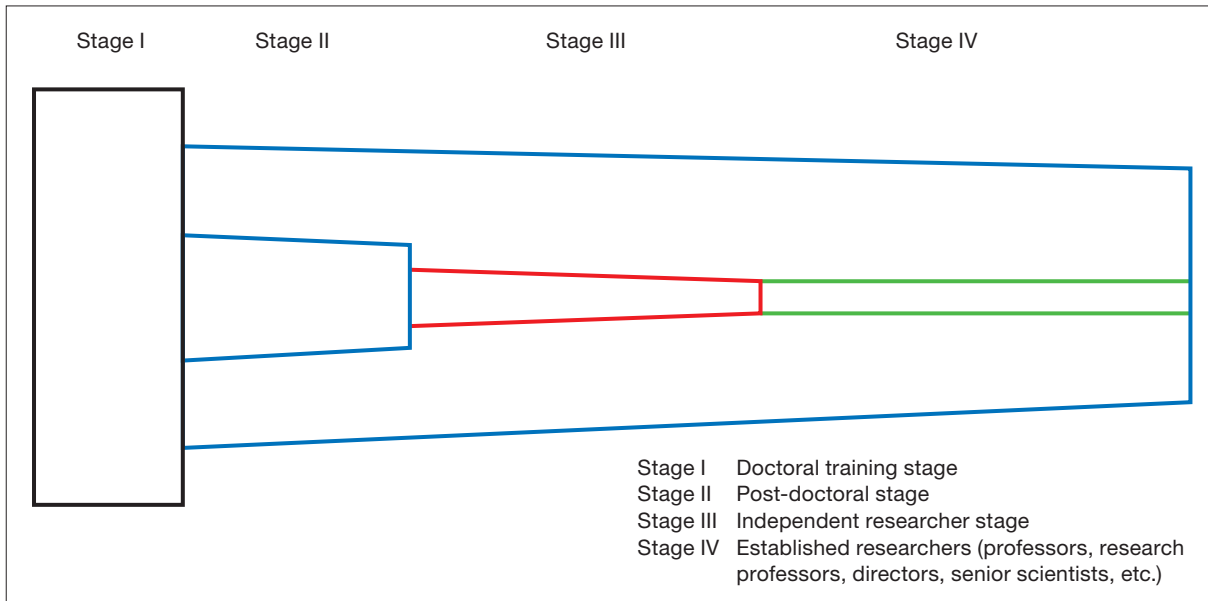


Figure 2.1. Schematic presentation of the four-stage research career

(b) In industry, administration and other non-academic areas job titles are quite heterogeneous, which makes direct comparisons with the academic four-stage career structure difficult. This situation probably explains why earlier surveys and presentations of the research career structure in Europe have focused on the academic career.

In most European countries academic institutions and public funding agencies adhere to and support the four-stage career structure. Most such programmes are currently targeted to support scientific excellence, and give little attention to the bulk of doctoral-level researchers who have not been successful or have selected other career paths. Unfortunately, even less systematic data seems to be available on research careers outside academia. In industry, administration and other non-academic areas job titles and requirements demonstrate more heterogeneity, which makes direct comparisons with the academic career structure difficult. This situation probably explains why earlier surveys and presentations of the research career structure in Europe have focused on the academic career.

In Finland (Figure 2.2) and Sweden (Swedish Government Official Reports: Careers for quality [Karriär för kvalitet] (2007) SOU 2007:98) recent reports have attempted to estimate the volumes of different career paths after a doctoral degree.

2.5 Attempts to group the different European research career structures and policies

Research careers differ greatly between disciplines and also between national systems. At least three kinds of groupings of research career systems can be proposed based on the information obtained by Subgroup 1A from member organisations and stakeholders. In many countries national (public) funding agencies have schemes to support the different steps of research career. Examples include the Nordic countries (Vetenskapsrådet in Sweden and the Academy of Finland), Germany (the German Research Foundation's, DFG, 'funding chain' to support research careers including the Emmy Noether and the Heisenberg Programme), the Netherlands (the Vernieuwingsimpuls programme, Veni-Vidi-Vici-scheme of the NWO), Luxembourg, Switzerland (Swiss National Science Foundation, Division for Individual Funding; 'funding chain' to support research careers with several programmes) and Turkey (different Tübitak schemes). Such grouping of research career systems and policies can be based on three variables:

(a) University versus RPO-driven research policy. In some countries of the European Research Area (ERA) research is to a considerable degree carried out in RPOs and/or academies, while in others the universities are the most important sites for research. This is often a policy

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Research Career Structure and Development

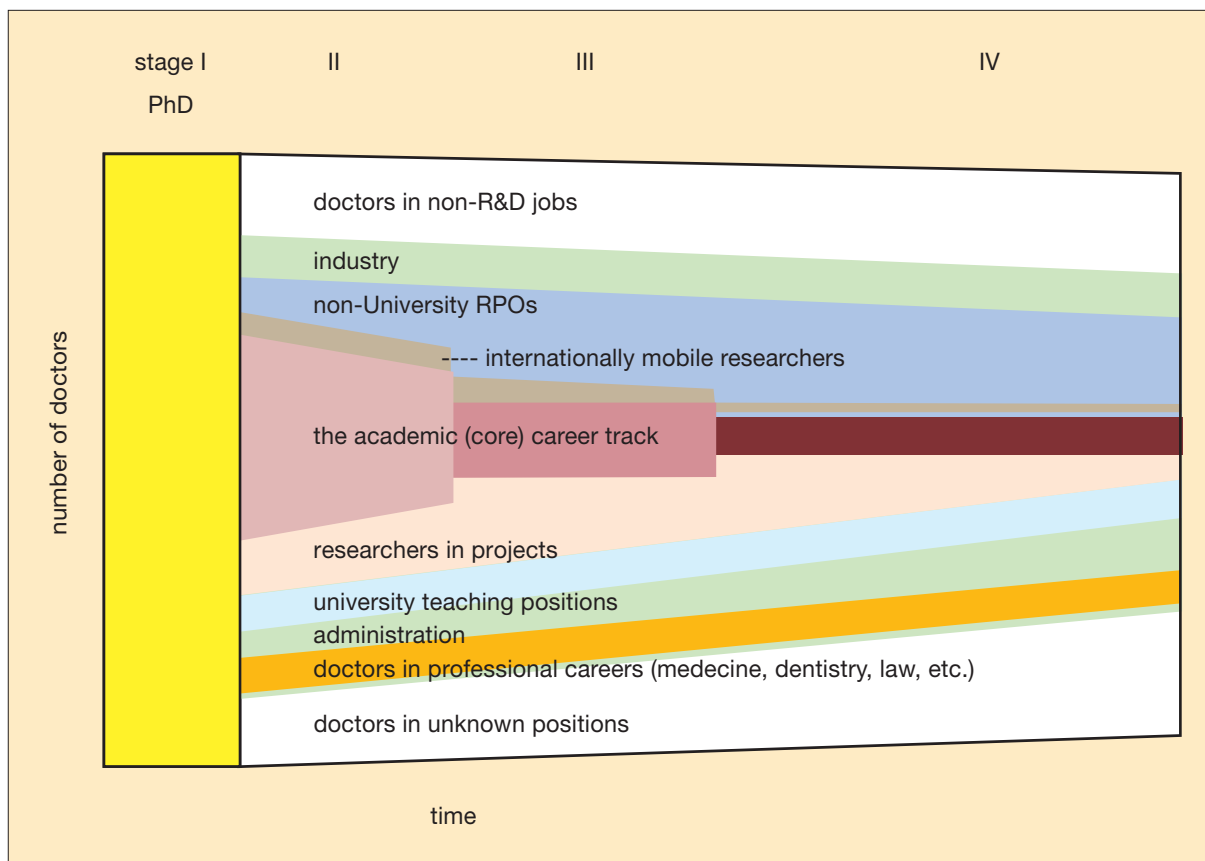


Figure 2.2. Schematic illustration of the diversity of research careers in the European Research Area (ERA) using Finland as a concrete example.

Figure 2.2: Schematic illustration of the diversity of research careers in the European Research Area (ERA) using Finland as a concrete example.

In Finland an attempt has been made to estimate the progression of research careers based on official statistics and different surveys. Finnish universities annually award approximately 1 500 doctoral degrees in total. As the number of professors appointed annually is approximately 150, roughly 10% of the newly appointed PhDs can expect to attain a professorship. Although the distribution of doctoral-level researchers in the different career paths is likely to vary between countries, it seems clear that a majority of doctoral-level researchers end in non-academic research (or R&D) careers.

Source: Ministry of Education, Tutkijanuratyöryhmän loppuraportti. Opetusministeriön työryhmämuistioita ja selvityksiä 2006: 13: 1-57 (ISBN 952-485-143-1) [in Finnish].

decision which is illustrated by the distribution of basic budgetary and competitive public funding between universities, academies and RPOs. This difference is also reflected in career structures. In some countries RPOs have also the right to grant doctoral degrees, although in most countries this is done only by universities. However, in many countries training towards doctoral degree may predominantly take place outside a university although the degrees are mainly awarded by the universities.

(b) Discipline- and paradigm-dependent variability.

In many scientific fields research is increasingly performed in research groups. Under such circumstances the progression of a scientist from one stage to another is usually easier to describe than in areas where research is largely carried out by individuals (e.g. humanities, social sciences). Subsequently, the term 'independent researcher' only for stage III (and IV) positions may be misleading, as many post-doctoral researchers may already be quite independent.

(c) Policy on fixed-term versus open-ended contracts (permanent positions). Although career structures differ between universities, RPOs, academies, businesses and administration, most ESF member states appear to have specific programmes to support an academic research career, particularly for stages I and II, and often also for stage III, usually funded by public funding organisations (ESF Member Organisations). Particularly in Northern and Western Europe such positions are for a fixed term and are highly competitive and provide attractive career possibilities for the recruitment of the best researchers although they are non-tenured. Particularly in the new EU Member States and new associated countries the competitive element appears to be more limited: researchers obtain open-ended contracts relatively early in their career and the competitive component is thereafter quite small. In some countries, e.g. Switzerland, permanent positions are rare and usually only linked to a professorship. In many EU countries, labour laws require fixed-term positions to become permanent after a set number of years also in universities.

2.6 Compilation of the findings of Subgroup 1A

The report aims to summarise key features (taxonomy, job status, recruitment, training, career perspectives) at each stage of the career structure and to list examples of best practice. It also highlights the biggest obstacles/bottlenecks identified and gives recommendations to various stakeholders regarding the development of research careers in Europe.

Stage I. Doctoral training

Taxonomy: Although doctoral training (the third cycle of the Bologna Process) is relatively well defined in Europe, considerable variability exists in nomenclature throughout the ERA. Titles such as doctoral candidate, doctoral trainee, and doctoral student are used in EU Member States regardless of job status. The European Charter for Researchers and the Code of Conduct for Recruitment of Researchers (Charter and Code) of the European Commission¹⁹ propose the term ‘early stage researcher’ for all doctoral candidates, but translation of such terminology into European languages has not been particularly successful. Job titles such as ‘junior researcher’ and ‘research assistant’ are also used variably for doctoral candidates and post-doctoral researchers. Subgroup 1A encourages recognition of doctoral candidates as

(early stage) researchers throughout the ERA, including the development of job titles corresponding to ‘early stage researcher’.

The duration of doctoral studies varies throughout EU Member States and between disciplines. Doctoral training programmes established in Europe usually limit this stage to three to four years of full-time work (EUA Glasgow Declaration²⁰). In many countries the requirements for a doctoral thesis are expressed as a minimum (or recommended) number of original publications. Subsequently it is not uncommon that much more than four years are spent on thesis work particularly when research is carried out outside structured training programmes and supervisory committees. Potential reasons for these delays include poorly structured training and insufficient supervision as well as disturbance caused by other duties, e.g. heavy teaching load, concomitant professional training or part-time employment elsewhere.

Job status: the job status of doctoral researchers is highly variable throughout the ERA. Three parallel routes exist in many member states:

1. Some doctoral schools and training programmes (graduate schools or postgraduate schools) offer training positions with salaries.
2. Other doctoral schools and training programmes offer training funded by stipends (with or without social and pension benefits).

The above programmes have been reviewed by the European University Association (2007).

3. Another group of doctoral candidates carry out their research work outside official training programmes, often in different teaching positions or as researchers on projects. Others work towards their doctoral degree funded by stipends or while employed full-time or part-time elsewhere.

Recruitment: Based on the job status, the recruitment policies also vary considerably.

(a) Doctoral schools and training programmes usually organise open calls with transparent selection criteria and interviews, whereas (b) other doctoral candidates are often recruited without any preannounced criteria or competitive element. Those working on personal stipends have often gone through very rigorous selection procedures by outside evaluators. Any absence of transparency usually works to the disadvantage of equal opportunities.

In many countries nearly any graduate with a Master’s degree can sign up for doctoral (PhD) training if s/he

19. European Commission: The European Charter for Researchers and The Code of Conduct for the Recruitment (2005) 32 pp. Luxembourg, ISBN 92-894-9311-9.

20. EUE Salzburg Principles prepared from their doctoral projects for the 2005 Bologna Process Ministerial meeting – www.eua.be/eua/jsp/en/upload/Salzburg_Conclusions.1108990538850.p

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can find a supervisor for the work among the staff of the department. The situation is completely different from the one in the United States, where a very competitive selection process determines that only a certain percentage of students can enter PhD/doctoral training.

The training syllabus of doctoral training is highly variable. Under the best circumstances doctoral training programmes in universities and many RPOs provide a range of training courses from which the doctoral candidates select their formal training based on their preferences and on formal requirements. Many doctoral programmes encourage participation in international training courses and support participation financially. Structured doctoral programmes tend to prepare their early career researchers for a labour market which is much wider than academia. Training (and funding) for students outside doctoral training programmes may be much more limited and often unpredictable. While the training programmes often list the rights and responsibilities of the trainee, the supervisor(s) and the thesis committee, the traditional master-apprentice model seems to prevail outside the doctoral programmes. Further variation stems from different training requirements of faculties. In Ireland, national guidelines have been adopted for organisation of doctoral training²¹ There have been suggestions to introduce skills statement forms both for self-evaluation and for formal follow-up of progression, as discussed in detail in Section 4.

Career perspectives: Information on research career perspectives has focused on the academic career because systematic information is not readily available for the different career alternatives in other fields. Individual scientists may provide examples of their personal careers and different Web portals are available. In interviews doctoral researchers themselves have reported positive experiences from their own networks (of peers) for mentoring, coaching and career planning. This is much more important for women as they usually have more difficulties in getting access to mostly male-dominated peer networks.

A survey conducted by an EC Expert Group in 2002²² investigated the first destinations of researchers after attaining their PhD. Although the survey is not the most recent one, the general trends are probably still valid. Several national surveys are also available.

Obstacles/bottlenecks: Sometimes doctoral trainees

have been recruited with the promise of unrealistic career perspectives, which may lead to great disappointment. Therefore realistic figures should be presented to allow potential candidates to make an informed decision. The number of post-doctoral positions available in the next stage of a research career is often much lower than the number of young doctors, which makes competition for stage II quite fierce. If career prospects in research are not clear or appear unrealistic, young doctors may select another career with a more predictable career outlook outside academia, e.g. in industry or administration.

This probably holds all the more true for the opportunities and perspectives the science system can convincingly offer to women scientists.

The issue of social security and pension schemes for researchers on stipends is an important issue in the ERA. In several European research funding organisations, all researchers working on funded projects must be employed at a national research institution, and with a contract assuring the payment of contributions for social security. The issue of researchers receiving stipends which are usually without any contributions to social security remains partially unsolved.

Good practice: Doctoral training programmes in many countries have introduced a number of 'good practice', e.g. transparent recruitment policies; systematic training programmes, transparent supervision and follow-up policies with thesis committees; as well as listing of rights and responsibilities of trainees and supervisors.

More information on doctoral training programmes is available through several organisations. These include EURODOC (the European Council of doctoral candidates and young researchers; www.eurodoc.net), the European University Association (EUA) and the European Commission. Many of the basic principles of the Charter and Code have been implemented in EU Member States. To help raise awareness and create more clarity the Commission launched the EURAXESS – Researchers in motion website (ec.europa.eu/euraxess/index). To increase the implementation of the Charter and Code, the EC has also launched a Promoter's Network in 2008. This network will analyse awareness of the Charter and Code and its concrete application by the institutions which have endorsed it, and develop new communication tools to help better promote the Charter and Code²³. In some countries, such as the UK, national agreements have been widely approved endorsing the principles of the Charter and Code (The Concordat to Support the Career Development of Researchers (2005) pp24.; www.researchconcordat.ac.uk/)

21. Irish Universities Quality Board (IUQB), Guidelines: Good practice in the organisation of PhD programmes in Irish higher education. 2nd edn. (2009) pp. 72.

22. STRATA-ETAN expert working group: Human Resources in RTD (including attractiveness of S&T professions, Brussels 2002, pp. 83ff.

23. European Commission: The European Charter for Researchers and The Code of Conduct for the Recruitment (2005) 32 pp. Luxembourg, ISBN 92-894-9311-9.

Good practice: EURODOC

EURODOC is a federation of national associations of PhD candidates and young researchers.

EURODOC's objectives are:

- To represent doctoral candidates and junior researchers at the European level in matters of education, research and professional development of their careers.
- To advance the quality of doctoral programmes and the standards of research activity in Europe.
- To promote the circulation of information on issues regarding young researchers; organise events and surveys, take part in debates and assist in the elaboration of policies about Higher Education and Research in Europe.
- To establish and promote cooperation between national associations representing doctoral candidates and junior researchers within Europe.

EUA has recently set up a Council for Doctoral Education (CDE) as a membership service where good practices in graduate schools in the >130 member universities throughout Europe are collected and catalogued (www.eua.be/cde).

Good practice: EUA-CDE (Council for Doctoral Education)

EUA-CDE was established in 2008. It creates a strong voice for European universities on doctoral education both inside Europe and internationally and contributes to enhancing the visibility of doctoral/graduate/research schools and programmes. It builds on the outcomes of EUA's policy and project work on doctoral education and research careers, and seeks to respond to growing demands from members for a more structured supporting framework and additional opportunities to promote cooperation and exchange of good practice on issues of common concern related to the organisation and quality of doctoral education in universities across Europe.

Objectives of EUA-CDE

- To enhance the quality of doctoral education in European universities by fostering debate and promoting the exchange and dissemination of good practice.
- To encourage and support the development of institutional policies and strategies as well as the introduction of effective leadership and management practices.
- To improve the availability of data and information on doctoral education in European universities.

- To identify and monitor emerging trends in doctoral education inside and outside Europe.
- To act as a representative voice of European universities in the dialogue with other stakeholders on the issues of doctoral education.
- To contribute to strengthening the international dimension of doctoral programmes and research training through improved cooperation among its members and in particular by establishing dialogue with partner organisations in other world regions.
- To build and develop a strong link between education and research policies and strategies within Europe.
- To promote the doctorate and doctorate holders as careers upon which to build a knowledge-based society.

In many other EU Member States extensive reorganisation of doctoral training and of later stages of a research career have been initiated with an intention to fully re-shape doctoral education. One example is the German Excellence Initiative. Another example comes from Ireland, where the Graduate Research Education Programme launched in 2006 contributes to doubling the number of PhDs within the next five years.

The issue of social security and pension schemes for researchers on stipends has found a solution in Finland. In 2009 an obligatory pension scheme was introduced for all scientists working on tax-free stipends for a period of four months or longer ('stipends with a backpack').

Good practice: Mela insurance for recipients of grants or scholarships in Finland (stipends with a backpack): <http://www.mela.fi/Kielietusivu.aspx?path=172,526,3275>

- Organised under the Farmers' Social Insurance Institution, Mela, which is responsible for the statutory pension (MYEL) and occupational accident insurance (MATA) of the persons who have a grant or a scholarship and who have to be insured in Finland as of the beginning of 2009. This insurance is mandatory.
- Available also for the foreign recipients of grants or scholarships if they are covered by Finnish social security. This insurance cover is mandatory and all recipients of this insurance must be active in the application process.

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Stage II. Post-doctoral training

Taxonomy: Although the concept of post-doctoral researchers is well understood there is considerable variability in job titles and in the practical organisation of this stage in Europe. Eligibility for a post-doctoral position does not usually extend beyond 5-8 years after the doctorate is awarded. However, in some countries, the concept of a post-doctoral researcher is used for non-independent researchers also in the later stages of their career.

Subgroup 1A has identified four kinds of post-doctoral career paths in Europe:

1. Many national funding agencies have their 2-3 year post-doctoral funding schemes, as do the EC (Marie Curie individual fellowship scheme), Human Frontiers Science Programme, EMBO (long-term fellowships) etc. Many national funders support both international and domestic post-doctoral research through different schemes. In 2005, an Inventory of Post-doctoral Schemes in Europe was published by the EC summarising these activities (European Commission, an Inventory [Note for the File] of Post-doctoral Schemes in Europe [RTD-D1/EB D] (2005). This information suggests that this stage has probably the largest number of funding opportunities, mostly mobility fellowships.
2. Many researchers in their post-doctoral stage, work in different types of teaching positions or in research projects under a great variety of titles.
3. In some Eastern European countries researchers who receive a post-doctoral position enter a career track that more or less automatically leads to a permanent position. The element of competition in future research career is limited.
4. Other post-doctoral researchers work on personal grants or stipends which have usually been obtained through highly competitive funding.

Due to the different post-doctoral career routes a wide variety of titles is in use. Furthermore, inconsistent use of terms has caused further confusion about the correspondence of national job titles. Therefore it is not surprising that researchers at this level have emphasised the need for an official taxonomy (e.g. an official listing of corresponding/qualifying degrees) of the different national career systems as they frequently find it difficult to position themselves in the heterogenous taxonomy landscape of Europe. The findings of the LERU Working Group on Research Career are in line with those presented here.

Job status: The job status of post-doctoral scientists is highly variable throughout the ERA. Some receive salaries, others stipends (with or without social and pension benefits). Stipends are particularly common for post-doctoral work abroad due to poorly developed pan-European and international pension schemes. In universities many postdocs work in different teaching positions with varying opportunities to carry out research. In some countries, non-independent researchers working in projects on fixed-term contracts are referred to as 'postdocs' also beyond the 5-8 year time limit. Fixed-term positions for post-doctoral researchers are characteristic in most EU-15 countries, whereas in the new Member States and new associated countries open-ended contracts have traditionally been offered at an early career stage.

The Marie Curie Schemes of the European Commission represent good practice as they are geared for experienced researchers and give salaries with full social security and pension benefits.

These programmes should be used as examples at national and EU level to eliminate the stipend system.

International mobility: The post-doctoral stage is a prime time for research experience abroad as also highlighted in a recent report on researcher mobility. A variety of national and international competitive funding schemes are available both for incoming and outgoing postdocs. There are also signs that young researchers at this stage move to countries where career prospects and the level of independence are more promising/appealing (e.g. USA, UK) than in their home country. In response, a range of ESF Member Organisations has introduced funding schemes to re-attract postdocs after a phase of international mobility.

Bureaucratic and time-consuming visa requirements of EU Member States represent an additional obstacle for researcher mobility into ERA countries. EU governments should make an extra effort to remove this obstacle and to make it easier for non-EU researchers to enter the ERA.

Recruitment: In general, the national and international post-doctoral funding schemes are highly competitive and have transparent recruitment policies with peer evaluation and interviews. Recruitment into university or RPO positions is usually through open calls, whereas recruitment into research projects may occur in a non-transparent way even when funded by a public funding organisation. Any absence of transparency usually works to the disadvantage of equal opportunities.

Training syllabus: Traditionally, post-doctoral researchers have not been viewed as a prime target for training programmes. Postdocs typically participate actively in scientific training (workshops, conferences and practical

courses) in their own research field. Some universities and RPOs have started to provide training courses in transferable skills, e.g. research and financial management, career management, communication skills, intellectual property rights etc., but such training is out of reach for many postdocs. The issue of transferable skills is discussed in detail in Section 4. Some recent reports have also emphasised the importance of training for specialised research skills in conjunction with professional training, e.g. in clinical research (ESF Forward Look: Investigator-Driven Clinical Trials (2009) 60 pp. Strasbourg, ISBN: 2-912049-95-4).

Although European harmonisation has sometimes been proposed also for the post-doctoral stage, formal criteria do not seem to exist except for some eligibility criteria based on the number of years since doctoral degree was attained. In interviews post-doctoral scientists have complained about lack of feedback on their scientific development. They have proposed enhanced use of skills statements, appraisal systems and post-project evaluation as tools to help them obtain feedback on their research performance.

Career perspectives: The post-doctoral period is a critical stage for selecting a research career as a profession, but information about further research career prospects is not readily available in a structured way. As universities cannot be expected to provide jobs for a majority of researchers, funding programmes to support the next career steps, as well as career opportunities in RPOs, industry and administration should be actively advertised. Choosing a non-academic career should be marketed as a valid first choice rather than a failure to get an academic position, although such views still persist in academia. International mobility is encouraged at the post-doctoral stage but uncertain career perspectives, fear of becoming forgotten by the national system and potentially family reasons may actually prevent mobility.

LERU universities have generated the concept of 'career maps' for a number of member universities. Such institutional career maps show different positions available in each institution, including a listing of broad levels of responsibilities, length of service, key promotion or exit points and description of how these positions are funded at each stage. Such career maps cover all four stages of a research career.

The scarcity of positions of advancement of research career makes a scientific career appear a risky business for individuals with clear targets, who have to, or intend to, combine their professional life with social and caring responsibilities. This is especially important for women scientists who have to take into consideration their traditional gender role when having children.

Obstacles/bottlenecks: Both entry into the post-doctoral stage and exit into stage III represent critical points in a research career and appear as true bottlenecks in the eyes of many young researchers. Compared to the number of doctoral degrees awarded annually, the number of post-doctoral positions is limited and competition is often quite fierce. A similar highly competitive situation occurs at the transition phase from stage II to III. If more highly trained researchers are needed, these two bottlenecks should be focus points of national policies. One alternative for the stage II to III transition could be the establishment of special funding schemes for mini-groups to support the spin-off of senior postdocs from large research groups into semi-independent researchers.

When interviewed, postdocs themselves have emphasised that there is considerable variability in the level of independence of post-doctoral researchers between national systems, universities or RPOs and disciplines. In some countries, even personal grants do not seem to guarantee independence. Independence has been quoted as a decisive factor when junior researchers are seeking stage II and III positions.

Those researchers who decide or desire to leave the academic track during or after the post-doctoral stage complain about lack of systematic information on career development in non-academic environments. This may represent a real obstacle for those wishing to bridge the industry-academia gap.

Good practice: Many national and international funding schemes for international mobility of post-doctoral researchers serve as examples of good practice.

The Swedish COFAS scheme, run by FAS (The Swedish Council for Working Life and Social Research), being a recent example (<http://cofas.fas.se/en>). The programme is cofunded within the Marie Curie COFUND action in the EU Seventh Framework Programme (FP7). It is a good example of transferring stipends to full positions and also shows the importance of offering a clear career path for the scientist, throughout his/her whole academic career.

Networking of post-doctoral scientists, e.g. through ENI-Net (Network of European Neuroscience Institutes, www.eni-net.org) or an intergovernmental research organisation, EMBL (European Molecular Biology Laboratory, <http://www.embl.de/training/postdocs/index.html>) serve as other examples of good practices.

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Good practice: COFAS, FAS Marie Curie International Postdoc Fellowship Programme

With support from the Marie Curie COFUND action within the People Category in the Seventh Framework programme (FP7), FAS have announced a new post-doc programme for internationalisation, the FAS Marie Curie International Postdoc Programme (COFAS). The International Postdoc Fellowship Programme has been created to increase international mobility and collaboration, but it is also an extension of the broad range of grants open for researchers in order for them to pursue a career path in science. The objective of the programme is to develop competence and at the same time promote international research mobility and cross-border research collaboration. The programme consists of two types of grants: FAS Outgoing International Post-doctoral fellowships (FOIP) and FAS Incoming International Post-doctoral fellowships (FIIP).

In Luxembourg, an AFR scheme has been initiated relying basically on work contracts for both doctoral trainees and postdocs wherever the host institutions can offer such contracts. However, given the fact that researchers abroad will continue to be funded by this scheme, the option of fellowships must be maintained for countries or institutions where this is standard. A financial incentive is given to promote work contracts, including social security and employers' charges.

Good practice: Network of European Neuroscience Institutes ENI-Net

The network, established in 2004, currently comprises 55 Young Investigator Groups in 19 institutes located in 13 European countries, and is supported by funding from the EC.

The ENI-Net network recognises that European neuroscience research depends critically on the creative contributions of young investigators. The participating institutes supply laboratory space, infrastructure, a nurturing environment and other support, which enables young investigators to build small research teams and to perform independent work. The activities of the network comprise regular meetings, workshops, and exchange of students and know-how. The young investigators supported by the network are typically researchers in the age group 30-40 years, at the peak of their productivity. They usually have experience of 3 to 5 years of post-doctoral training – very often abroad – but are too young to be considered eligible for a tenured professorship in most EU Member States.

Recent fellowship programmes in some European countries and the Framework Programmes have opened up funding sources for the research of independent young investigator teams. Members of the ENI-Net consortium see their role (and chance) to host such teams and to optimise their working conditions.

The existence of networks such as ENI-Net is dependent on the availability of funds to support them as the junior researchers involved typically do not have access to such funds in their home institutions. The EC has provided start-up funds, but there appears to be a gap in European research funding for provision of long-term support for such networks. Some funding organisations, e.g. The German Research Foundation, DFG, have such a scheme in place (www.dfg.de/en/research_funding/promoting_young_researchers/networks/index), but a common scientific goal is a requirement for funding of such networks.

Stage III. Independent researcher

Taxonomy: Research-funding organisations and RPOs in many EU Member States have a limited number of highly competitive positions in this category, usually for approximately five years. Within universities there is great variability in taxonomy among EU Member States; in many countries the number of researcher positions at this stage is low, whereas different types of teaching positions (with possibilities for own research) under a great variety of titles are available. EUROHORCs and ESF (EURYI Awards between 2003 and 2007; www.esf.org/activities/euryi), European Research Council (ERC; Starting Independent Researcher Grants; erc.europa.eu), EMBO (European Molecular Biology Organisation; Young Investigator Programme, YIP; www.embo.org/programmes/yip.) and EMBL (European Molecular Biology Laboratory; www.embl.org, Group leaders) are examples of transnational organisations that are supporting or have supported this stage of the research career. In some countries a tenure track extending into assistant/associate professorships is available.

Those researchers who have left their post-doctoral training behind but have not continued as independent researchers in universities or RPOs, are likely to end up in different types of teaching positions (in universities and polytechnics) or as researchers in large projects in universities, RPOs and industry. Career perspectives in these institutions can be quite variable. Several different titles are in use.

Job status: Most scientists at this stage receive salaries. Initially, independent researchers in universities and RPOs often work under fixed-term contracts (which may be quite short, i.e. with low job security). Possibilities for tenure or permanent positions vary greatly between European countries and between sectors (universities, RPOs, industry). The entire career structure in some top-level intergovernmental research institutions (e.g. EMBL) is based on fixed-term contracts of 5-9 years. Interestingly the feedback from junior researchers often emphasises the importance of a correct balance of competitiveness and security. Particularly in the new Member States and new associated countries, the competitive element of research career appears to be small: researchers obtain open-ended contracts relatively early in their career. Many view this as a problem as it reduces the competitive component.

Recruitment of independent researchers is variable. National (and international) funding schemes are highly competitive with transparent recruitment policies, peer evaluation and interviews. Recruitment into university, RPO and industrial positions occurs often through open calls, whereas recruitment into research projects may occur in a non-transparent way.

Training syllabus: Training at this career stage is very specialised and follows the principles of life-long learning and individual career development (but only for those few who have been successful in obtaining grants to support their career development). International conferences, symposia and workshops play an important role, as do participation in collaborative projects and short-term laboratory visits.

Career perspectives: The availability of independent researcher positions through funding agencies, and in universities and RPOs is limited. Those postdocs who are successful in entering the next stage of their academic career appear to be quite competitive in their future career and often end in top-ranking positions (associate and full professorships) in universities and in equivalent positions in RPOs and industry. Much less is known of stage III researchers who find employment outside academia (whether in universities, RPOs or industry), in teaching or administration. Progress at this stage of the research career is often dependent on success in grant applications in a highly competitive environment.

In the academic environment competition for stage IV positions (professorships) is quite fierce. In many countries, e.g. Germany, there are several stage III researchers aged in their 40s who fulfil all requirements to be appointed as a professor, but might end up in secondary positions or professions because they are considered overqualified, too old, and often overspecial-

ised. This problem is especially severe in the humanities and among those who have remained in this phase for too long and who are not aware of their career development opportunities at this stage.

Obstacles/bottlenecks: Compared to the number of post-doctoral positions, the number of positions offered to independent researchers is limited. In many countries such positions are offered by public funding organisations and RPOs and are highly competitive. Obtaining such a position (often with accompanying research funding) provides an advantage for a young independent researcher and makes him/her very competitive for higher academic positions. The low number of these positions is often seen as a bottleneck in a research career path. In this case transparency of recruitment criteria and processes is especially important for reducing the possibility of gender bias in peer review.

Good Practice: Several good practices are seen both in national funding schemes (e.g. the Emmy Noether groups, equivalent to an assistant professorship, and the Heisenberg Professorship scheme, equivalent to an associate professorship, of the Deutsche Forschungsgemeinschaft [German Research Foundation, DFG], www.dfg.de/en/research_funding/promoting_young_researchers/emmy_noether/index, www.dfg.de/en/research_funding/promoting_young_researchers/heisenberg/index), the SNSF-Professorships of the Swiss National Science Foundation (www.snf.ch/E/FUNDING/INDIVIDUALS/SNSFPROFESSORSHIPS/Pages/default), and in international organisations, e.g. EUROHORCS (EURYI Awards), European Research Council (Starting Grants), EMBO (YIPs) and EMBL (Group leaders).

The Swedish *Karriär för kvalitet* report (Swedish Government Official Reports: Careers for quality [Karriär för kvalitet] (2007) SOU 2007:98) introduces the associate professorship as a separate stage and thereby adopts the US three-stage model after the post-doctoral phase, i.e. assistant, associate and full professorships. This option should receive careful consideration also in Europe.

Stage IV. Established scientist stage

Although the final stage of the European research career structure is an important one, it is beyond the scope of the current report. However, for consistency some short remarks on the same issues as for stages I-III will be given below.

Taxonomy: In the academic career, this corresponds to the professor/associate professor stage. However, due to the small number of professorships available, it appears that most researchers in academia continue in other senior scientist positions with variable level

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of independence. Job titles in RPOs, businesses and administration vary greatly. In universities, scientists employed in different types of teaching positions also continue their own research through their career, under a great variety of titles. In some universities and RPOs a tenure track extending into assistant/associate professor or equivalent position is available for transition from stage III to IV.

Job status: Nearly all scientists at this stage receive salaries, but still sometimes work under fixed-term contracts (especially in projects).

Recruitment: In academia, professorships are highly competitive positions involving usually transparent recruitment policies, peer evaluation and interviews. Recruitment into other university, RPO and industrial positions also occurs through open calls, whereas recruitment into research projects may still occur in a less transparent way.

Training syllabus: by definition and academic tradition, professors and other senior staff have the responsibility for training of younger scientists. This naturally involves lifelong learning and self-training through participation in international conferences, symposia, workshops, as well as in collaborative projects and peer-evaluation processes.

Career perspectives: Professorships are typically permanent positions, although fixed-term positions also exist. Possibilities for international and intersectorial mobility exist, but returning to academia from industry and RPOs is often considered problematic. According to the career tracking report by Juergen Enders and Lutz Bornmann of 2001 (*Karriere mit Dokortitel*) engineers and economists are more likely to be offered professorial positions even after long phases in the private sector.

Obstacles/bottlenecks: In many European universities professors feel they are overburdened with administrative and teaching responsibilities and find it difficult to remain competitive in their own research, particularly compared with colleagues working in RPOs and in countries with lower teaching/administrative loads. Those who have not managed to become appointed to a high-ranking permanent position at this stage might be in danger of ending up in a precarious position at a relatively late stage of their career.

Good practice: Some countries have competitive research professorships and sabbatical funding schemes available for senior researchers to allow them to focus on research work without the burden of teaching and administration. The ERC Advanced Grants represent a new and exciting development within ERA.

2.7 Mobility between industry and academia

In most countries the available statistics suggest that the mobility of researchers between academia and industry is predominantly in one direction only: University-trained researchers find positions in industry, but a return from industry back to academia seems to be limited, and littered with major obstacles in nearly all countries. This phenomenon is likely to have several explanations. Progression in an academic career is based on accumulation of 'academic merits', especially original publications. In some positions experience in teaching and mentoring are also highly valued. In an industrial research environment, the publication culture is often much different, and is more focused towards patenting key discoveries than writing original publications. Use of bibliographic analyses (e.g. impact factors, citation indices and H-indices) tend to give even more weight to the academic publication merits. As teaching experience and supervision of junior researchers can also be quite limited in an industrial environment, it is no surprise that industrial researchers find themselves handicapped in competitions for academic positions. As progression in an academic career follows the pattern of accumulating merits, one of the real challenges is to decide how to weigh entrepreneurial merits against academic ones when researchers seek to reintegrate into the academic world. Other reasons cited for the low level of industry-to-academia mobility include lower salary levels in academia, and the different working cultures. Subgroup 1A feels that more information is needed on the views of industry and industrial researchers regarding the obstacles encountered in intersectorial mobility.

The low level of industry to academia mobility may have its roots already in the early stages of researcher training. In most countries there seems to be relatively little exchange of information between industry and academia regarding the expectation of skills of doctoral and post-doctoral scientists. Some surveys suggest that the skills of young PhDs and postdocs do not always match the expectations of industry. It would appear that in cultures where industrial researchers interact with university researchers the training syllabus of doctoral programmes better reflects the needs of industry, and should help bridge the industry-academia gap also during the later stages of the research career. Potential ways to combine a public and a private research career, e.g. through academic or industrial sabbaticals, part-time professorships and secondments, have been explored in the document 'Responsible Partnering' by the EUA, EIRMA, EARTO and PROTON of 2005 which was updated in October 2009. Good practice examples include biocentres (or science parks) in many countries.

Such establishments house academic researchers, start-up companies, SMEs and industry. Researchers working together in the same building, using joint core facilities, cafeterias etc have much fewer obstacles for free communication than if housed separately.

Another good practice comes from Switzerland: The Commission for Innovation and Technology (CTI) is the Confederation's innovation promotion agency. For the past sixty years, it has fostered knowledge and technology transfer between companies and universities by bringing them together as partners on applied research and development projects (www.bbt.admin.ch/kti/index). Similar agencies exist also in other European countries (e.g. Vinnova in Sweden and Tekes in Finland).

Another good example for industry-academia collaboration comes from the Graduate Schools under the German Excellence Initiative: 50% of the Graduate Schools have active collaborations with companies (they mostly take an active part in the research and training programmes and sometimes also offer additional doctoral fellowships).

Researchers who have interrupted their doctoral studies and moved to industry form a special subgroup in the area of industry to academia mobility. Some funding agencies (e.g. the Academy of Finland) have special funding schemes in place to support their return to academia for the time needed for the completion of their doctoral studies.

2.8 Important areas of development and Subgroup 1A recommendations

As its first opinion, Subgroup 1A acknowledges and supports the many developments towards improvements in research careers in several European countries. These include better structured training programmes, transparent recruitment policies and improvements in the job status of junior researchers including their social security and pension benefits as well as gender equality measures. An important pan-European step towards these goals has been the European Charter for Researchers and the Code of Conduct for Recruitment of Researchers (Charter and Code) of the European Commission, and the Concordat in the UK (The Concordat to Support the Career Development of Researchers (2005) pp. 24., www.researchconcordat.ac.uk). Subgroup 1A recommends that all ESF Member Organisations pay a lot of attention to these improvements, some of which are illustrated as examples and good practices in this report.

Subgroup 1A has identified several good practices, which should be examined carefully by all stakeholders in order to improve the attractiveness of the research

career. These include better structuring of doctoral training in specific programmes, and cooperation of universities with RPOs and industry at all stages of research career, joint degrees, joint appointments etc. Early exposure to industrial research could be a way to bridge the industry-academia gap.

Furthermore, Subgroup 1A would like to draw the attention of all parties involved in improving European research careers to the following areas, where European research careers need development throughout the member organisations and ministries in their home countries.

Taxonomy of research career steps and degrees throughout Europe

- The heterogeneity of national degrees and career structures makes comparisons difficult. Particularly, junior scientists complain that they do not have information about the correspondence of their university degrees and/or career structure level to those in other countries. This is seen as an obstacle to mobility. Sometimes lack of clear eligibility criteria has discouraged junior scientists from participating in international calls for proposals. Subgroup 1A recommends that ESF Member Organisations create an officially recognised taxonomy for the different phases of research career. As LERU has already been engaged in a similar exercise, such taxonomy would be drafted in cooperation with the League of European Research Universities. Although the end product is called 'taxonomy', the aim is not to promote a unified system throughout Europe; rather the objective is to help researchers to recognise correspondences across different national systems. Subgroup 1A therefore recommends establishment of a permanent forum for ESF Member Organisations, European universities and the European Commission to cooperate in working out a joint taxonomy for European research careers.
- One approach would be to give more overall attention to the post-doctoral phase of the research career. To give such a process a clear label this stage could be considered as the fourth cycle of the Bologna Process. However, should this gain support, it is important to note that the process must avoid excessive bureaucracy.
- Despite improvements the status of junior researchers in Europe remains variable. Although an increasing number of organisations in Europe have managed to introduce new funding schemes which offer salaried positions or stipends with social security benefits, this issue remains unsettled in many European countries.
- The proposed 'European Alliance for Research Career Development' should establish a working group for

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this topic with the mandate to study the prerequisites for offering salaried positions or stipends with social security benefits on a larger scale.

- Work should continue towards making the transition stages (especially stage I to II and stage II to III) smoother and more attractive, thereby preventing bottlenecks.

Increased transparency of career paths

- The stakeholders called for more transparency when it comes to the different alternatives of career paths in research. Quite often descriptions of research careers focus on academic career tracks that have a full professorship as their culmination point. As only a fraction of those who complete a PhD end up on this academic career track, information on successful exit strategies is urgently needed. Throughout the research career, current focus is on excellence (typically defined as top 5-20% of applicants), while the rest of those who have entered the research career receive very little attention. A number of young researchers feel they have been recruited into a research career with false promises and have received little information about alternative careers if they do not reach the 'category of excellence'. ESF Member Organisations should plan strategies towards better presentation of alternatives to an academic research career, possibly using individuals that have chosen different career paths as role models. The Web-based mobility portals developed by a number of funding agencies represent positive developments towards more transparent research careers.
- The importance of transparency of recruitment criteria and processes and their accountability in order to ensure equal opportunities in all stages of the career process is a precondition to excellence and innovation in research. The bottlenecks/obstacles identified above, especially the lack of transparency and accountability, aggravated by the competition issue regarding the scarcity of attractive positions, appear to disadvantage women scientists as well as other minority groups of researchers. This leads to a limitation of the pool of potential candidates at the expense of scientific excellence.

Need for a better knowledge-base of research careers

- There is an obvious need for an improved knowledge-base on research careers. Some countries have made efforts to estimate the needs of highly trained researchers in different disciplines within and outside academia. It is not clear how well these estimates take into account demographic changes and the heavy investment in knowledge-based society which is on the political agenda of nearly every European country.

- As a researcher is a very international profession, governments, ministries and funding agencies should also pay more attention to the international mobility of researchers. In discussion with junior researchers, Subgroup 1A learned that researchers at all levels are seeking for the best possible research environment (including research infrastructure) and for the amount of academic independence they require. Statistics on the mobility of awardees of ERC and EURYI Awards, Marie Curie Fellowships, EMBO Fellowships and Young Investigators etc. demonstrate clear trends of international mobility. Subgroup 1A feels these trends are reflections of the researchers' search for the best possible work and living environments. All parties involved in research career development should study such trends carefully and aim to improve the attractiveness of their own career structure. Universities should also pay attention to the transition phases between career steps as these are particularly important for recruitment of best talents to future professors. Unfortunately, at these transition stages a research career often appears unpredictable with little promise of secure funding for more than a few years (no tenure).
- Universities (Graduate training programmes) should also consider a tracking system to follow where their PhDs go later in their career. This should also help them get feedback on the success of their training programmes.

Networks of junior investigators

- The presentation from the representatives of ENI-NET, the Network of European Neuroscience Institutes, clearly showed to Subgroup 1A that junior researchers consider the role of thematically coherent networks of peers very important for their career development. Such networks also exist, for example, among EURYI awardees and EMBO fellows.

Handbook for researchers

- One of the end products of the process initiated by the Members Organisations Forum could be a handbook for researchers. The handbook could be a Web-based resource that includes, at its first phase, a listing of requirements and criteria of different phases of a research career and a description of what happens after each phase.
- Issues related to the Charter and Code for researchers could be included in this handbook by further explaining the contents of the roles, rights and responsibilities and the legal and ethical framework of a research career.

References

- Britta Thomsen (rapporteur for the Committee on Women's Rights and Gender Equality) (European Parliament) Women and science draft report (2007/2206(INI))
- EIRMA, EUA, EARTO, PROTON: Responsible Partnering. Joining Forces in a World of Open Innovation, Revision 1.1, 2009
- EUA: Collaborative Doctoral Education. University-industry partnerships for enhancing knowledge exchange, Brussels 2009
- EUA: Doctoral Programmes in Europe's universities. Achievements and Challenges, Brussels 2007
- ESF Forward Look: Investigator-Driven Clinical Trials (2009) 60 pp. Strasbourg, ISBN: 2-912049-95-4
- ESF, Standing Committee of European Medical Research Councils (EMRC), A European Syllabus for Training Clinical Investigators (2003) pp. 4 Strasbourg
- ESF, White Paper from European Medical Research Councils (EMRC) "Present Status and Future Strategy for Medical Research in Europe" (2007), pp 52. Strasbourg
- European Commission, STRATA-ETAN expert working group Human resources in R&D: Benchmarking national R&D policies. Final report (2002)
- European Commission, Report of the ERA Expert Group: Realising a Single Labour Market for Researchers (2008), pp 74. Luxembourg, ISBN 978-92-79-08360-0
- European Commission, Communication from the Commission to the Council and the European Parliament. Better careers and more mobility: A European partnership for researchers. SEC (2008) 1911 and 1912 [COM (2008) 317]
- European Commission: The European Charter for Researchers and The Code of Conduct for the Recruitment (2005) 32 pp. Luxembourg, ISBN 92-894-9311-9
- European Parliament: Policy Department A, Economic and Scientific Policy: Cross-border Mobility of Young Researchers. (2009) pp. 31. PE 416.244 (IP/A/ITRE/NT/2009-08). European Parliament, 2009
- Irish universities Quality Board (IUQB), Guidelines: Good practice in the organisation of PhD programmes in Irish higher education. 2nd ed. (2009) pp. 72
- Juergen Enders and Lutz Bornmann, Karriere mit Dokortitel (2001)
- Swedish Government Official Reports: Careers for quality [Karriär för kvalitet] (2007) SOU 2007:98
- Ministry of Education: Tutkijanuratyöryhmän loppuraportti. Opetusministeriön työryhmämuistioita ja selvityksiä [In Finnish] 2006: 13: 1-57 (ISBN 952-485-143-1)
- The Concordat to Support the Career Development of Researchers (2005) pp 24. (<http://www.researchconcordat.ac.uk/>)

Annex 2.1

Members of the Subgroup 1A: Research Career Structure and Development

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3. Working Group 1: Conditions of a Research Career in Europe

Subgroup 1B: Gender Issues (Chair, Susanne Matuschek)

3.1 Introduction

The Member Organisation Forum on Research Careers (MOF RC) was implemented in 2007 because the promotion of research careers is central to the missions and key objectives of research councils all across Europe and especially to the funding activities of the European Commission and the European Research Council. For Europe to remain competitive in attracting the brightest and most creative researchers and in training and developing the next generation of researchers it has an urgent need to adopt a common strategy to ensure the attractiveness of research careers in Europe as a whole. The Forum will thus serve as a joint platform for the exchange of views and experiences and for the development of strategy concepts.

It was unanimously agreed by Working Group 1 at the Launch Conference that there is need to have more women in research and especially in academia in senior positions, as well as needing to know more about bottlenecks and best practices in the countries of the European Research Area. As consequence, a separate Subgroup 1B on Gender Issues was constituted.

The following report presents the work and findings of Subgroup 1B on Gender Issues.

3.2 Methodology and milestones

At the Launch Conference in November 2007, four topics were identified for Subgroup 1B on Gender Issues:

- Leaky pipeline
- Maternity/paternity/parental leave
- Career breaks due to family reasons
- Equal playing fields

Additionally, the overall objective for the planned work of Subgroup 1B was formulated as follows:

Synthesis of strategies and recommendations for more women at the top of research

Subgroup 1B on Gender Issues consisted of 7-11 members. The majority of them joined the group after the Launch Conference and have mostly contributed 'virtually'.

The kick-off-meeting of Subgroup 1B on Gender Issues was combined with a meeting of the European Network in Research Careers (ENRC) on 'Gender and Diversity Issues' in April 2008 (Brussels) which was jointly organised by the DFG (German Research Foundation) and SNSF (Swiss National Science Foundation). After that kick-off-meeting the share of labour for Subgroup 1B was organised for the purpose of analysing several countries of the ERA in a mapping exercise based on

published reports, participants' own knowledge and enquiries performed via the Internet as well as by personal contacts.

The results of this mapping exercise and preliminary findings were presented and discussed in a Subgroup 1B meeting in October 2008 (Brussels), and at the Member Organisation Forum Annual Assembly in November 2008 (Brussels). Evolving out of these meetings, three major questions and three challenges have been defined, and in a second step deeper analyses have been performed on six countries.

Subgroup 1B organised a joint meeting with Subgroup 1A in April 2009 (Zurich) where an overview was given about the work and first results of Subgroup 1B. Input was received concerning 'Dual Career Couples', a topic currently growing in importance and levels of awareness by decision makers at universities and funding organisations.

The following report synthesises the work of more than 100 pages of analysis produced by Subgroup 1B members.

3.3 Topics and analysis

The four identified topics have been related to four fields of major interest and high strategic value:

- Leaky pipeline → Statistics
- Maternity/paternity/parental leave → Work-Life Balance (WLB)
- Career breaks due to family reasons → WLB and Women-only funding (WOF) & Dual Career Couples (DCC)
- Equal playing fields → Women in Science/ Research including Gender Equality Policy/ Initiatives/ Networks/ Mentoring/ Peer Review

The topic of the 'Leaky pipeline' was not followed as the members of Subgroup 1B felt that a sufficient number of surveys and statistics (e.g. She Figures, EUROSTAT) had already been conducted (which would serve as a basis) and that it was now the time to bring up concrete measures which would refer to the remaining three topics.

First analysis phase:

In a first step **19 countries** (Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Norway, Poland, Portugal, Slovenia, Slovakia, Spain, Sweden, Switzerland and UK) have been analysed concerning the abovementioned three topics and under the following aspects:

- Main areas to be analysed
- Situation and barriers to progress

- What has been done in the respect field → examples of good/best practice
- What should be done ↔ objective → recommendations

Main areas which should be analysed have been identified as:

- careers of women researchers in general, with special regard to the professional and personal parts of a woman's life and circumstances which influence a women's career in science and research;
- definition of reasons for, as well as forms of, career breaks (degree, paid, unpaid etc.), short- and long-term effects on career and individual development;
- possibilities and barriers (e.g. conflict between family and career, pre-existing male lobby and old-boys' networks as well as organisational structures) to re-enter research after having had a career break;
- political context including the implementation of gender equality policies/measures within the management and priority settings of research institutions, which was judged as crucial for women in science and research.

Second analysis phase:

Based on the preliminary findings six countries (Germany, Ireland, Norway, Spain, Switzerland, UK) of special interest have been identified for a deeper analysis following the above-formulated questions but other countries have also been taken into consideration. These countries have been chosen for the following reasons:

- Countries with a long, or intermediate, or short tradition of gender equality policy and measures; and a larger or smaller share of women in research;
- Countries with a high, or intermediate, or low factor for Work-Life Balance (definition see Section 3.4)

Intermediate results

Recent published reports ^{24,25} give a very good overview about the landscape of gender equality policies and measures in the countries of the European Research Area (ERA)-EU Member States and associated countries. The following results of our analysis can partly be considered as planned redundancy to these reports, and do show new features. Both approaches served for the second analysis phase and the presented overall results and recommendations.

Women's careers are different to those of men, a simple and well-known statement, but it leads to several points which have to be taken into consideration for

reaching the overall objective of having more women at the top of science and research in the ERA.

It was stressed that the cultural and historical background of a country and/or a group of countries is an important factor which must be taken into consideration when talking about measures for more women at the top of research. Four groups of countries with common characteristics were identified from the reports and information by group members:

Northern European countries with a long tradition of gender equality policies, a large variety of offers for women researchers, laws and measures in all parts of society (e.g. paid parental leave). These result in a high proportion of women in research, and a particularly small gender gap²⁶ (2008: Norway was ranked as 1st, Finland 2nd and Sweden 3rd).

Eastern European countries have a completely different cultural background especially after decades of communism with its famous slogan: 'Women to tractors' – characteristically to tractors, not to the highest posts. This is still the situation behind the, at first sight, high number of women in science. After communism and a sudden confrontation with so many serious economic and social challenges, science itself, not to mention the female scientist was a rather marginalised issue. Accompanied by a certain shift towards 'traditional values', which place women at home, preferably with numerous children, a consequence is that most of the women in science and research do not hold high or senior positions and/or they work part-time.

Southern European countries show very traditional gender roles and stereotypical attitude towards gender roles. These roles hamper both men and women in reconciling work and family. In some of the Southern European countries, gender mainstreaming policies and the reconciliation of work and family life have entered the policy debate but can be found quite low on the political agenda. Childcare services are still in short supply and additionally, there is a clear lack of policies to increase the father's sharing of domestic and care chores. In some of these countries the focus stayed on the creation of a publicly funded infrastructure for the care of children, and the extension of schedules of public nurseries, kindergartens and schools. Spain should be noted as an exception, where, under a favourable political climate in recent years, several gender equality measures have been introduced.

Countries of mid-Europe show quite a heterogeneous picture concerning the state-of-the-art of gender equality policies/measures, the proportion of women in research,

24. Mapping the Maze – Getting More Women To The Top In Research (EC, 2008)

25. Benchmarking Policy Measures in Gender Equality (EC, 2008)

26. The Global Gender Gap Report 2008 (World Economic Forum)

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and recent developments. For example countries such as Austria, Belgium, Germany, Netherlands and Switzerland show a high percentage of employment of women in general, but also of households in which men work full-time and the women only part-time. Additionally, with a growing number of children, fathers increase their work load, mothers decrease it or stop working. This means that the reconciliation of work-life and family-life is mainly falls on the shoulders of the mothers. A precondition for working-parents is the assurance of childcare, especially through public childcare facilities. As a next step Subgroup 1B analysed the question of how these different situations influence the career of a woman and the proportion of women in research.

Career in research with critical transition phases

In general, three critical transitions points of career development in science and research exist (→) where usually more women drop out of an academic career path than men:

- PhD → Postdoc → Independent Researcher → Professor

Martinez et al.²⁷ showed in their study, that most women leave academia in the transition phase from postdoc to independent researcher/principal investigator. This point in the life of a woman correlates with the so-called 'rush hour', meaning the biological and academic age of women where decisions concerning children and/or career advancement must be taken. In this context, mobility as an individualistic concept and also as a selection criterion in the peer-review process requires greater consideration (see below).

This of course runs into the issue of career breaks due to childcare obligations. These obligations are much more fall on the shoulders of the mothers only, causing the well-known conflict between family and career. In consequence, women scientists drop out of the system (leaky pipeline²⁸) and have severe problems in continuing their scientific careers. Ledin et al.²⁹ showed that traditional gender roles have a deep impact in keeping women away from a career in research. Following the study of Martinez et al. and others, it is evident that women should have support in deciding not for or against either children or a career but for children and a career. This is much more important, in order to meet the ever-increasing demands of the knowledge-based economy and because Europe must realise the full potential of its

27. Falling off the academic bandwagon – Women are more likely to quit at the postdoc to principal investigator transition (Martinez et al., EMBO reports VOL 8 | NO 11 | 2007)

28. She Figures, EC (2006 and 2009)

29. A persistent problem – Traditional gender roles hold back female scientists (Ledin et al., EMBO reports VOL 8 | NO 11 | 2007)

human capital. Attracting and retaining more women at all levels of research is of great importance as well as finding measures for an improved reconciliation of family and work life.

In this context, the issue of **Work-Life Balance (WLB)** becomes more and more important, connected to the features of working conditions, affordable and flexible facilities for external childcare and the topic of maternity/paternity and parental leave.

Organisational structures can contribute in a positive manner, especially by providing more flexible working conditions and childcare facilities, and by offering access to networking and career development opportunities, career advice/support and mentoring from peers. **Networks** and **mentoring** have been judged as being very important and as very efficient support measures for the advancement of women in research.

Box 1

Best Practice

- **Networks and mentoring for women in science and research**
 - Association of International Professional and Business Women/Norway
 - Networks for stakeholders/Norway: e.g. Network for Equal Opportunity Advisers at universities;
 - National Council of Women of Finland – WomEqual/Finland;
 - Women in Technology and Science (WITS) and Women in Science, Engineering and Technology (WiSET)/Ireland
 - MentorSET, HighTech Women, UK Resource Centre for Women in SET/UK
 - European Platform for Women Scientist (EPWS)
 - Centre of Excellence Women in Science (CEWS)/Germany
 - eument-net/Austria, Bulgaria, Germany, Switzerland/EC
 - European Association for Women in Science, Engineering and Technology (WiTEC)

Countries that have a long tradition of providing networks, mentoring and other career support for women in science can all be found in the top 10 in the Gender Gap Report 2008.

Under this paragraph the Subgroup 1B discussed a point which has to be considered as a sensitive issue: the sometimes lack of self-confidence of women in research and, in contrast, the demand that women be part of the 'normal' competition with equal chances, and to still be taken as a serious researcher even after having children.

This leads to the importance of ‘role model’ as successful women in research reconciling her career and family-life which would very effectively contribute to the aim that more young women see a career in science as worthwhile and compatible with children. Additionally, the very low numbers of women awarded high prestigious research prizes has an additional negative influence on young women in the decision process in favour or against a career in science and especially in research.

Finally, another new and early obstacle was identified within the Bologna Process that, especially for students with children, creates major disadvantages due to the very strict schedule and long intervals of courses. So, if a student is missing an obligatory course due to maternity or paternity leave, she or he usually has to wait one year before attending this course again. Again, as women still take over the majority of childcare, these problems could lead to another leak in the already leaky pipeline, but at a very early stage.

Within the fourth topic of **‘Equal Playing Fields** for women and men in research, the issue of women applying for and obtaining research funding as well as the effects of assessment criteria and processes in peer review needs more attention:

Usually members of scientific boards, selection/evaluation committees are full professors or senior academics, and with the EU-meridian of 15% of senior posts at universities being held by women, the consequence is that women are underrepresented and men-only boards do still exist. Several reports and studies of the European Commission did set this topic high on the agenda.

On 21 May 2008, the European Parliament Committee on Women’s Rights and Gender Equality adopted Britta Thomsen’s report on women and science³⁰ and in 2009 the EC-working group Gender and Excellence stated in their report³¹ that the percentage of women on selection committees should be targeted at 40% even if simply having a higher number of women on decision-taking committees does not automatically mean less gender bias in peer review. But the visibility of women in decision-taking bodies is a clear and important sign that women are part of the decision-making process.

What about a gender bias in the peer review process itself?

In recent years, a growing number of research teams have addressed this question. For example Trix and Penska³² stated that letters of recommendation writ-

ten for female applicants differ systematically from those written for male applicants in many aspects, e.g. the extremes of length, in the percentage lacking in basic features, in the percentage using negative language (often associated with ‘apparent commendation’).

Ledin et al.³³ analysed a possible gender bias in peer review and found that rather than a possible gender bias in the peer-review process itself, the bias is more often created by the different career paths of women researchers and traditional gender roles. Women still bear the majority of childcare responsibilities that cause a career slow down; and women still tend to follow their partners to another country where they often have more problems in finding a research institution matching to their field of research and expertise. This might result in lower quality and lower number of publications. The consequence is decreased competitiveness and a disadvantage in peer-review processes when simply compared to straight-career researchers especially those without children.

These findings can be underlined by the evaluations of the European Young Investigator Awards scheme showing discrepancies in written peer review resulting in a disadvantage for women researchers: The female applicants had a somewhat higher tendency to be filtered out in the domestic selection process and at the first stage of the European selection than did their male competitors.³⁴

3.4 Results

Work-Life Balance (WLB) is a broad concept including proper prioritising between career and ambition on the one hand, compared with leisure, pleasure and family development on the other. Traditional gender roles cause women additional stress when they must decide what they feel is best for their children and families or what is best for their career. As the separation between work and home life has diminished more and more, this concept has become more relevant than ever before.

In respect of our survey, we summarise under WLB the following features:

- Extent of implementation of maternity, paternity and/or parental leave
- Childcare facilities especially for scientists and researchers
- Part-time working, flexible working hours and facilities (e.g. e-working)

30. A6-0165/2008: Report on Women and science (Britta Thomsen, EC, 2008)

31. Gender-Challenge-in-Research-Funding (EC, 2009)

32. Exploring the Color of Glass: Letters of Recommendation for Female and Male Medical Faculty (Trix F. & Penska C., Discourse & Society, Vol. 14, No. 2, 191-220, 2003)

33. A persistent problem – Traditional gender roles hold back female scientists (Ledin et al., EMBO reports VOL 8 | NO 11 | 2007)

34. Evaluation of the European Young Investigator Award Scheme (Langfeldt, L. and Solum N.H., 2005 & 2007)

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The evolving question was, on how a high (all three categories implemented and including parental leave), intermediate (at least one category implemented) or low (maximum one category implemented e.g. maternity leave only) factor for WLB will have an influence on the number of women in research.

To answer this question, we first compared the grade of implementation of maternity, paternity and/or parental leave and found that countries of the ERA can be divided into three clusters concerning maternity/paternity and parental leave:

- **Cluster 1:**
Countries providing paid maternity, paternity and parental leave;
- **Cluster 2:**
Countries providing paid maternity and paid or unpaid paternity leave;
- **Cluster 3:**
Countries providing paid maternity leave only;

In a second step we linked these countries, grouped along maternity/paternity and parental leave, to gender equality policies/measures and to the WLB factor on the one hand and the ranking in *The Global Gender Gap Report* (World Economic Forum, 2007 and 2008) and the share of women in research on the other.

The results of our analysis show an interesting picture as countries of the ERA have been able to be divided basically into three models:

- **Model A:**
no or poor awareness of gender imbalance, almost no gender equality policy/measures
- **Model B:**
proven awareness and gender equality policy/measures, no special initiatives for women-only funding
- **Model C:**
proven awareness, gender equality measures and special initiatives/programmes for women-only funding especially for returnees

Model A:

→ weak commitment, weak results ↔ **low factor for WLB/larger gender gap**

Model B and C:

→ good results = larger share of women in research
↔ **intermediate/high factor for WLB/larger or smaller gender gap**

→ weak results = smaller share of women in research
↔ **low/intermediate factor for WLB/larger or smaller gender gap**

The most interesting and most difficult countries to be interpreted are those which are summarised under Models B and C as they show both good and poor results in respect of the share of women in research.

Additionally, we recognised that some countries changed their position in the Gender Gap Report from 2007 to 2008 due to developments which were usually initiated several years before, e.g. paid parental leave in Germany. Other reasons remained unknown because of the restricted time for deeper analysis on this issue.

So these results must be taken as a snap-shot and it is surely worth spending more time (and means) on a deeper analysis. But one statement can clearly be given:

All countries with a higher factor for WLB, e.g. offering flexible and affordable childcare facilities especially for scientists and researchers, paid parental leave etc. can be found to show more and more good results concerning the share of women in research. Rare, expensive and inflexible childcare, paid maternity leave only, pushes men into the role of the single-earner and women out of employment in all parts of society and especially out of their careers in the highly competitive and demanding field of research.

After the compilation of the results of the first analysis phase, three questions and three challenges emerged. They address the most urgent fields to be tackled and lead to the identification of good and best practices in the European Research Area:

Questions:

1. Which are the most successful models in fixing the leaky pipeline and bringing more women to the top of research?
2. What can be done to prevent women abandoning their research careers after they reach a certain point?
3. What can be done to provide best conditions for returnees and Dual Couple Careers?

Challenges:

1. How to remove inherent gender biases from the peer-review process?
2. How to provide equal conditions for a predictable research career in Europe for both genders?
3. How to make use of the full human potential available for research?

The following sections will try to answer these questions and address the challenges in combination with best practices.

Increase of the Work-Life Balance factor

Some countries have already raised their awareness to increase the factor for more WLB, e.g. with the recent introduction of paid parental leave (Germany), more flexible childcare facilities at universities (one example is given in Box 2), allowing part-time, tele-work, sabbatical leave and more flexible working hours (several countries), job-sharing, or research funding on part-time basis for women and men.

Box 2

Best Practice

- **Flexible childcare facilities at universities – Austria**

Children Offices (UniKid) and/or Childcare Contact Points at universities offer flexible (in time and organisation) childcare for students and young researchers.

Some countries offer women researchers a compensation for committee work (e.g. Norway), or an extension of the academic age rules taking into account childcare-time when applying for funding (e.g. Switzerland), and raise the child allowance by up to 20% (e.g. Finland, Switzerland), or abolish the age limit at all, and offer appointments in combination with care responsibilities (e.g. Netherlands).

Children and career break – the end of a women’s career?

Even if it must be stated clearly that women researchers still have severe problems in returning to research for the continuation of their careers, this question can be answered with ‘no, not necessarily’.

In the ERA several successful initiatives and programmes for re-entry and sustained re-integration after a career break do exist, as well as other women-only funding instruments. The aim of all initiatives, instruments and programmes is to give support exactly at that point in the career of a woman where most of the women drop out (leaky pipeline).

Support can be given in different ways: courses and training, domestic help for women with children, and finally by substantial research funding after a competitive peer-review selection process (example, see Box 3).

In this aspect, the cooperation of research funding organisations and universities must be stated to be crucial as well as the need of change in attitude of peers in respect of acceptance and valuation of women researchers with children.

Women successfully combining a career in research and family life can serve as role models encouraging

young women to see that a career in research is worthwhile and compatible with children (see Box 4).

Box 3

Best Practice

- **Re-entry: Marie Heim-Vögtlin Programme – Switzerland**

Since 1991, The Swiss National Science Foundation has supported women researchers who have had an interruption or reduction in their scientific career due to childcare obligations and/or the career development of their partner. The Marie Heim-Vögtlin subsidies provide the chance to re-enter the science community and to continue a career in research in Switzerland. The MHV Programme is opened for all disciplines and for doctoral as well as post-doctoral candidates. The two-step selection process is based on peer review followed by an interview.

- **Basic funding:** 2 years, covering salary and social contributions, plus subsidies for consumables, travel expenses, and (uniquely) for childcare.
- **Proven success:** 85% of the funded women stay employed in science and research after the termination of the awarded MHV subsidy.

Box 4

Best Practice

- **MHV-Prize – Switzerland**

In 2009 the Swiss National Science Foundation introduced an annual prize to one MHV subsidy recipients of CHF 25'000 who has made outstanding achievements and career developments during her period of funding.

- **Royal Society – UK**

- **‘Mothers in Science – 64 ways to have it all’**

The aim of this book is to illustrate, graphically, that it is perfectly possible to combine a successful and fulfilling career in research science with motherhood, and that there are no rules about how to do this.

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Dual Career Couples (DCC) – a growing demand

Dual Career Couples are relationships in which both partners are well educated, career orientated, and pursue their own professions³⁵.

There is not only the reality of dual career couples but also the growing demand of couples (women and men) to pursue a career in research but with the reconciliation of work- and family-life. As the US is approximate 20 years ahead of Europe in terms of dual hiring there is additional pressure on the universities in the ERA to offer support to Dual Career Couples because those returning or coming from the US are already used to it. Traditionally, first initiatives have been implemented for newly arriving professors, so there is still a lack of well-aimed support for young researchers, especially for women with children.

In the ERA only a few countries (e.g. Germany, along with the recently established Excellence-Initiatives, see Box 4, and Switzerland, mostly along with the Federal Equal Opportunity Programme 2008-2011) have developed measures in the field of DCC, usually at universities and almost all in recent years. Currently we see two basic models where a support for DCCs can be implemented: either affiliated to Human Resources (as part of the recruitment process) or integrated into the gender equality offices and measures.

The first approach serves usually full professors only, the latter takes into consideration the trend towards family friendly policies at universities³⁶, childcare facilities and promotion of women in general).

For universities in the ERA, offering support for DCCs has added value in respect of gaining excellent researchers, brain re-gain in general and especially from the US, and for achieving a much higher commitment from those who have been attracted to the universities and for raising the number of women researchers. As mentioned before, usually women researcher follow their partners, taking care of the children especially in those times of transition, and slow-down in their career. As a consequence, the support of DCCs is a very effective measure against the leaky pipeline.

The discussion around possible favouritism should decrease by raising awareness of the demand for transparency in recruitment processes in general (see final report part on Career Structure and Development) and

35. Wenn zwei das Gleiche tun... : Ideal und Realität sozialer (Un-)Gleichheit in Dual Career Couples, Solga, H., & Wimbauer, C. (2005)

36. Familienfreundliche Hochschulen: Handlungsfelder und Praxisbeispiele (Family-Friendly universities: Fields of Action and Examples of Practice) (Lack C., Amstutz N., Meyerhofer U., CH, 2009)

Box 5

Best Practice

• The Konstanz Networking Project on promoting Dual Career Couples – Germany

Networking project between seven universities, three research universities and four universities of applied sciences, in Germany and Switzerland

- Career choice advice and network of contacts;
- Opportunities for gaining further qualifications, job exchange and employment assistance;
- Family-friendly frameworks and questions regarding the compatibility of career and family, childcare services and schools for accompanying children;
- University of Konstanz provides funding for temporary research positions (one year) for partners who want to relocate and pursue their research career in Konstanz.

clearly advertised criteria for and areas of supporting DCCs. The indicated figures that women are increasingly very well-educated and trained should lead to more confidence in such measures for the support of DCCs.

Finally it should be mentioned that not only the environment contributes to or a more or less successful Dual Couple Career but also 'inner couple' developments are important, as every step in a partner's career and every incident in a couple's life has a deep influence and will change the overall duality.³⁷

Peer-review process – ambilateral

Basically, even if examples of gender bias in peer review can be proved, the highest influence on the small proportion of women in research in Grade C to A level positions (according to She figures) are the different life and career concepts of women. In consequence, Subgroup 1B did not deepen their work into gender bias in peer-review processes, and believes that with a higher number of women on scientific boards and selection committees, as well as with growing awareness for gender equality especially for women having different career paths, there will certainly be a positive impact.

In consequence, Subgroup 1B focused on the other face of the peer-review process; more precisely, the possible influence of research-funding organisations on their own peer-review process and within their funding programmes.

The implementation of gender equality aims by research-funding organisations and, for example, into the selection process can be considered as a change of

37. A systematic Reflection upon Dual Career Couples (A. Rusconi, H. Solga, WZB Germany, 2008)

Box 6

Best Practice

- **Gender equality as part of the selection process/Germany**
 - ‘Excellence Initiative’ German Research Foundation (DFG): In all three lines of competition, gender equality is implemented as a selection criterion (‘new scientific quality approach’).
 - German Research Foundation (DFG): Additional lump sums for gender equality measures
 - collaborative research endeavours, up to €50 000 per annum
 - mentoring and coaching, ‘competitiveness training’ geared for women scientists

paradigm and is stated to be a very effective measure to increase the awareness of women in science and to improve their chances in a career (example, see Box 6).

Other countries do accept up to 3 years of childcare time as an exception to the academic age limit, a measure with adding value for particularly re-attracting women to a career in research while having a family as well. Another measure introduced is, to have the officer for equality present at the evaluation of the proposals.

In some countries instead of complete lists of publication only a list of the 10(-15) most important publications may be required. It may contribute to gender equality as well if applicants mention their children in the proposal so that a correlation between a slow-down in publications and family obligations can be made.

3.5 Conclusions

- Women are increasingly very well-educated and trained. A loss of women is a loss of investment, which especially European countries can no longer afford. The European Research Area (ERA) must take advantage of the full human potential available for research. This accords with the aim of building up a competitive ERA and the indicated need of 700 000 researchers in the upcoming years.
- Women and men want to and do have the right to a career in science/research as well as having children, so women-friendly policy is family-friendly policy. This holds the **added value** especially for European countries of producing higher birth rates a contribution against the advanced ageing of the European population³⁸.

38. World Population Ageing: 1950–2050, Population Division, DESA, United Nations, 2002

- The demand for a better reconciliation of work-life and family as well as for more support of Dual Career Couples is obviously growing. Support of Dual Career Couples at universities can contribute with **added value** for more women in research.
- A high factor of Work-Life Balance (e.g. flexible and affordable childcare facilities, paid and accepted parental leave) leads to a higher share of women in research.
- Women researchers with children do have other means of career development and progress as they still bear the majority of childcare responsibilities. Research-funding organisations are starting to consider this aspect in their peer-review processes.
- Well-aimed women-only funding schemes, especially for returnees are of **great value** as long as the share of women in Grade B and A-positions (according to She Figures) is still much lower than that of men.

3.6 Recommendations

Recommendations to ESF and its Member Organisations to

- introduce gender equality targets and measures in their peer-review criteria as part of a ‘new scientific quality approach’;
- establish permanent and public monitoring of gender-segregated statistics over all applications, allocation of funding and application behaviour at the different career stages;
- implement measures for an increase of applications from women researchers, e.g. by support of networking as well as of mentoring by peers;
- think of an alternative concept of mobility which offers not only stays abroad, but includes international working relations and the option of ‘virtual’ mobility;
- implement funding possibilities for early mobility during PhD training, meaning before the ‘rush hour’, and this to be accepted as equivalent to mobility at the post-doctoral level in peer-review processes;
- impose pressure on their partners for more flexible and affordable childcare facilities especially at universities in countries where support is poor;
- offer better predictability and security (e.g. with longer funding periods; a budget for childcare especially for women and single parents; combining stays abroad with a guaranteed return to be funded up to 12 months) for making a career in research/academia in the ERA more attractive;

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References

- Mapping the Maze – Getting More Women to The Top In Research (EC, 2008)
- Benchmarking Policy Measures in Gender Equality (EC, 2008)
- The Global Gender Gap Report 2008 (World Economic Forum)
- Falling off the academic bandwagon – Women are more likely to quit at the postdoc to principal investigator transition (Martinez et al., EMBO reports VOL 8 | NO 11 | 2007)
- She Figures, EC (2006 and 2009)
- A persistent problem – Traditional gender roles hold back female scientists (Ledin et al., EMBO reports VOL 8 | NO 11 | 2007)
- A6-0165/2008: Report on Women and science (Britta Thomsen, EC, 2008)
- Gender-Challenge-in-Research-Funding (EC, 2009)
- Exploring the Color of Glass: Letters of Recommendation for Female and Male Medical Faculty (Trix F. & Penska C., Discourse & Society, Vol. 14, No. 2, 191-220, 2003)
- A persistent problem – Traditional gender roles hold back female scientists (Ledin et al., EMBO reports VOL 8 | NO 11 | 2007)
- Evaluation of the European Young Investigator Award Scheme (Langfeldt, L. and Solum N.H., 2005 & 2007)
- Wenn zwei das Gleiche tun... : Ideal und Realität sozialer (Un-)Gleichheit in Dual Career Couples, (Solga, H., & Wimbauer, C., 2005)
- Familienfreundliche Hochschulen: Handlungsfelder und Praxisbeispiele (Family-Friendly Universities: Fields of Action and Examples of Practice) (Lack C., Amstutz N., Meyerhofer U., CH, 2009)
- A systematic Reflection upon Dual Career Couples (A. Rusconi, H. Solga, WZB Germany, 2008)
- World Population Ageing: 1950–2050 (Population Division, DESA, United Nations, 2002)

Annex 3.1

Members of the Subgroup 1B on Gender Issues

- **Susanne Matuschek** – Switzerland (Chair)
- **Sandra Bitusikova** – Belgium/Slovakia
- **Jennifer Brennan** – Ireland
- **Marta Caradonna** – Italy
- **Eleana Gabriel, Ioanna Loisou** – Cyprus
- **Barbara Haberl** – Austria
- **Marta Lazarowicz, Magdalena Zuberek** – Poland
- **Veronika Paleckova** – Czech Republic
- **Charlyne Pullen** – United Kingdom
- **Neil Williams** – ESF
- **Maren Jochimsen** – Belgium

Annex 3.2

Table of Initiatives and Measures for Women in Science and Research in the European Research Area (ERA)

Table 3.1 gives an overview of activities for women in science of some countries along the agreed four topics

- Leaky Pipeline → Statistics
- Maternity/paternity/parental leave → Work-Life-Balance
- Career breaks due to family reasons → WLB & Women-only-funding & Dual Career Couples
- Equal Playing Fields → Women in Science/ Research incl. Gender Equality Policy/Initiatives/ Networks/Mentoring/Peer Review

Sources are the following reports:

- Benchmarking Policy Measures in Gender Equality (EC, 2008)
- The Global Gender Gap Report 2008 (World Economic Forum)

Table 3.1. Initiatives and Measures for Women in Science and Research in the European Research Area (ERA)

	Topic – Leaky Pipeline	Topic – Maternity/ Paternity leave	Topic – Career breaks	Topic – Equal playing fields
Country	Statistics	Work-Life-Balance (WLB)	Work-Life-Balance (WLB) & Women-only-funding (WOF) & Dual Career Couples (DCC)	Women in Science/Research (Gender Equality Policy/ Initiatives/ Networks/ Mentoring)
Norway	Gender Gap Index 2008: Rank 1 (Index 2007: Rank: 2)	<ul style="list-style-type: none"> maternity leave: 9 weeks paternity leave: 2 weeks + 6 weeks during first year parental leave: 39 weeks; male researchers are esp. encouraged to use all their parental leave 	<p>WLB:</p> <ul style="list-style-type: none"> childcare-time part-time; tele-work; flexible working hours sabbatical leave <p>WOF:</p> <ul style="list-style-type: none"> Qualification grants/ scholarships Extra research funds to female scientists in disciplines with a low female ratio Allocation of funds (Female scientists are given financial support for research trips and research assistance) Compensation for committee work Courses (e.g. The Norwegian University of Science and Technology (NTNU) the equal opportunities adviser arranged a course for female assistant professors on how to apply to become qualified for a professor position) <p>DCC:</p> <ul style="list-style-type: none"> no initiatives known 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> Equal Opportunity Act (1978) Research Council of Norway: <ol style="list-style-type: none"> Action Plan for Gender Equality (since 1999) Committee for Mainstreaming Women in Science (since 2004) <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> Callings (A position needs to be filled, instead of advertising, a chosen female candidate is called) Ministry of Education, Research and Church Affairs (MERCAs): economic rewards University in Tromsø (UiTø): economic incentive to make the faculties call women for professor II positions, and offers an extra research semester for female associate professors NTNU Trondheim: search commission for female candidates Univ. Oslo: matching funds for female staff, incl. mentoring <p>Mentoring/Networking:</p> <ul style="list-style-type: none"> Mentor projects Norwegian University Council Action Plan National networks for gender equality: <ol style="list-style-type: none"> Network for Equal Opportunity Advisors at universities Network for Equality in the University and College Sector

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	Topic – Leaky Pipeline	Topic – Maternity/ Paternity leave	Topic – Career breaks	Topic – Equal playing fields
Finland	Gender Gap Index 2008: Rank 2 (Index 2007: Rank: 3)	<ul style="list-style-type: none"> • maternity leave: 17.5 weeks • paternity leave: 28 working days • parental leave 158 working days • men are esp. encouraged to take their paternity/ parental leave 	<p>WLB:</p> <ul style="list-style-type: none"> • part-time; flexible working schedule • distance work • mat./pat./par. leave > extension of funding period; • childcare-time > extension academic age rules • child allowance of up to 20% (AcF) <p>WOF:</p> <ul style="list-style-type: none"> • Academy of Finland: equality plan (2002) → special grants for women (returnees) <p>DCC:</p> <ul style="list-style-type: none"> • no initiatives known 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • Act on Equality between Women and Men (since 1987) • Academy of Finland: Equality Plan (since 2005) <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • Gender Equality Unit (Ombudsman for Equality); • Targets and Quotas to raise the percentage of women in science <p>Mentoring:</p> <ul style="list-style-type: none"> • New programmes are being launched by universities <p>Networks:</p> <ul style="list-style-type: none"> • European network on gender equality in higher education (e.g. at Univ. Helsinki since 1998); • University Network for Women's Studies; • National Council of Women of Finland • WomEqual • WITEC
Sweden	Gender Gap Index 2008: Rank 3 (Index 2007: Rank: 1)	<ul style="list-style-type: none"> • parental (maternity and paternity) leave: 16 months, fully paid • 13 months in total for each child that can be split between the parents as they want; although two months are exclusively reserved for the father 	<p>WLB:</p> <ul style="list-style-type: none"> • childcare-time; part-time <p>WOF:</p> <ul style="list-style-type: none"> • Vinnmer Programme for post-doctoral women researchers (2007-2014, Swedish Governmental Agency for Innovation Systems) <p>DCC:</p> <ul style="list-style-type: none"> • no initiatives known 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • Equal Opportunities Act (1992) • Equal Treatment of Students at universities Act (2002) <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • Swedish Research Council founded 3 Centres of Gender Excellence • Various general associations for women, in science, but also some networks for women in specific areas of research • Mentoring programmes for: <ul style="list-style-type: none"> – women in leadership roles – female researchers

	Topic – Leaky Pipeline	Topic – Maternity/ Paternity leave	Topic – Career breaks	Topic – Equal playing fields
Ireland	Gender Gap Index 2008: Rank 8 (Index 2007: Rank: 9)	<ul style="list-style-type: none"> • maternity leave: paid 26 weeks – unpaid mat. leave: 16 weeks • paid paternity leave: 3 days • unpaid parental leave: 14 weeks/child 	<p>WLB:</p> <ul style="list-style-type: none"> • part-time, flexible working time • job-sharing, term time <p>WOF:</p> <ul style="list-style-type: none"> • SFI Principal Investigator Career Advancement Award (PICA) → e.g. for researchers who have taken a career break for childcare • SFI/DELL Scholarship: Young Women in Engineering • SFI Institute Planning Grant • FÁS: Programmes for women returnees <p>DCC:</p> <ul style="list-style-type: none"> • no initiatives known 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • Department of Justice, Equality and Law Reform (DJELR) • Programmes of the National Development Plan → Equality for Women Measures <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • Centre for Women in Science & Engineering Research (WiSER) • Women in Science, Engineering and Technology (WiSET) <p>Mentoring:</p> <ul style="list-style-type: none"> • e.g. Mentorlink <p>Networks:</p> <ul style="list-style-type: none"> • e.g. WITS (Women in Technology and Science)
The Netherlands	Gender Gap Index 2008: Rank 9 (Index 2007: Rank: 12)	<ul style="list-style-type: none"> • maternity leave: 16 weeks • paternity leave: 2 working days • parental leave: 13 x no. of working days/week/child up to 8th birthday 	<p>WLB:</p> <ul style="list-style-type: none"> • abolition of age limits if possible (NWO) • extension of time-limits (on grounds of pregnancy, parental leave or part-time) • appointments in combination with care responsibilities <p>WOF:</p> <ul style="list-style-type: none"> • Aspasia (women senior lecturer/assistant professors, since 1999); • Athena (Chemical Sciences, since 2007, NWO) • More Women Researchers as University Lecturers (MEERVOUD, NWO) • Policy on women in the Innovational Research Incentives Scheme (Veni, Vidi, Vici) • The FOM/v incentives programme <p>DCC:</p> <ul style="list-style-type: none"> • Local initiatives 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • Equal Treatment (Men and Women) Act; • Dutch Civil Code; • Central and Local Government Personnel Act <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • Innovation Research Inventive Scheme grant programme (NWO) • Policy to address under-representation of women in WVOI (NWO) • NWO: 80 promotions for women (from assistant professor to associate professor and from associate professor to full professor) <p>Mentoring and Networks:</p> <ul style="list-style-type: none"> • VHTO: National expert organisation girls/women and science/technology • Dutch Network for Women in Computer Science, Mathematics and Physics; • Network for Women in Earth Sciences

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	Topic – Leaky Pipeline	Topic – Maternity/ Paternity leave	Topic – Career breaks	Topic – Equal playing fields
Germany	Gender Gap Index 2008: Rank 11 (Index 2007: Rank: 7)	<ul style="list-style-type: none"> • maternity leave: 14 weeks • parental leave: 12-14 months (12m.: single parent – 14m. both parents) (since 2007) 	<p>WLB:</p> <ul style="list-style-type: none"> • supplements for families & childcare • prolongation of 3 months in case of pregnancy/birth; part-time • Christiane Nüsslein-Vollhard-Foundation: support for domestic help and childcare <p>WOF:</p> <ul style="list-style-type: none"> • Max-Planck Society: special research positions for young women • Returnees: Helmholtz Association “Re-entry” (since 2006) • Local activities at universities <p>DCC:</p> <ul style="list-style-type: none"> • Konstanz Networking Project on Promoting Dual Careers (since 2007) • Alliance of Northern German universities (since 2007); and in South-East Lower Saxony • Excellence-Initiative-universities: DCC-Services (since 2008/2009) 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • General Equal Treatment Act <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • Fraunhofer research institutions e.g. mentoring for young women scientists; childcare facilities • Max-Planck Society: special research positions for young women • Helmholtz Association: 5 Point Programme to promote Equal Opportunity e.g. re-entry into science & research careers after family break • Leibniz-Society: programme for equal opportunities (since 1998) → high proportion of women scientists • Excellence Initiative; • Women Professorships Programme for universities (BMBF) • Gender equality standards – requirement for member institutions (DFG) • Additional lump sums for gender equality measures – incl. mentoring, coaching, training for women scientists (DFG) • Programmes of certain ‘Länder’ as e.g. Baden-Württemberg (Schlieben-Lange-Programme for young female researchers with children) <p>Mentoring:</p> <ul style="list-style-type: none"> • Center of Excellence Women in Science (CEWS); • eument-net • local activities and national support (DFG) <p>Networks/Platforms:</p> <ul style="list-style-type: none"> • KISSWIN: Platform for the Researchers of Tomorrow → Gender

	Topic – Leaky Pipeline	Topic – Maternity/ Paternity leave	Topic – Career breaks	Topic – Equal playing fields
UK	Gender Gap Index 2008: Rank 13 (Index 2007: Rank: 11)	<ul style="list-style-type: none"> • maternity leave: 26 weeks + 26 weeks (of which 13 are paid) • paternity leave: 2 weeks t.b. taken in the first 8 weeks • unpaid parental leave: 13 weeks per parent/child 	<p>WLB:</p> <ul style="list-style-type: none"> • part-time <p>WOF:</p> <ul style="list-style-type: none"> • Royal Society Dorothy Hodgkin Fellowships (early career stage) • Daphne Jackson Memorial Fellowship Trust (re-start/returnees) • Athena Project (since 1999) • UKRC: Return (programme for returnees) • Equalitec (programme for returnees) • The Open University (courses) <p>DCC:</p> <ul style="list-style-type: none"> • No initiatives known 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • Equality Act (2006) • Gender Equality Duty (2007) • Equal Opportunity Commission <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • UK Resource Center for Women in Science (UKRC); • Research Councils UK (RCUK): <ul style="list-style-type: none"> – Research and Diversity Unit (2005) • Women and Equality Unit (WEU) • Athena SWAN Charter <p>Mentoring:</p> <ul style="list-style-type: none"> • e.g. MentorSET; HighTech Women • many others <p>Networks:</p> <ul style="list-style-type: none"> • e.g. British Federation of Women Graduates • many others
Switzerland	Gender Gap Index 2008: Rank 14 (Index 2007: Rank: 40)	<ul style="list-style-type: none"> • maternity leave: 98 days (14 weeks) • no paid paternity leave, no paid parental leave • 1-5 days paid paternity leave: e.g. universities, NPOs, some companies in industry 	<p>WLB:</p> <ul style="list-style-type: none"> • part-time; childcare-time • FEOP 2008-2011: e-working, flexible working times and organisation service for families incl. childcare; coaching • mat. leave > extension of funding period (SNSF) • childcare-time > extension academic age rules (SNSF) • Marie Heim-Vögtlin Programme: budget for external childcare <p>WOF:</p> <ul style="list-style-type: none"> • National: Marie-Heim-Vögtlin Programme (Returnees/ Re-start) • Local: Tremplin subsidy (universities of Geneva and Neuchâtel) <p>DCC:</p> <ul style="list-style-type: none"> • National: Projects under the framework of FEOP (since 2008) • Local: support office at ETH Zurich, universities of Zurich, Berne, Basel, Fribourg, Geneva, Neuchâtel, Lausanne, Lucerne, St. Gallen, Ticino 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • Federal Equal Opportunity Programmes (FEOP) since 2000 • Swiss National Science Foundation (SNSF): <ul style="list-style-type: none"> – Gender Equality office & plan (since 2002) – SNSF Mission Statement on Equality between Women and Men (since 2008) • local: universities – officers for gender equality <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • National: <ul style="list-style-type: none"> – Marie Heim-Vögtlin Programme, MHV Prize – Gender equality measures of the SNSF • Local: <ul style="list-style-type: none"> – activities under the umbrella of the FEOP <p>Mentoring:</p> <ul style="list-style-type: none"> • eument-net • Mentoring Deutschschweiz & Réseau romand de mentoring pour femmes • many local activities <p>Networks:</p> <ul style="list-style-type: none"> • Gender Campus • MHV-Networking; • many local initiatives

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	Topic – Leaky Pipeline	Topic – Maternity/ Paternity leave	Topic – Career breaks	Topic – Equal playing fields
France	Gender Gap Index 2008: Rank 15 (2007: Rank: 51)	<ul style="list-style-type: none"> • maternity leave: 16 weeks at full pay • paternity leave: 11 days at full pay • parental leave: either parent, up to the third anniversary of the child, with no pay 	<p>WLB:</p> <ul style="list-style-type: none"> • full-time childcare services <p>WOF:</p> <ul style="list-style-type: none"> • Prix Irène Joliot-Curie <p>DCC:</p> <ul style="list-style-type: none"> • CNRS: Topic included in the current “mission pour la place des femmes au CNRS” 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • National action plan for equality in education (2000) <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • The Women and Science Association • Unit ‘Women and Science’ CNRS • ‘Elles en science’ • Prix Irène Joliot-Curie <p>Mentoring:</p> <ul style="list-style-type: none"> • ‘Elles Bougent’
Spain	Gender Gap Index 2008: Rank 17 (Index 2007: Rank: 10)	<ul style="list-style-type: none"> • maternity leave: 16 weeks • paternity leave: 15 days • unpaid parental leave: max. child’s age of 3 	<p>WLB:</p> <ul style="list-style-type: none"> • childcare-time accepted → more time to complete their degrees • financial allocation during maternity leave in cases of fellowship holders <p>WOF:</p> <ul style="list-style-type: none"> • local initiatives <p>DCC:</p> <ul style="list-style-type: none"> • no initiatives known 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • Ministry of Equality • Law for equality of women and men (2007) <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • Institutos de la Mujer (Women’s Institutes) • Institute for Women (ibid.) • Women and Science Committee (Council for Scientific Research) <p>Networks:</p> <ul style="list-style-type: none"> • Association of University Women • Association of Women in Research and Technology • portal Universia

	Topic – Leaky Pipeline	Topic – Maternity/ Paternity leave	Topic – Career breaks	Topic – Equal playing fields
Austria	Gender Gap Index 2008: Rank 29 (2007: Rank: 27)	<ul style="list-style-type: none"> • maternity leave: 16-20 weeks • paternity leave: 2 weeks • followed by parental leave: max. 3 yrs 	<p>WLB:</p> <ul style="list-style-type: none"> • part-time; childcare-time (mothers and fathers) • UniKid: nation-wide web-portal on childcare for women scientist and students • Children’s Offices & ChildcareContactPoints at universities: flexible childcare facilities <p>WOF:</p> <ul style="list-style-type: none"> • DOC-fForte Fellowships & L’Oréal (ÖAW) • Hertha Firnberg Program & Elise Richter Program (FWF) • Excellentia (Ministry of Science and Research); • Forte-Women in R&T • 4 programme lines (4 Ministries) <p>DCC:</p> <ul style="list-style-type: none"> • Concrete measures at the University of Vienna, ÖAW, Institute of Science and Technology (I.S.T.) Austria • Discussion nationwide in framework of the new “Nationalen Aktionsplan für Forschende” 	<p>Gender Equality Policy:</p> <ul style="list-style-type: none"> • At constitutional, federal and university level • University Act 2002 • Federal Commitment to gender mainstreaming (2000) • Act on Equal Treatment in Federal Service (1993) <p>Initiatives for WiS/R:</p> <ul style="list-style-type: none"> • Women and Science Unit at Federal Ministry of Science and Research • Ministry of Science and Research <p>Mentoring:</p> <ul style="list-style-type: none"> • eument-net • many local activities
EU-level	EU-25 – Median			<ul style="list-style-type: none"> • Charter and Code of Conduct for Researchers (2007) • Green Paper (2008) • Better Careers and More Mobility: A European Partnership for Researchers (Mai 2008) • ESF & EUHOCs Roadmap (2009)

4. Working Group 2: Human Resources Development

Transferable skills (Chair, Iain Cameron)

4.1 Introduction

The Human Resources Development working group was established at the Launch Conference of the ESF Member Organisation Forum for Research Careers in Europe in Brussels in November 2007. The original plan had been to run two separate working groups focusing on transferable skills and staff development issues. However, the conference agreed that a single working group looking at Human Resource issues should be established.

4.2 *Modus operandi* of Working Group 2

The inaugural working group meeting at the Launch Conference 8 November 2007 in Brussels was followed by four workshops: on 8 May 2008 in Dublin, 25 September 2008 in Brussels, 11 November 2008 (at the MO Forum Annual Assembly in Brussels) and 6 July 2009 in London.

At the inaugural meeting the key points noted were that:

- Doctoral candidates should have access to resources and training, career advice, transferable skills training and continuing professional development.
- The following skills were mentioned as 'transferable skills' particularly relevant for outside academic environments:
 - Entrepreneurship, communication, ability to apply knowledge and skills.
 - Ability to recognise similarities and differences in the world of industry, economy etc. from the academic world and to be able to act accordingly.
 - Self-awareness of own skills, abilities as well as limitations.
- Training in transferable skills should be provided during the doctoral education period at the right time and level, to complement the education without hindering the normal development of the scientific research.
- Funding organisations can support the delivery of transferable skills training and career services through:
 - Partnerships, both national and international
 - Exchange of good practices
- Exchange of good practices requires mapping of existing initiatives in the area.

At the workshops held on 8 May and 25 September 2008 participants introduced the situation in their own countries describing:

- Government or other policy in each country, when

it started, what is expected and how it is implemented

- Which aspects of transferable skills are included
- Which organisations are responsible for delivering the agenda in each country and how they interact with each other and the research base (universities, research organisations etc.)
- The particular policy and role of their Research Council or other ESF Member Organisation

As a result of these presentations a number of ideas for outputs from Working Group 2 were discussed.

At the third workshop held at the Member Organisation Forum Annual Assembly 11-12 November 2008 an agreed working definition of 'transferable skills' was developed and it was agreed that the prime output of Working Group 2 should be to develop and analyse the results of a questionnaire focused on the policy and implementation of transferable skills training in the countries of the MO Forum participants.

The questionnaire (Annex 4.3) was constructed with a total of 19 questions in six sections.

- Section 1: Description and definition of transferable skills
- Section 2: Provision of transferable skills
- Section 3: Responsibility for procuring, managing and delivering transferable skills
- Section 4: Provision of transferable skills in relation to researchers in your country
- Section 5: Quality and impact of transferable skills training
- Section 6: Responder's details

It was implemented by Research Councils UK on behalf of the Member Organisation Forum using the Bristol Online Survey software tool³⁹. The survey was launched on 26 Feb 2009 and closed on 30 May 2009. The questionnaire was sent to the representatives of all ESF Member Organisations who signed up to the Forum.

At a fourth workshop, on 6 July 2009, the findings of the survey were discussed and a structure for the report was agreed.

³⁹ <http://www.survey.bris.ac.uk/> This survey tool enables construction of surveys and produces an automated report (see Annex 4.3).

4.3 Questionnaire results and discussion

A total of 18 valid responses were received. Responses were received from participants representing the following 16 countries: Austria, Belgium (Flanders), Cyprus, Denmark, Finland, France*, Germany, Ireland, Italy*, Luxembourg, Norway, Poland, Spain, Sweden, Switzerland, UK. EURODOC and the ERC also responded although much of the Eurodoc response was from a Dutch perspective. In 10 cases respondents consulted with other colleagues in producing their response.

Due to the number of responses, distribution of countries, affiliation of respondents and the fact that some comments are made from a specific institutional rather than national perspective, Working Group 2 decided that it was not possible to compare countries with each other nor to group them in terms of their state of development of this agenda. Working Group 2 decided that the most useful way to use the results was as a broad snapshot of European opinion in early 2009 about this agenda and what it entailed. Nevertheless there was considerable agreement on the definition of transferable skills and on the set of skills covered by that definition. In publishing the report, this analysis would then be available as a reference point for any country to judge its own activity against. The group also recognised that it would be possible to update or extend the survey in future.

Survey Section 1: Description and definition of transferable skills

“Definitions of this kind are very important to make sure that we all are talking about the same issue when discussing European research careers and researcher training.”

Survey respondent

There are a number of definitions of transferable skills available through Internet searches but none of these were ideally suited to the research situation. The term ‘transferable skills’ was used in the Salzburg Principles (Principle 8 – **The promotion of innovative structures: to meet the challenge of interdisciplinary training and the development of transferable skills.**) prepared by the EUA for the Bergen Bologna Conference. The Bergen Communiqué also uses the term in stating ‘We urge universities to ensure that their doctoral programmes promote interdisciplinary training and the development

* Note that in some instances the response was made from a specific institutional perspective e.g. INRA (Institut National de la Recherche Agronomique) in France and INFN (Istituto Nazionale di Fisica Nucleare) in Italy.

of transferable skills, thus meeting the needs of the wider employment market.’

Other terms such as ‘generic, ‘core’ or ‘personal’ have been used, however none of these fully captures the key aspect of transferability. Working Group 2 therefore developed a definition of ‘transferable skills’ that was in principle generic but which made reference to the context of research. It was specifically designed to address three concepts (1) transferability between work contexts,(2) enhancing the application of other skills, and (3) routes to acquiring skills. This led to the research-related definition of transferable skills:

Definition of transferable skills in a research context

“Transferable skills are skills learned in one context (for example research) that are useful in another (for example future employment whether that is in research, business etc). They enable subject- and research-related skills to be applied and developed effectively. Transferable skills may be acquired through training or through work experience”

Question 1

Respondents were asked whether they agreed with this definition of transferable skills developed by Working Group 2. Sixteen of the eighteen responses agreed or strongly agreed that the definition was appropriate. The strongest comment noted that transferable skills as a term was not easily translatable into other European languages and that this definition was ‘...the best one I have ever seen...’.

Some suggestions for clarification were made and a minority suggested a more generic definition with no specific reference to research. Taking words suggested by a respondent and eliminating the research references the following, more generic, statement can be constructed which is complementary to the agreed definition for a research context.

“Transferable skills are necessary for effective performance by individuals in a workplace. They are skills that all types of study, work and career have in common and they can serve as a bridge from study to work and from one career to another. They may be acquired through work experience or by training”

Survey Section 2: Provision of transferable skills

Questions 3 and 4

The questionnaire asked respondents about 12 categories of skills and whether they should be provided to (a) doctoral candidates or (b) post-doctoral researchers.

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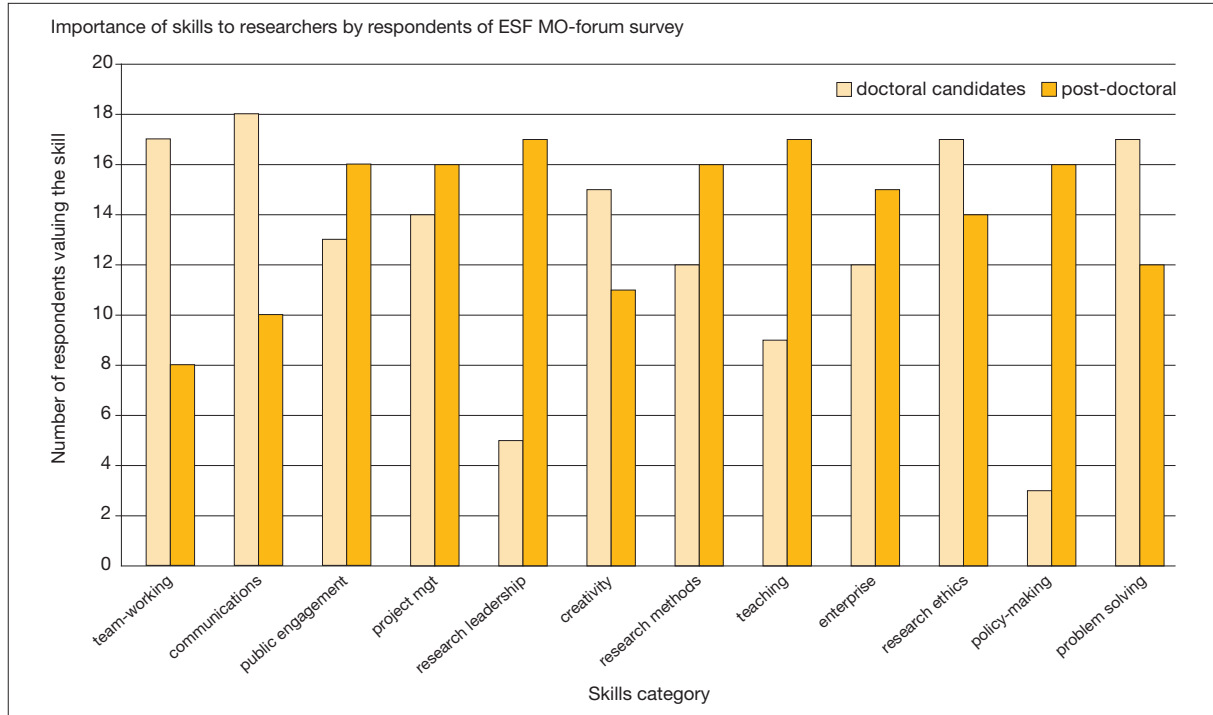


Figure 4. 1. Results of survey Q3: Number of respondents identifying each category of skills as important for (a) doctoral candidates and (b) post-doctoral researchers

This list was constructed by members of the working group and was influenced by the most readily available published list contained in the United Kingdom's 'Joint Skills Statement of the Research Councils' (Annex 4.2). All categories were seen as relevant to both groups although the balance of importance varied, e.g. policy skills for postdocs or emphasising team-working at doctoral level. Only one respondent used the 'neither' category and this was in relation to creativity, enterprise and problem solving. The relative response for doctoral candidates and postdocs also indicates the relative importance at a particular stage of development; for example the focus on team-working, or communications may be greater for doctoral candidates whereas teaching skills or research leadership are increasingly important at the post-doctoral stages. It is clear that there are few skills perceived to be unique to one group.

Respondents identified several additional skills which they felt should be provided: mentoring and supervision (post-doc); research integrity; negotiations; career planning; networking; grant application writing. Working Group 2 agreed that all of these were relevant and should be added to the 'recommended' list of skills to produce the following final list (amendments in italics):

Agreed list of transferable skills

- Working with others/team working
- Communication/presentation skills, both written and oral
- Communication/dialogue with non-technical audiences (public engagement)
- Project and time management skills
- Research management and research leadership
- Creativity and the ability for abstract thought
- Knowledge of research methods and technologies beyond the Doctoral project
- Teaching skills
- Mentoring and supervisory skills
- Enterprise skills (entrepreneurship, commercialisation, innovation, patenting and knowledge transfer)
- Research ethics *and research integrity*
- Use of science in policy making
- Problem solving
- *Negotiation skills*
- *Networking skills*
- *Grant application writing skills*
- *Career planning skills*

Working Group 2 noted that it had not made any distinction in this list between skills relevant for non-academic or academic careers, nor were any comments made relating to disciplinary differences.

Questions 5 and 5a

These questions were designed to determine whether a policy on transferable skills existed in each country and are linked to Question 6 on the aims of the policy. The responses indicated an increasing awareness of the importance of transferable-skills provision and the working group indicated that the nature of the policy and the extent of its implementation were likely to vary significantly between countries. Half (9) of the respondents reported that their country had a policy for development and all of these identified preparation for a wider labour market as a reason for transferable-skills training. Enhancing academic employment (6) and improving research work (4) were also selected.

Question 6

This question was intended to clarify the mechanisms used for and the aims of transferable-skills policy. Fourteen respondents answered this question although it is clear from the responses that there was some variation in the understanding of the question. The responses are to an extent country-specific although there are some commonalities. The national policy drive in the UK and Ireland for a systematic approach is strongly reflected in the response of those countries. Other countries (Belgium (Flanders), Finland and Germany) make reference to structured research training and/or graduate/doctoral schools as vehicles for transferable skills. In other countries the policy may be left to the individual institutions or be embedded in research training. In these instances it is not clear that a systematic national approach is being taken to skills development.

Thus the major divide seems to be between an integrated/systematic national approach and leaving matters to the institution with some degree of encouragement to undertake transferable skills.

Survey Section 3: Responsibility for procuring, managing and delivering transferable skills

Question 7

This was intended to elicit where the responsibility lay for procuring, managing and delivering skills training. The response to the three parts is summarised in Table 4.1. It is clear that respondents see that the research organisation (also referred to as the 'research-performing organisation' RPO) has the key role in skills training particularly in terms of its management and delivery. The

role of the individual researcher was seen as strongest in procuring their own training. The role of ESF Member Organisations or national government was seen as less strong.

Question 8

This question identified a set of other organisations that may have responsibilities with regard to transferable-skills provision. The types of organisation listed included:

- Funding organisations – through funding and organisation
- Universities and research institutions and their graduate schools
- Industry confederations, businesses, companies and innovation organisations
- National and regional government
- Scientific societies and professional institutions and alumni associations
- National training organisations*
- Quality assurance and enhancement organisations

* The UK is the only country where a dedicated organisation (VITAE®)⁴⁰, focused on researchers, is mentioned.

Question 9

Question 9 sought to understand the level of knowledge of transferable-skills strategies or policies by the funding organisations represented by ESF. However, Working Group 2 felt that this had been understood differently and had not elicited a useful response. As a consequence, the results have not been presented.

Survey Section 4: Provision of transferable skills in relation to researchers in your country

Question 10

Responses indicated strong agreement that transferable skills development should continue through the career of a researcher (11 strongly agreed and 6 agreed). Comments were provided by 12 respondents. Specific mention was made of different skills becoming important at different stages, the importance of flexibility and a diverse range of skills. Also it was recognised that actually moving jobs may be harder over time.

Question 11

Only 5 respondents reported a policy to include prior experience and from the explanations given in Question 11a it appears that only two countries may have explicit

40. <http://www.vitae.ac.uk/> Vitae is a national organisation championing the personal, professional and career development of doctoral researchers and research staff in UK higher education institutions and research institutes.

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	Individual researcher	Research organisation	Member organisation	National government
Procurement	9	12	3	5
Management	4	15	8	4
Delivery	7	15	5	1

Table 4.1 Role responsibility as seen by questionnaire respondents

recognition of prior experience through a ‘training needs analysis’ indicating that prior experience is probably recognised as part of a systematic approach to transferable skills. Other responses indicated a significant degree of uncertainty about the question, which may correlate with the level of development of a transferable-skills policy in their country.

Question 12

Formal recognition of transferable-skills programmes in the form of credits or qualifications was reported in a minority of cases (5). Recognition is listed as through the diploma supplement, listed in the CV, or by practical demonstration of skills. The level of support for the question and the detailed responses are in line with hesitancy about using credits in assessment of the PhD perception, e.g. in discussions around the Bologna Process. Indeed the EUA in its recent Trends questionnaire includes a question to assess the extent of use of credit systems at doctoral level.

Question 13

The relative roles of mentors and supervisors in relation to transferable-skills training are demonstrated in the answer. Whereas mentors clearly have a role in discussing training needs with a researcher, the role is progressively reduced with reference to arranging training and evaluating the outcomes. Supervisors are expected to have a high level of responsibility in all three aspects with the strongest role being in relation to arranging training.

Question 14

The responses to this question along with those to Question 13 indicate that there is a strong understanding of the concept and role of a mentor amongst respondents. Mention is made of role models, brokering a contact with those delivering skills, and raising the awareness of transferable skills and their importance.

Note: Various definitions of mentoring can be found on the Web. In the UK, Imperial College, London uses a definition⁴¹ which is reproduced in the UK Concordat for Career Development of Researchers.

Survey Section 5: Quality and impact of transferable-skills training

Question 15

The question indicates that national Quality Assurance (QA) frameworks either do not generally recognise transferable skills or the respondents are unsure. Given the position of knowledge of the respondents in their national systems it is likely that this indicates a low level of engagement between QA and transferable-skills provision, which is likely to correlate with the extent of systematic provision in a country.

Questions 16 and 16a

Regarding measuring the impact of transferable-skills training, sources of feedback included researchers themselves, mentors, employers, supervisors and managers. Of 14 comments, 8 said that surveys of these groups were important.

More abstract or quantitative methods of assessing impact were recognised as being difficult, however the following were suggested:

- Levels of employment in academia and industry
- Proportions of PhDs moving between academia and industry
- PhDs being valued/viewed positively by the public
- Observed improvement in job performance
- Employment and employability – demand for PhDs by industry
- Time to complete the degree
- Development of an Impact Framework

41. Mentoring for Research Staff at Imperial College London
 “The mentoring scheme has been introduced to give researchers the opportunity of talking to someone who may have had similar experiences but is further ahead in their career. Discussions with a mentor could include the following: career options; routes to career goals; information/people/networks of potential help to them; feedback on fellowship applications or CVs; and balance between work and family. The main difference between a mentor and a line manager is the mentor has no personal responsibility for performance. The mentee may also wish to discuss career plans with their line manager and they should ensure they do not neglect this option during the mentoring relationship”.

Working Group 2 noted several recent studies that were relevant to transferable skills, in particular the DOC-Careers report from EUA which addressed transferable skills as one of its issues. The report's recommendations record that 'while there was a general agreement between universities and industry that transferable skills are important, there was less consensus on the extent to which they should be a structural element of doctoral education'. In the UK the Vitae programme has published the reports 'What do PhDs do?' and 'What do Researchers do?' covering career destinations of researchers. The latter notes that doctoral graduates are typically high calibre individuals with specialist knowledge, well-developed transferable skills and an ability to work creatively and independently and are highly employable right across the economy in a wide range of occupations. EURODOC has also undertaken a survey on the views of European researchers which was still being analysed at the time of publication of this report.

4.4 Conclusion

This survey has provided a snapshot of European opinion on the state of policy with respect to transferable skills within doctoral programmes. It offers a definition of transferable skills and an agreed list of the transferable skills important to funding organisations and, through the comments of respondents, offers an insight into the state of policy in Europe. Working Group 2 wishes to thank all those who participated in the work of the group and in the design, completion and analysis of the survey.

Annex 4.1

Members and Participants in the meetings of the Working Group 2*

- **Iain Cameron** – United Kingdom (Working Group Chair)
- **Beate Scholz** – Germany (MO-Forum Chair)
- **Anjana Buckow** – Germany
- **Annalisa Montesanti** – Ireland
- **Luciano Catani** – Italy
- **Loula Sigala** – Greece
- **Massimo Serpieri** – European Commission, DG Research
- **Marie-Claude Marx** – Luxembourg
- **Margarita Martin** – Spain
- **Marta Lazarowicz** – Poland
- **Martin Hynes** – Ireland
- **Thomas Jorgensen** – European Universities Association
- **Tina Petanen** – Finland
- **Tone Vislie** – Norway
- **Westley Forsythe** – Ireland

* A number of other Forum participants also participated in the launch discussion of the Forum in Brussels (November 2007)

- **Guntram Bauer** – Germany
- **Barbara Zimmerman** – Austria
- **Adrian Curaj** – Romania
- **Lidia Borell-Damian** – European Universities Association

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Annex 4.2

Joint Statement of the Research Councils Skills Training Requirements for Research Students⁴²

Introduction

The Research Councils play an important role in setting standards and identifying best practice in research training.

This document sets out a joint statement of the skills that doctoral research students funded by the Research Councils would be expected to develop during their research training. These skills may be present on commencement, explicitly taught, or developed during the course of the research. It is expected that different mechanisms will be used to support learning as appropriate, including self-direction, supervisor support and mentoring, departmental support, workshops, conferences, elective training courses, formally assessed courses and informal opportunities.

The Research Councils would also want to re-emphasise their belief that training in research skills and techniques is the key element in the development of a research student, and that PhD students are expected to make a substantial, original contribution to knowledge in their area, normally leading to published work. The development of wider employment-related skills should not detract from that core objective.

The purpose of this statement is to give a common view of the skills and experience of a typical research student thereby providing universities with a clear and consistent message aimed at helping them to ensure that all research training was of the highest standard, across all disciplines. It is not the intention of this document to provide assessment criteria for research training.

It is expected that each Council will have additional requirements specific to their field of interest and will continue to have their own measures for the evaluation of research training within institutions.

(A) Research Skills and Techniques – to be able to demonstrate:

- the ability to recognise and validate problems
- original, independent and critical thinking, and the ability to develop theoretical concepts
- a knowledge of recent advances within one's field and in related areas
- an understanding of relevant research methodologies and techniques and their appropriate application within one's research field
- the ability to critically analyse and evaluate one's findings and those of others
- an ability to summarise, document, report and reflect on progress

(B) Research Environment – to be able to:

- show a broad understanding of the context, at the national and international level, in which research takes place
- demonstrate awareness of issues relating to the rights of other researchers, of research subjects, and of others who may be affected by the research, e.g. confidentiality, ethical issues, attribution, copyright, malpractice, ownership of data and the requirements of the Data Protection Act
- demonstrate appreciation of standards of good research practice in their institution and/or discipline
- understand relevant health and safety issues and demonstrate responsible working practices
- understand the processes for funding and evaluation of research
- justify the principles and experimental techniques used in one's own research
- understand the process of academic or commercial exploitation of research results

(C) Research Management – to be able to:

- apply effective project management through the setting of research goals, intermediate milestones and prioritisation of activities
- design and execute systems for the acquisition and collation of information through the effective use of appropriate resources and equipment
- identify and access appropriate bibliographical resources, archives, and other sources of relevant information
- use information technology appropriately for database management, recording and presenting information

42. The Joint Skills Statement was developed in 2001 by the UK GRAD Programme and the Research Councils. This version published by Vitae® – <http://www.vitae.ac.uk>

(D) Personal Effectiveness – to be able to:

- demonstrate a willingness and ability to learn and acquire knowledge
- be creative, innovative and original in one's approach to research
- demonstrate flexibility and open-mindedness
- demonstrate self-awareness and the ability to identify own training needs
- demonstrate self-discipline, motivation, and thoroughness
- recognise boundaries and draw upon/use sources of support as appropriate
- show initiative, work independently and be self-reliant

(E) Communication Skills – to be able to:

- write clearly and in a style appropriate to purpose, e.g. progress reports, published documents, thesis
- construct coherent arguments and articulate ideas clearly to a range of audiences, formally and informally through a variety of techniques
- constructively defend research outcomes at seminars and viva examination
- contribute to promoting the public understanding of one's research field
- effectively support the learning of others when involved in teaching, mentoring or demonstrating activities

(F) Networking and Teamworking – to be able to:

- develop and maintain co-operative networks and working relationships with supervisors, colleagues and peers, within the institution and the wider research community
- understand one's behaviours and impact on others when working in and contributing to the success of formal and informal teams
- listen, give and receive feedback and respond perceptively to others

(G) Career Management – to be able to:

- appreciate the need for and show commitment to continued professional development
- take ownership for and manage one's career progression, set realistic and achievable career goals, and identify and develop ways to improve employability
- demonstrate an insight into the transferable nature of research skills to other work environments and the range of career opportunities within and outside academia
- present one's skills, personal attributes and experiences through effective CVs, applications and interviews

Annex 4.3

Questionnaire sent to Member Organisation Forum members by Working Group 2 (Human Resources Development) – Numerical Results (next pages)

Survey Overview:

Number of respondents: 18

Launch date: 26 Feb 2009

Close date: 30 Jun 2009

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Survey on the status of transferable skills in the countries of MO Forum members

Section 1: Description and definition of transferable skills

1. To what extent do you agree with the following definition of 'transferable skills'?

'Transferable skills are skills learned in one context (for example research) that are useful in another (for example future employment whether that is in research, business etc). They enable subject and research related skills to be applied and developed effectively ... Transferable skills may be acquired through training or through work experience'

Strongly Agree:		44.4%	8
Agree:		44.4%	8
Neutral:		11.1%	2
Disagree:		0.0%	0
Strongly Disagree:		0.0%	0

2. Is there anything you would add or change to the above definition of transferable skills?

Section 2: Provision of transferable skills

3. Which of the following skills do you think should be provided to early stage researchers, and at what stage do you think these skills should be provided? (select all that apply)

3.a. Working with others/team working

Doctoral candidates:		n/a	17
Postdoctoral researchers:		n/a	8
Neither:		n/a	0

3.b. Communication/presentation skills, both written and oral

Doctoral candidates:		n/a	18
Postdoctoral researchers:		n/a	10
Neither:		n/a	0



3.c. Communication/dialogue with non-technical audiences (public engagement)

Doctoral candidates:		n/a	13
Postdoctoral researchers:		n/a	16
Neither:		n/a	0

3.d. Project and time management skills

Doctoral candidates:		n/a	14
Postdoctoral researchers:		n/a	16
Neither:		n/a	0


3.e. Research management – research leadership

Doctoral candidates:		n/a	5
Postdoctoral researchers:		n/a	17
Neither:		n/a	0

3.f. Creativity and the ability for abstract thought

Doctoral candidates:		n/a	15
Postdoctoral researchers:		n/a	11
Neither:		n/a	1

3.g. Knowledge of research methods and technologies beyond the Doctoral project

Doctoral candidates:		n/a	12
Postdoctoral researchers:		n/a	16
Neither:		n/a	0

3.h. Teaching skills

Doctoral candidates:		n/a	9
Postdoctoral researchers:		n/a	17
Neither:		n/a	0

3.i. Enterprise skills (entrepreneurship, commercialisation, innovation, patenting and knowledge transfer)

Doctoral candidates:		n/a	12
Postdoctoral researchers:		n/a	15
Neither:		n/a	1

3.j. Research ethics

Doctoral candidates:		n/a	17
Postdoctoral researchers:		n/a	14
Neither:		n/a	0

3.k. Use of science in policy making

Doctoral candidates:		n/a	3
Postdoctoral researchers:		n/a	16
Neither:		n/a	1

3.l. Problem solving





Doctoral candidates:		n/a	20
Postdoctoral researchers:		n/a	15
Neither:		n/a	1

4. Are there any skills not mentioned above which you think should be provided to early stage researchers? Please indicate at which career stage (Doctoral Candidate/Postdoctoral Researcher) you think these skills should be provided.

5. Does your country have a policy to support the development of transferable skills?

Yes:		50.0%	9
No:		38.9%	7
Unsure:		11.1%	2

5.a. If you replied 'Yes' to the question above which of the following reasons apply to this policy?

Enhancing employability inside academia:		n/a	6
Preparation for a wider labour market:		n/a	9
Improvement of research work:		n/a	4
Other (please specify):		n/a	4

6. Please briefly describe the mechanisms and programmes used to realise your country's aims for transferable skills?

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Section 3: Responsibility for procuring, managing and delivering transferable skills

7. Which of the following groups do you think has a main responsibility for procuring, managing and delivering transferable skills? (select all that apply)

7.a. Individual researcher

Procurement:		n/a	9
Management:		n/a	4
Delivery:		n/a	7

7.b. Research organisation (universities, research institutions)

Procurement:		n/a	12
Management:		n/a	15
Delivery:		n/a	15

7.c. Member organisation

Procurement:		n/a	3
Management:		n/a	8
Delivery:		n/a	5

7.d. National Government




Procurement:		n/a	5
Management:		n/a	4
Delivery:		n/a	1

8. Which other institutions do you think have important responsibilities when it comes to transferable skills provision?

9. Please briefly describe your knowledge of the institutional strategies or policies in your country (e.g. HR development strategies)?




Section 4: Provision of transferable skills in relation to researchers in your country

10. To what extent do you agree with the following statement? *“The development of transferable skills continues throughout the career development of a researcher”*

Strongly Agree:		61.1%	11
Agree:		33.3%	6
Neutral:		5.6%	1
Disagree:		0.0%	0
Strongly Disagree:		0.0%	0

10.a. Please explain your response to the question above

11. Is there a policy in your country to include the prior experience or expectations of researchers entering the profession?

Yes:		29.4%	5
No:		35.3%	6
Unsure:		35.3%	6

11.a. Please explain your answer e.g. what is this policy?



12. Is there formal recognition in your country for transferable skills programmes in the form of credits or qualifications?

Yes:		27.8%	5
No:		61.1%	11
Unsure:		11.1%	2

12.a. Please provide further comment on the question above if necessary

13. Which of these roles do you think mentors or supervisors typically have when it comes to the provision of transferable skills? (select all that apply)




13.a. Discuss the need for training (with the researcher)

Mentors:		n/a	14
Supervisors:		n/a	13
Neither:		n/a	2

13.b. Help arrange training

Mentors:		n/a	8
Supervisors:		n/a	16
Neither:		n/a	2

13.c. Evaluate outcomes of training

Mentors:		n/a	7
Supervisors:		n/a	13
Neither:		n/a	4




14. Do you think there are any other roles that mentors or supervisors typically have when it comes to the provision of transferable skills?

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Section 5: Quality and impact of transferable skills training

15. Does your country's quality assurance framework for doctoral programmes incorporate transferable skills programmes?

Yes:		22.2%	4
No:		38.9%	7
Unsure:		38.9%	7

15.a. Please provide further comment on the question above if necessary

16. How do you think the impact of transferable skills training can be measured and assessed?

16.a. Please provide any examples of measuring and assessing transferable skills that your organisation is aware of (e.g. survey of views of researchers, employers, supervisors etc.)

Section 6: Responders Details

17. Please provide your full name including title

18. Please select which ESF Member Organisation you belong to

19. Please provide the names and organisation of colleagues who you have consulted with and who have provided input for this questionnaire

Annex A

Participating organisations and nominated representatives

Country	Organisation	Members
Austria	Austrian Academy of Sciences (ÖAW)	Gerhard Leder, Barbara Haberl
Belgium	Research Foundation Flanders (FWO)	Jan De Beule, Benno Hinnekint, Stijn Verleyen
Belgium	National Fund for Scientific Research (FNRS)	Elisabeth Kokkelkoren, Bruno Moraux, Pascal Perrin
Cyprus	Cyprus Research Promotion Foundation	Eleana Gabriel, Ioanna Loisou
Czech Republic	The Czech Science Foundation (GAČR)	Veronika Paleckova
Denmark	Danish National Research Foundation (DG)	Geeske de Witte Vestergaard, Vibeke Schrøder
Finland	Academy of Finland	Maiju Gyran, Tiina Petänen
Finland	Delegation of the Finnish Academies of Science and Letters	Irina Kauhanen, Eero Vuorio
France	National Institute for Agronomic Research (INRA)	Thierry Boujard
France	The ELSO Gazette	Carol Featherstone
France	Ministry of National Education, Advanced Instruction, and Research	Alain Lichnewsky
Germany	German Research Foundation (DFG)	Anjana Buckow, Anke Reinhardt, Beate Scholz
Greece	National Hellenic Research Foundation (NHRF)	Loula Sigala
Hungary	Hungarian Academy of Sciences	Zsolt Kajcsos
Ireland	Irish Research Council for Sciences, Engineering and Technology (IRCSET)	Martin Hynes, Jennifer Brennan
Ireland	Health Research Board (HRB)	Annalisa Montesanti
Italy	National Research Council (CNR)	Marta Caradonna, Anna D'Amato, Andrea Lapicciarella
Luxembourg	National Research Fund (FNR)	Marie-Claude Marx, Ulrike Kohl
The Netherlands	Netherlands Organisation for Scientific Research (NWO)	Anko Wiegel
Norway	The Research Council of Norway (RCN)	Tone Vislie
Poland	Foundation for Polish Science (FNP)	Marta Lazarowicz-Kowalik, Magdalena Zuberek
Romania	Ministry of Education and Research	Monica Cruceru
Spain	Council for Scientific Research (CSIC)	Margarita Martin Munoz, Jose J. Sanchez Serrano
Sweden	Swedish Research Council (VR)	Ana Beramendi, Håkan Billig, Carl Jacobsson, Anna Sjöström Douagi
Sweden	Swedish Council for Working Life and Social Research (FAS)	Cecilia Grevby
Switzerland	Swiss National Science Foundation (SNSF)	Susanne Matuschek
United Kingdom	Research Councils UK	Iain Cameron
United Kingdom	Medical Research Council (MRC)	Kevin Moreton
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Annex A

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