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BETTER CAREERS AND MORE MOBILITY: A EUROPEAN PARTNERSHIP FOR RESEARCHERS

IMPACT ASSESSMENT

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1. PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

1.1. Organisation and timing

This Impact Assessment accompanies the Communication: **"Better careers and more mobility: A European partnership for researchers"**, one of the five policy initiatives (catalogue 2008/RTD/033) planned by the Commission in 2008 to follow up on the Green Paper "The European Research Area: New Perspectives" (COM (2007) 161). A roadmap has been prepared and published in Agenda Planning. A consultation with other Directorate-Generals has been carried out through an inter-service group composed of BEPA, BUDG, CCR, COMP, EAC, ECFIN, EMPL, ELARG, ENTR, ENV, INFSO, JLS, MARKT, REGIO, RELEX, the Secretariat-General, DG TRADE and DG TREN. The group was set up in December 2007, has met twice and has been invited to provide specific contributions during the course of the elaboration of the impact assessment. Most **comments have been taken into account.**

1.2. Consultation of stakeholders and experts

The publication of the Green Paper by the European Commission launched a broad institutional and public debate on possible actions to give renewed impetus to the realisation of an open, competitive and attractive European Research Area. 685 (211 coming from organisations) replies were received to an on-line questionnaire from 1st May 2007 until 31st August 2007. In addition, 145 free-format contributions (position papers, opinions, etc.), mainly coming from Member States (mostly from Ministries in charge of Research) and organisations, were received by 31 December 2007.

The results of the consultation[1] highlight strong support for all ERA axes presented in the Green paper. Concerning the level of expected actions (EU, national or regional), **"Realising a single labour market for researchers" is the top area of expected action at the EU level**. Respondents opt for flexible and adaptable, bottom-up cooperation schemes, networking, voluntary frameworks, best practices and guidelines. There is generally little demand for binding legislative actions at European level.

According to Business Europe, which includes the European Industrial Research Management Association, *"…priorities for the ERA should be expressed in terms of ensuring adequate numbers of people, trained to be skilled in the knowledge economy and understanding the value and application of research in achieving these skills and in meeting social and economic objectives... "*

Less than half of the on-line respondents declare that they are sufficiently aware of the Commission Recommendation on a European Charter for Researchers and the Code of Conduct for their Recruitment. **They suggest that progress should be speeded up, although they recognise that the great diversity of research patterns throughout Europe requires a degree of flexibility** when implementing the C&C principles**.** A large proportion of respondents suggest that a **"C&C label"** awarded to employers and funders applying the principles would be preferable to more binding regulation in this area to help speed up the implementation of the C&C.

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[1] SEC(2008)430, 2.4.2008, see also http://ec.europa.eu/research/era/progress-on-debate/stakeholder-consultation_en.html

Concerning **social security coordination**, respondents perceive claiming social security rights in another Member State to be difficult and time-consuming, despite coordination regulations across the EU[2] which aims to ensure that the application of the different national legislations does not adversely affect mobile workers. The majority of respondents (74.6%) had a mobility experience, but most of them did not spend more than three months in doing research in another EU country. Only 6.8% out of the respondents used the Article 17 of Regulation 1408/71[3], granting exceptions to the rules, and more than two thirds used this possibility for 1 to 3 times. The bilateral agreements on social security coordination, signed between different countries, are still unknown. According to the respondents, the lack of information on existing EU rules concerning the coordination of social security systems reduces the share of researchers who can benefit from them.

Concerning **supplementary pension rights**, a large majority (80%) of the on-line respondents favour **common rules throughout the EU** on the acquisition, preservation and transferability of such rights. Main issues include the need to ensure a proper pension, to reduce the paperwork involved and to organise portability of supplementary pension rights. Vesting periods and negative effects on pension benefits should be reduced and compensation in salary for pension gaps is proposed as a solution. Over 65% agree that researchers would be well served with a **European researchers' pension fund** to secure their supplementary pension rights.

Three quarters of the on-line respondents consider that the **lack of information on careers in research** is a **major barrier towards greater up-take.** However, the majority of those who consider having enough information do not find careers attractive and competitive with other options. Just over two thirds of respondents consider that **greater use of end of career researchers** for mentoring and advisory functions could be facilitated through the provision of new job opportunities/incentives targeted at this group. However, less than half are supportive of legal changes enabling later retirement. Some respondents are concerned that retaining end of career researchers could impede the creation of positions for younger researchers.

Working conditions enabling **a better work/life balance are considered important for increasing the attraction and retention of women in research careers** by a large number of the respondents (88%). As to the idea of benchmarking recruitment and funding of researchers at institutional level, the results are less clear with nearly half agreeing this can have positive effects, one third disagreeing and 20% of respondents stating they have no opinion. The share of those that disagree is higher among men (38%) than among women (25%).

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[2] Council Regulation (EEC) No 1408/71 on the application of social security schemes to employed persons, to self-employed persons and to members of their families moving within the Community (OJ L 149, 5.7.1971, p. 2. Regulation as last amended by Regulation (EC) No 1992/2006 of the European Parliament and of the Council (OJ L 392, 30.12.2006, p. 1), and the Regulation (EEC) 574/72 (OJ L 74, 27.3.1972, p. 1. Regulation as last amended by Commission Regulation (EC) No 311/2007 (OJ L 82, 23.3.2007, p. 6).. They will be replaced by Regulation 883/2004 of the European Parliament and the Council of 29.4.2004 on the coordination of social security systems OJ L 166 of 30.4.2004 and the draft new Implementing Regulation, once the latter is adopted by Parliament and Council

[3] It states that "two or more States…may by common agreement provide for exceptions to the provisions of article 13 to 16 in the interest of certain categories of persons or a certain person." In this sense**, t**he Recommendation of the Administrative Commission for Social Security for Migrant Workers n°16/1984 recommends *the conclusion of agreements pursuant to Article 17 of Regulation 1408/71* applicable to employed persons with special knowledge and skills

As part of the ERA Green Paper consultation process, seven independent Expert Groups were set up to identify policy options addressing research issues requiring new or improved initiatives. In its report[4] the Expert Group "Realising a Single Labour Market for Researchers" puts forward policy options (see Annex 3) relating to the following four "cornerstones" which the group identified to develop the ERA:

- "**Attraction, ethical recruitment and retention of researchers**";
- **"Mobility in all its facets** (geographical, sector, disciplinary and 'demographic')";
- **"Researcher-friendly social security and supplementary pension systems"**;
- **"The European Charter for researchers and Code of Conduct for their recruitment as a dynamic process"**.

Other ERA Expert Groups also highlighted the need to enhance human resources policies, in particular by removing obstacles to inter-sectoral mobility, fostering institutional autonomy in recruitment, compensation and promotion mechanism, and developing training on knowledge exploitation and other transferable skills.

The proposed initiative on researchers has also been presented at a dedicated meeting with Member State representatives, organised in Brussels on18 March 2008. The meeting revealed an overall positive attitude. The only critical remarks addressed the initial title of the initiative ("Passport") and the possibility of legislative action on social security and supplementary pension rights.

1.3. Improvements in response to the Impact Assessment Board Recommendations

The revised IA report includes, in particular, a more systematic and detailed analysis of the problems, clarification of the objectives, more detailed presentation of the baseline scenario, revision of the options considered and identification and justification of the options discarded, inclusion of administrative costs and impact on third countries.

It clarifies from the beginning that the **focus is on both researchers' mobility and careers** and **this is also reflected in the revised title**. The revised IA explains more clearly the links with the Lisbon process, in particular regarding the preferred option, clarifies the responsibilities of the Member States and presents the added value of the EU action. A table summarising the main impacts of the three options has been included in section 5.4.

Additional **quantitative information has been added to the problem definition and the qualitative analysis has been further developed.** Some comparative data is now included on the differences between the situation in the different Member States. However, while there is a considerable amount of data available on researchers and their situation from a number of different sources, information is by no means comprehensive and presents the usual problems of comparability between different data sets. Calls for tender to be launched in 2009 will support the implementation of the initiative by collecting information on the situation and policies in the Member States and their evolution and impact over time using a set of indicators to be agreed with the Member States as one of the first steps implementing the partnership.

And although some of the key objectives have been described in quantitative terms (e.g. number of additional researchers needed), it would be very difficult, given the complexity of

[4] The views expressed in the published Expert Group report are the sole responsibility of the author and do not necessarily reflect the views of the European Commission

the issues and the proposed implementation mechanism, to quantify with a reasonable degree of confidence, some of the expected impacts e.g. the exact numbers of researchers across the EU that could become mobile between different sectors.

Finally, additional material has been added to the problem definition in response to the Board's specific recommendation to strengthen the arguments for EU intervention including on the issues of gender balance and salaries. This clarifies the need to provide more attractive employment and working conditions for all researchers through a series of measures at Community, national and institutional levels.

2. PROBLEM DEFINITION

2.1. Europe's human potential in science and technology

New technologies are developed and applied increasingly quickly and the renewal of the research workforce is crucial to manage these rapid changes in science and technology. Human capital in science and technology can be created domestically, or attracted from abroad.

2.1.1. EU produces more science and engineering graduates and doctorates than US and Japan but is being rapidly caught up by India and China

The supply of human resources for research is best reflected in the number of new university graduates. In the EU27, the total number of graduates from all fields of education amounted to 3.57 million in 2004. Of these 820,000 graduated in maths, science and technology (MST) subjects. This is almost twice the number of MST graduates produced by the US and almost four times as many as Japan. However adjusted for population size the numbers of MST graduates produced are roughly similar. The EU27 has 12.4 graduates in MST subjects per 1,000 of the population aged 20 to 29 compared to 10.2 in the US and 13.4 in Japan (EC 2007a).

And in terms of absolute numbers of MST graduates it is probably India and China that lead globally. Full statistics are not available and there are problems of data comparability but it is estimated that India produces 2.5 million new graduates in science, engineering and IT every year while China produces around 1.5 million (EC 2007a).

Within the EU, Sweden, France and Ireland generate the highest shares of S&E graduates, with around one-third of all degrees being awarded in these areas against an EU average of around one-quarter. However, since 1998 the share of S&E degrees has declined or stagnated in 19 of the 27 Member States. Only Spain, Sweden, Slovakia and Finland saw steady increases, with high rates of growth in Malta and Estonia largely reflecting the small size of their graduate populations (EC 2007b).

According to NSF data[5], 41,100 S&E[6] doctoral degrees were awarded in the EU[7], compared to 18,800 in the US, 13,500 in China, 7,100 in Japan and 6,300 in India. Over 1997-2004, the number of S&E doctoral degrees slightly decreased in the US, from 19,600 to 18,800 (-0.6% per year) and strongly increased in China, from 5,000 to 13,500 (+15.4% per year). It increased as well but to a lesser extent in India, from 4,800 to 6,300 (+4.8% per year) and in Japan, from 5,800 to 7,100 in Japan (+3% per year).

In the EU-27, the number of S&E doctoral degrees increased on average by 3% per year over 1998-2005 (from 33,200 to 40,900)[8] (EC 2007d). In science, mathematics and computing, the

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5 National Science Board, *S&E Indicators 2008*, volume 2. Calculations have been based on Appendix table 2-40. Data refer to 2004 except for India (2003)

6 S&E are defined as the aggregation of the fields "Physical/biological sciences", "Mathematics/computer sciences" (not available for China, India and Japan), "Agricultural sciences" and "Engineering"

7 Data for Cyprus and Malta are missing

8 It is less than the growth observed for all tertiary degrees (calculations based on Eurostat data)

number of doctoral degrees increased by 2.7% per year on average. In engineering, manufacturing and construction, the increase was one of 3.8% per year.

Within EU, the share of doctoral degrees in science and engineering in the total number of doctoral degrees was the highest in Greece (62%), Cyprus (60%), Ireland (57%), France (56%), Latvia (52%), Czech Republic (52%) and Belgium (51%) in 2005, all the other Member States being below 50% (European Commission 2007d).

2.1.2. EU and US attract significant numbers of students from rest of the world but from different sources and in different disciplines, with a significant net outflow from EU to US

In 2004, the EU27 hosted around 610,000 non-EU students in tertiary education mostly from Asia (50%), Africa (35%) and the rest of Europe. A similar number of EU students (560,000) were studying in another EU Member State in 2004. In the same year, the US hosted 586,000 non-US students nearly two-thirds of which were from Asia (62.5%), especially China, Taiwan, India and South Korea. But Europe (13.8%), Canada (10.2%) and South America (6.1%) also provided significant numbers (EC 2007a). There are much smaller outflows of students from the EU and the US making these regions substantial net recipients of foreign students overall. However, students going to the US, Canada and to a lesser extent Australia form a significant outward stream from the EU which is not balanced by similar numbers of students from these countries coming to the EU (EC 2003).

Within the EU, after Cyprus, where 32% of students in tertiary education were foreign, the UK has the highest proportion of foreign students enrolled (16.2%) with Germany and Austria the only other Member States above 10%. Estonia, Lithuania, Romania, Slovenia and Slovakia had very low shares of foreign students participating in tertiary education. Shares were also low in Greece, Spain, Italy, Latvia and Finland (2007b). The source of these students varies considerably. Most originate from other EU Member States, but apart from these, students from Asia and Oceania represent the largest shares in UK and Germany. Africans are strongly represented in Belgium, France and The Netherlands, while in Spain the largest group comes from Latin America. Overall the five largest groups of foreign students in the EU are Greeks in the UK, Turks in Germany and Moroccans in France followed by French (mainly in UK and Belgium) and German (mainly in UK and France) students studying in other EU Member States (EC 2003)[9].

It is significant that in the US a much larger share of foreign students are enrolled in science, mathematics and computing, engineering, manufacturing and construction disciplines than the EU (37% versus 22%). This proportion also varies widely between Member States within the EU, with for example, 39% of S&E PhDs being earned by foreign students in the UK, 27% in France and 14% in Germany (EC 2007a).

2.2. Europe's researchers

Researchers are defined, according to the internationally recognised reference of the Frascati manual (OECD 2002), as professionals engaged in the conception and creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned. In 2005, the EU-27 currently had the equivalent of 1.3 million FTE (full-

[9] These results are based on 1999 data. Recent results on the origin of doctoral candidates in the EU can be found in European Commission (2007d)

time equivalent) researchers, corresponding to approximately 1.8 million people with research as their main activity. Of these, around half work for the business enterprise sector (610,000) with the rest split between the higher education sector (454,000), government research institutions (172,000) and the private non-profit sector (13,000) (EC 2007b).

The term "researcher" covers many different roles and activities. From university academics and scientists engaged in long-term basic research at large research infrastructures to more mission-orientated researchers at government labs, from corporate employees engaged in market-orientated development work to the staff of high-tech SMEs that may be engaged mainly in technology transfer or product and process innovation.

In terms of the absolute number of FTE researchers, the EU closely follows the US (1.4m), followed by China (1.1m) and Japan (705,000) (EC 2007d).

2.2.1. EU has far smaller proportion of researchers in the labour force than US and Japan primarily due to the lower share of business-based researchers

The key difference between the EU and its main competitors is that Europe counts far fewer researchers per 1,000 labour force (5.5) than either the US (9.1) or Japan (10.1). This largely reflects Europe's lower overall R&D intensity (domestic spending on research as a percentage of GDP) which stands at 1.93 as against 2.59 in the US and 3.15 in Japan, and in particular the respective levels of business R&D intensity. In 2004, the private sector financed 64% of total R&D in the US, 67% in China, 75% in both Japan and South Korea, but only 55% in the EU. Consequently, the share of business-based researchers differs widely between the EU27 (48%) and the US (79%), with Japan (68%) and China (62%) in between (EC 2007b).

Within the EU not surprisingly, the countries with the highest R&D intensities, Finland (3.49%) and Sweden (4.27%), also have the highest numbers of researchers per 1,000 workers (16.2 and 10.1 respectively) with Luxembourg, Denmark, Belgium, France and Germany all above 6. Whereas the low R&D intensive countries such as the new Member States and the southern European countries have much smaller proportions of researchers with Slovakia, Portugal, Hungary, Poland, Greece and The Czech Republic all below 4, and Latvia, Italy and Cyprus below 3 (EC 2007b).

In some Member States there are even significant levels of unemployment among those with a tertiary education in an S&T discipline. In 2004, Romania had 11% unemployment in this group, with Spain and Greece having 7%. Lithuania, France, Poland, Bulgaria and Estonia all had unemployment levels above 5% against an EU-25 average of 3%. Austria, Hungary and The Czech Republic had the least unemployment amongst this group at around 1% (EC 2006c).

But it is important to understand that the direction of causation behind these figures is not one-way. Surveys suggest that when investing in R&D, business primarily looks for: favourable framework conditions for the commercialisation of technologies; large potential markets; adequate numbers of well-trained and mobile researchers, responsive to the needs of industry; and an excellent public research base (research institutions and infrastructures) with strong interactions with industry (Thursby M. and J. 2006).

So the links between an excellent public research base and business are therefore vital. Increasingly, businesses thrive in an environment of 'open innovation' – where connections with each other and with public research institutions are used to explore ideas and develop products more effectively that would be the case alone.

2.2.2. Many of Europe's universities and public research institutions need reform to allow them to compete in the international labour market

Member States value their universities and research institutions highly and many have tried to "preserve" them at national level through detailed regulations organising them, controlling them, micromanaging them and, in the end, imposing an undesirable degree of uniformity on them[10].

This pressure for uniformity has led to generally good average performance, but means that there are relatively few outstanding world class institutions in the EU. This can be seen in a number of global university rankings where US universities heavily dominate the top 100 with Europe gradually catching up as the sample gets larger and finally overtaking the US only in the top 500 (EC 2007a). If we look instead to bibliometric data, the EU share of the top 10 % most cited scientific publications of the world is 37.5 % against a US share of 48.9 %, while in the total number of publications, EU has a bigger share than the US. Only 8 of the 76 universities in the world with an average impact score of their publications higher than 1.5 are located in the EU versus 67 in the US (EC 2007a).

The performance of particular institutions is clearly related to the quality of their staff but also to how they are managed. Unfortunately, in many European countries the public sector still does not offer sufficiently attractive career prospects. Academic positions remain largely filled by national or even, in many cases, internal staff. Advancement based on seniority rather than performance means it can take many years before talented researchers are able to become independent scientists in their own right. Many researchers are trained in a traditional academic way which does not equip them for the needs of industry. Mobility between institutions, between academia and industry or across borders is difficult and tends to be penalised rather than rewarded.

Europe's universities and research institutions would in particular benefit from a greater focus on performance management and the need for enhanced autonomy especially in respect to hiring. At present, rigid compensation and promotion structures often make it difficult for universities to compete in an international academic market. The key issue is not the total budget spent on salaries and compensations (although in some countries this is an important constraint), but how they are allocated; in particular, how academic performance is rewarded[11].

Evidence for these rigidities is that in most of Europe we see a two-tier workforce with short-term contracts and low salaries often the rule for young researchers contrasting with little job to job mobility by senior researchers on permanent contracts. In almost all Member States the 25-34 year old age group is most likely to have moved from one job to another in any given year. But the differences are considerable. For example, amongst those having moved job in Portugal in 2004, 71% were in the 25-34 year old age group (as against 19% and 11% in the 35-44 year-old and 45-64 year-old age groups)[12]. In Denmark by contrast the proportion was

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10 "Delivering on the modernisation agenda for universities: education, research and innovation" COM(2006) 208, 10.5.2006

11 "Strengthening research institutions with a focus on university based research" Report of the ERA Expert Group, January 2008

12 These data refer to Human Resources for Science and Technology (HRST) at a whole (see Annex 2). They measure job-to-job mobility, within a one-year period, and do not include inflows into the labour market from unemployment or inactivity

35% in the 25-34 year old age group (against 36% and 29% in the 35-44 year-old and 45-64 year-old age groups). Overall as a proportion of the total employed in an S&T occupation the highest job to job mobility is in the UK (9.5%), Denmark (9.4%) and Finland (8.9%). The proportion in Germany (5.1%) is less than the EU average of 5.5% and the lowest proportion of job to job mobility is found in Sweden with less than 2.8% (EC 2006c). The insecurity and lack of independence associated with being an early stage researcher in many European countries is a significant disincentive to those considering whether to enter a research career.

These rigidities are also evident in the percentage of academic staff recruited by the same institution where they did their PhD. The percentage is generally higher in small countries with fewer research institutions such as Belgium, Denmark, Ireland and Sweden (between 40 and 63 per cent), but not in Switzerland (24%). The percentage is generally smaller in large countries like Germany (40%), Italy (24%) and the UK (8%), but not Spain (69%) (Bruegel 2007)[13].

This widespread practice of internal recruitment is a significant disincentive to many of those considering whether to enter a research career. It is also likely to have important consequences for research performance as researchers are a relatively small and highly specialised workforce so it will not always be possible to find the best qualified individual for a given research position within any single national system, let alone within a single institution. Researchers appointed from outside are also more likely to use links with other educational, scientific and societal institutions and tend to be measurably more creative, proactive, dynamic, independent and original (Horta et al 2007).

2.2.3. EU will need many more researchers in future to meet the Lisbon objectives and counter the effects of an ageing workforce and the rising international competition

Following decisions by the 2006 Spring European Council, Member States have set targets and taken steps to increase investments in research and development. The Commission estimated that reaching the objective of investing an average of 3% of GDP in research set by the Barcelona European Council[14] would create between 600,000 and 700,000 additional research positions in Europe by 2010[15].

At the same time, in the context of the ageing of the overall European population, the ageing of the research labour force is becoming a concern in many Member States. In the EU-27 as a whole about 35% of highly qualified S&T workers were in the 45-64 year-old age group in 2006, compared to 31% in the 25-34 age group. But in Bulgaria, Denmark, Germany, Sweden and Finland more than 40% of the highly qualified S&T workforce is aged between 45 and 64, while the 25-34 year-old age group represents only about 25% (only slightly over 20% in Germany) (EC 2007b). This situation will be exacerbated if young people are not attracted into the profession and if the present under-representation of women in science and engineering is not addressed. Gender differentials in salaries in some countries reach 35% and equal opportunities still represent a challenge in many domains. Women hold less than 15% of the full professorships in Europe (EC 2006a) even though more than half of the European student population is female.

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13 These data come from a questionnaire-based survey of 66 "top" universities in 10 countries. The percentages given are the "percentages of faculty trained in-house at PhD level"

14 Presidency Conclusions of the Barcelona European Council of 15-16 March 2002

15 COM (2003) 226 final of 30.04.2003

A third pressure comes from the rising international competition for the best talents. We have already noted the net outflow of EU students to the US above and this advantage is retained in terms of researchers. In 2004, 25% of the 400,000 foreign science and engineering workers in the US came from the EU, mostly from Germany, UK, Italy, France and Greece (the large majority came from Asia) (EC 2007a).[16] We can also see that foreigners are filling the highest positions in the US system. If we take just one example, only 25% of the 112 assistant professors in the top 10 US university economics departments had received their Bachelors degrees in the US (Oswald and Ralsmark, 2008). So, while the proportion of EU researchers in the US amounts to less than 10% of the total EU researchers' population, these are likely to be top performers in their fields.

Figures for the number of foreign researchers working in the EU27 are more limited but are likely to be considerably lower recognising the lower numbers of suitably skilled foreign students that enter the EU in the first place and the more limited opportunities on offer in Europe. One indication is that in 2001, the EU-15 hosted 28.4%[17] of the total highly skilled expatriates in the OECD area with many of these being internal transfers within the EU-15. The figure for the US on the other hand was 42.5% (EC 2007a). This ability of the US system to draw more readily upon the global talent pool for researchers must at least partly help to explain the clear lead which the US enjoys over the EU in terms of the very best research.

Historically countries like India and China have seen large net outflows of students and researchers to other world regions but the scale and speed of their development mean that this cannot be taken for granted in future. For example, if current trends persist China will have caught up with EU in terms of R&D intensity by next year and in terms of the absolute number of researchers China has already overtaken Japan (EC 2007a). A recent study has shown that the average salary (adjusted for purchasing power) for EU researchers is already below average salaries in the US, Japan and Australia but also India (EC 2007c). In future therefore there is likely to be decreasing outflow of researchers and students from some of the major emerging economies to the EU and elsewhere, a diversion to those emerging economies of researchers and students from other third countries that would previously have come to the EU, and an increasing outflow of EU researchers to those emerging economies.

2.2.4. Researchers' mobility

Addressing remaining structural, institutional, national and cultural barriers to mobility of researchers, could: enhance the diffusion of knowledge throughout Europe, dynamically balance demand and supply at European level for a highly skilled and specialised workforce; facilitate the creation of competitive poles of excellence and pools of talent; and enhance the qualifications and experience of researchers in Europe.

Researchers face many of the same barriers to mobility as other workers. These can range from legal and administrative obstacles, housing costs and availability, employment of spouses and partners, portability of pensions, linguistic barriers, and issues on the acceptance of qualifications in other Member States.

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16 However, it seems that "Europe accounts for a decreasing share of a growing total. In 2004, 25% of the nearly 400 000 foreign S&E workers in the US came from the EU-25, compared to 29% of the roughly 300 000 foreign S&E workers in the US in 1998." (EC 2007a, p. 20).

17 and the EU-19 29.6%

However, researchers are relatively speaking more mobile between different Member States than other workers. Compared to the 2% of working age citizens and the 3% of highly qualified workers that currently live and work in another Member State, 6% of doctoral candidates and 12% of post docs have worked in another country (EC 2007d).

But mirroring the situation at national level, these numbers largely reflect researchers moving between short-term contracts in the early stages of their careers. After 5 years of university education, a typical researcher might spend 3 to 4 years as a doctorate candidate, then accept 2 or 3 post-doc positions, with average duration of 2 years, and then expect an open-ended employment contract. As such, the present situation could be described as one of "early-stage mobility" followed by relative immobility as researchers find permanent positions which they are then very unlikely to leave for a temporary opportunity elsewhere. The ideal situation would see researchers able to find opportunities to move at all stages of their career and for institutions to be able to appoint the best researcher for the job regardless of their origin.

This high relative rate of mobility of researchers in the early stages can present its own problems. The European dimension of **social security** is subject to Community legislation which coordinates the different social security schemes and as such aims to ensure that the application of the different national legislations does not adversely affect mobile workers. But as highlighted in the recent EU Job Mobility Action Plan, new forms of mobility can make the application of current regulations problematic. Since researchers are among the most mobile categories of workers and can often hold a series of short-term contracts during their careers they are particularly likely to be confronted with such difficulties.

Another particular problem for researchers is the fact that national administrations do not usually allow research grants to be carried across borders. To date, almost all project funding, usually given in the form of multi-annual subventions for personnel costs, research costs, equipment and travel, has to be executed at an institution within the country of the funding organisation. Recipients are as a rule not allowed carrying such grants over national borders, even if trans-national relocation would be beneficial for the results of the project.

In its December 2007 paper on the strategic orientation for the EU's Lisbon Strategy 2008-2010, the Commission set out its vision of seeking to bring about a major increase in mobility, notably for students but also more broadly. There are important links to Erasmus and Erasmus Mundus programmes which support academic mobility both within Europe and globally.

A broad EU strategy to ensure that the EU has high quality skilled human resources in sufficient numbers to meet its ambitions to be a world leader in the knowledge economy, cannot but give a prominent place to the "skills agenda". The forthcoming EU initiative on "New Skills for New Jobs" will make proposals to address skills gaps and for forecasting and assessment of future skills and jobs needs.

2.3. Conclusion: Europe has excellent human potential but does not efficiently employ it

In summary, many Member States do not efficiently employ their excellent human potential and at the same time other regions of the EU are already experiencing bottlenecks which are only likely to get worse in future and form a major impediment to the achievement of the Lisbon goals.

From the analysis it is possible to identify two outstanding features of the European research landscape which lead to this outcome.

Firstly, many parts of the public sector research base do not offer attractive employment and working conditions, practice fully open recruitment or provide the right training, skills and experience for researchers. In consequence the EU does not succeed in retaining its best researchers or attracting the best researchers from third countries which impacts directly on the excellence of the public research base. These problems also contribute to the fact that there are insufficient levels of mobility between institutions, sectors and countries to rectify some of the current systemic imbalances.

The second major systemic weakness is the relatively low business R&D intensity in many parts of Europe. This provides far fewer opportunities for researchers in the private sector than in comparable economies. There are many causes for this low intensity but weaknesses in the public research base are a major contributing factor as industry needs a sufficient flow of well trained researchers and tends to locate its research centres close to the best public centres. Strong academic research is also a stimulus for business R&D in other ways. Universities generate new ideas which are then transferred to the private sector The transformation of these ideas into products or processes requires further applied research activity and development and universities often therefore form the nucleus of industrial clusters.

2.4. Existing policy initiatives addressing researchers at the Community level

The need for adequate human resources for R&D has been identified as a key challenge[18] since the launch of the Lisbon Strategy in 2000.

Article 165 of the Treaty states that the Community and the Member States shall coordinate their research and technological development activities so as to ensure that national policies and Community policy are consistent and, in close cooperation with the Member States the Commission may take any useful initiative to promote this coordination. Article 163 (d) states that, complementing the activities of the Member States, the Commission shall carry out activities to stimulate the training and mobility of researchers in the Community.

The Commission's policy initiatives and actions to define and promote a European agenda to address issues of common interest related to researchers have developed along two separate streams, one focusing on mobility and the other one on careers. Both areas are now widely recognised as important for improving the performance of national and European research systems and also as being complementary.

In 2001, work started on mobility with the Communication **"A mobility strategy for the European Research Area"**[19], which defined a set of objectives and measures aimed at creating a more favourable environment for the mobility of researchers in the ERA, with a view to attracting and keeping young talents and promoting innovation. The need for the strategy was endorsed by a Council resolution[20] and implementation was taken up by a dedicated Steering Group on Human Resources and Mobility composed of Member States representatives.

A range of measures was put in place at EU level aimed at broadening and strengthening the support for researchers. Funding from the Research Framework Programme was allocated to

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18 Presidency Conclusions of the Lisbon European Council 23-24 March 2000

19 COM (2001) 331 final of 20.06.2001

20 2001/C 367/01 of 21.12.2001

various types of mobility grants and initiatives launched to provide information and assistance to potentially mobile researchers at European and national levels and to create more favourable legal and administrative environment to facilitate the entry and stay of foreign scientists.

In 2003, the Communication **"Researchers in the European Research Area: one profession, multiple careers"**[21] marked the first step to address the attractiveness of the research career with the aim of promoting the emergence of a genuine labour market for researchers in Europe. The Communication was endorsed by a Council resolution[22] and contributed to enhance awareness among policy makers, public employers and funders of the importance of the issues and the various dimensions involved.

Going one step further, in 2005, the European Commission adopted a **Recommendation on the European Charter for Researchers and a Code of Conduct for the Recruitment of Researchers (C&C).** These documents set out a voluntary framework of principles, addressed to researchers as well as to employers and funders, in both the public and private sectors, with the aim of promoting the same rights and obligations wherever researchers may work in Europe. The European Charter includes a set of general principles and requirements related to the management of research and the conduct researchers (Research Freedom, Ethical principles, Professional responsibility and attitude, Contractual and legal obligations, Accountability, Good practice in research, Dissemination and exploitation of results, Public engagement, Relation with supervisors, Supervision and managerial duties, Continuing professional development).

The Charter also covers general principles and requirements for employers and funders of researchers: recognition of the profession; working conditions; gender balance; career development; value of mobility; access to research training and continuous development; and recruitment.

The Code of Conduct for the Recruitment of Researchers defines more precise principles and requirements that should be followed by employers and/or funders when appointing or recruiting researchers. They should ensure observance of values such as transparency of the recruitment process and equal treatment of all applicants. These principles and requirements cover also aspects related to: judging merit; recognition of mobility experience; recognition of qualifications; and post-doctoral appointments.

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21 COM (2003) 436 final of 18.07.2003 and COM (2004) 353 of 16.06.2004

22 14636/03 RECH194 of 12.11.2003

Table I. Achievements of the mobility and career strategies 2000-2007

The launch of the Researchers' Mobility Portal[23] in 2004 to provide information on fellowships/grants, research job vacancies (more than 4,800 jobs posted in 2007) and practical information when moving
The set up of the ERA-MORE network in 2004 to assist researchers in all matters relating to legal issues, social security, health and taxes, daily life and family support (200 information/ assistance centres in 32 countries)
The adoption of the "Scientific Visa" package, in 2005, to facilitate administrative procedures for third country researchers entering the European Community. It includes a Council Directive 2005/71/EC (12 October 2005) and two Recommendations: the 2005/761/EC on short-term visas and the 2005/762/EC on long-term admission (more than three months). The Directive has been transposed in 15 Member States
The adoption in 2005 of a Commission Recommendation on the European Charter & Code which aims at giving the same rights and obligations wherever researchers may work in Europe (signed by over 200 organisations, representing over 800 institutions in 23 countries).
The launch of ERA-link in the US in 2005 to keep the contact with European researchers active abroad (more than 3,000 EU researchers registered), the launch of ERA-link in Japan in 2008 (more than 500 EU researchers)
Awareness initiatives (The Researchers' Night events involved 100,000 people in 21 countries in 2006)
The FP6 Marie-Curie actions have been the equivalent of the Erasmus programme for researchers: Approximately 70,000 researchers have benefited so far from EC funding under this dedicated mobility action

Progress has been made with these existing initiatives. The mobility and career strategies and the Charter & Code have established important principles which should underpin the European research system. And these initiatives have certainly succeeded in raising European wide awareness about the problems of mobility and careers of researchers and established general objectives and principles. But **implementation has been slow and very uneven across the different Member States and institutions.**

Learning the lessons from previous initiatives, the reasons for this disappointing progress can be summarised as follows:

- existing policies at Community and national levels have tended to address issues in relative isolation. The **lack of a coherent framework** addressing both mobility and career issues has sometimes resulted in a failure to take into account the **relevant links and interdependencies**. For example, promoting more mobility without improving career development and opening positions in the public sector could lead to more "forced mobility" for early stage researchers and to brain drain from some countries. Similarly actions to open positions in the public sector would have limited impact without increased mobility;

- the **difficulties of coordination** between the different Ministries, agencies and Commission services dealing with different aspects of mobility and career issues at Community, national or regional level can result in suboptimal combinations of actions. This can mean that the specific circumstances of researchers are not always reflected in wider initiatives, for example cooperation between ministries in charge of research and

[23] http://ec.europa.eu/eracareers/

social security policies would help develop a common understanding of the issues and possible actions;

- efforts can be complicated by the shared competence in this area. Existing **policies at national level have tended to take a narrow national perspective** limited in scope to encouraging the return of expatriate national researchers, attracting foreign researchers or promoting intra-national mobility between industry and public research organisations. Some Member States have also been concerned that past initiatives at Community level have not taken into account the diverse situations in the Member States which present very different patterns of problems and needs and might result in some cases in too much outward mobility or 'brain drain' due to better research conditions abroad.

2.5. Why a new EU policy momentum is needed

The Lisbon strategy seeks the transformation of the EU economy towards more knowledge intensive activities. Achieving the overall Lisbon goals will require action across a wide range of areas but the availability of sufficient researchers of sufficient quality has been identified as an essential element of the strategy from the start[24]. **Researchers are the main producers of new knowledge** and the main agents in its transfer. In order to compete at a global level and to achieve our broader ambitions Europe must be able to train, retain and attract the best research talents

The most compelling case for continued action for Europe's researchers is provided by the remaining **systemic weaknesses in Europe's research system** which impact on researchers as highlighted above. This need for action has been recognised by political leaders at the highest level. **The 2008 Spring European Council confirmed** investing in people and modernising labour markets, and investing in knowledge and innovation as priority areas for the next cycle of the Lisbon Strategy. In particular the Council made a commitment that the Member States and **the EU must remove barriers to the free movement of knowledge by creating a "fifth freedom"** based on:

- enhancing the cross-border mobility of researchers, as well as students, scientists, and university teaching staff;

- making the labour market for European researchers more open and competitive, providing better career structures, transparency and family-friendliness.

In its **Key Issues Paper 2008** to the European Council, the **Competitiveness Council** stated that the Commission and Member States should take concrete steps to increase human resources for S&T and to **"enhance the mobility and career prospects of researchers through a coherent set of focused measures taken in partnership"**, on which the Council welcomed the Commission's intention to present a Communication in 2008.

The **Integrated Guidelines for the Lisbon Strategy** on raising research investments, include the objective that **a determined effort must be made to ensure a sufficient supply of qualified researchers** by attracting more students into scientific, technical and engineering disciplines and enhancing the career development and the European, international as well as inter-sectoral mobility of researchers and development personnel.

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[24] Presidency Conclusions of the Lisbon European Council 23-24 March 2000

The **Single Market Review**[25] emphasises that further efforts are needed to promote free movement of knowledge and innovation as a "fifth freedom" in the single market and **the need to remove barriers to researcher mobility and facilitate the exchange of researchers**.

The results of the consultation on the 2007 Green Paper **"The European Research Area: New Perspectives"** showed that **realising a single labour market for researchers is the top area of expected action at the EU level by stakeholders**.

This new impetus is also reflected in actions on the ground and many Member States are now for example attempting reforms to their university and higher education sectors[26]. These reforms, and in particular increasing the autonomy and improving the governance and accountability of individual institutions, are directly relevant to improving the situation for researchers.

There would therefore be considerable EU added value in a new initiative at this stage which could **capitalise on this political momentum and stakeholder support and build upon reforms** which are currently underway. There is much scope for learning from the lessons of previous and existing initiatives at both the Community and national levels. The impact of individual initiatives could also be greatly increased by ensuring that they are planned and implemented in a coordinated, consistent and mutually reinforcing way.

The **mutual benefits of acting in a consistent way across the EU** would be considerable. For example the opening of positions in public institutions beyond national borders would improve research performance and specialisation at institutional level, it would balance the supply and demand for researchers, boost productivity growth through better job matching, increase knowledge transfer and facilitate the development of centres of excellence throughout the EU, create better international connections for collaborative research and the economic exploitation of research results

In addition a new initiative for researchers at this time would also benefit from and contribute to the overall re-launch of the ERA and the Lisbon Strategy to implement the priorities agreed by the 2008 Spring European Council. The preceding analysis tries to draw a picture of an interlinked innovation system both at national and European levels. Each individual element reinforces the others, while weaknesses or lack of progress in one holds back progress in the others.

The Lisbon strategy recognises the need to make progress in a comprehensive and coordinated way. Significant efforts are already underway to create the right framework conditions including measures to strengthen the single market, increase job mobility[27] and incentivise more private investment in research and innovation[28]. These policies can help to address some of the systemic weaknesses identified in the analysis above such as low business R&D intensity. Equally specific action for researchers will contribute to the success of these initiatives.

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25 "A Single Market for 21st Century Europe" COM(2007) 724

26 "Delivering on the modernisation agenda for universities: education, research and innovation" COM(2006) 208, 10.5.2006

27 The European Job Mobility Action Plan 2007-2010, COM(2007)773, 6.12.2007

28 "Putting knowledge into practice: A broad-based innovation strategy for the EU" COM(2006) 502, 13.9.2006 and "A lead market initiative for Europe" COM(2007) 860, 21.12.2007

An initiative for researchers would be one of five policy initiatives planned by the Commission in 2008 to follow-up the ERA Green Paper "The European Research Area: New Perspectives"[29]. It is foreseen that the overall governance of the ERA initiatives will be overseen by the Competitiveness Council utilising the Lisbon process and national actions to implement each initiative should be reflected in the National Reform Programmes of the Member States.

Furthermore an initiative at this stage would also complement and benefit from a number of other important and related European initiatives. In the recent Communication by the Commission on the Job Mobility Action Plan[30], it is reported that **new trends in mobility patterns increasingly include "…**young and higher-skilled workers engaged in 'multi-mobility practices'" with "…short mobile periods responding to specific needs in a professional career, a tendency illustrating that mobility is becoming more integrated into career perspectives". The same Communication, thus, also aims at improving existing legislation and administrative practices regarding worker mobility. A proposal for a **Directive on improving the portability of supplementary pension rights** is currently under negotiation[31]**,** and it may have a significant impact on "acquisition" and "preservation" rules on supplementary pension rights of in particular highly-mobile workers holding short-term contracts, such as researchers who particularly suffer from lack of consistency between different supplementary pension schemes.

The EU legislation on labour law, such as for instance the Directive on fixed-term work[32], which established a general framework for ensuring equal treatment for fixed-term workers by protecting them against discrimination and for using fixed-term employment contracts, is highly relevant for young researchers who often hold **fixed-term assignments**. The implementation of the common principles on **flexicurity**[33] may also have a significant impact on both research institutions and researchers as regards problems of balancing flexibility, deemed necessary to do research activities, and job security.

Other related policies are the mutual recognition of diplomas for the regulated professions through **Directive 2005/36/EC on the recognition of professional qualifications[34],** and, for the other professions, **through the European Qualification Framework (EQF)** assessing and comparing qualifications[35]. Recognition of researchers' diploma is an important instrument to facilitate the free movement of researchers in Europe. The **network of national information centres for the recognition of diplomas**[36] provides information on national academic recognition procedures.

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29 Other initiatives will address the management of intellectual property by public research organisations; pan-European research infrastructures; international science and technology cooperation; and joint programming and programmes

30 Social Committee and the Committee of The Regions on the "Mobility, an instrument for more and better jobs: The European Job Mobility Action Plan (2007-2010)"

31 Amended Commission proposal COM(2007)603 final on minimum requirements for enhancing worker mobility by improving the acquisition and preservation of supplementary pension rights

32 Council Directive 1999/70/EC of 28 June 1999 concerning the framework agreement on fixed-term work concluded by ETUC, UNICE and CEEP

33 "Towards common principles of flexicurity – more and better jobs through flexibility and security", COM(2007)359.

34 Directive 2005/36/EC of the European Parliament and of the Council on the recognition of professional qualifications, Official Journal L255 of 30 September 2005 - page 22

35 http://ec.europa.eu/education/policies/rec_qual/recognition/in_en.html

36 http://www.enic-naric.net/

The ongoing inter-governmental **Bologna process addresses some issues such as curricula development for quality doctoral programmes**. Community measures such as the proposed Joint Doctorates action in the Erasmus Mundus programme and the European Institute for Innovation and Technology (EIT) will also contribute.

3. OBJECTIVES THAT THE PROPOSAL IS EXPECTED TO ACHIEVE

3.1. General objectives

The general objective of the current initiative is to harness the current political momentum for action for researchers to make further, faster progress in key areas selected for their high potential impact at the Community, national and institutional levels in the short to medium term. The initiative will build on the success of existing measures and will benefit from a clearer focus, greater coherence and an increased engagement of the Member States.

The ultimate goal of Community policy in this area is to ensure that the **necessary human resources are available to sustain a dynamic knowledge-based economy.**

3.2. Specific Objectives

The preceding analysis has identified **a series of key weaknesses** in the European research system which impact on researchers. The general objective of this initiative is **to focus on those areas where the greatest impact can be achieved by new coordinated efforts.**

Existing efforts are underway to address Europe's low business R&D intensity including measures aimed at creating dynamic and innovation-friendly markets to incentivise increased private investment in research and innovation.

The major remaining weakness identified was that many parts of the public sector research base do not offer attractive employment and working conditions, practice fully open recruitment or provide the right training, skills and experience for researchers. These problems also contribute to the fact that there are insufficient levels of mobility between institutions, sectors and countries to rectify some of the current systemic imbalances. In addition there are certain specific issues which mobile researchers can face and which should be addressed.

The proposal is therefore to make rapid, measurable progress to:

- systematically open recruitment and portability of grants;
- meet the social security and supplementary pensions needs of mobile researchers;
- provide attractive employment and working conditions; and
- enhance the training, skills and experience of researchers

3.3. Operational objectives

Systematically open recruitment and portability of grants

To ensure the removal of remaining barriers to the open, transparent, competition-based recruitment of researchers at institutional, national and Community levels and make sure that the portability of individual grants is a possibility.

Meet the social security and supplementary pension needs of mobile researchers

To improve awareness about the existing legal framework in particular through ensuring that researchers and their employers have full access to relevant information on the application of EU social security coordination rules and by exploring derogations to general rules on legislation applicable to take into account the problems which can be encountered by highly mobile researchers on short-term contracts. To ease transferability of supplementary pension rights and explore the possibility to set up pan-EU pension schemes targeted to researchers.

Provide attractive employment and working conditions

To introduce more attractive "working packages", especially for young researchers, and to progressively introduce more flexibility in contractual and administrative arrangements and relevant national legislation for senior and end of career researchers; to enable both men and women to pursue a fulfilling and well-balanced scientific career.

Enhance the training, skills and experience of researchers

To ensure that researchers are equipped with the full range of skills necessary to participate in a range of evolving roles in the modern knowledge economy and society, and, in particular, to encourage better links between academia and industry.

4. MAIN POLICY OPTIONS AND DELIVERY MECHANISMS

4.1. The policy response and the early discarded options

From the preceding analysis of the problems and stated objectives we now consider a number of concrete policy options to reach those objectives. As highlighted in the previous chapters any options also need to take full account of the wide range of existing policies both those specific to better careers and more mobility for researchers in the EU and actions in other areas which may have a bearing on researchers' issues, e.g. in social policy.

Three main possible realistic options have been identified and developed:

- Option 1: No policy change scenario;
- Option 2: A Recommendation and more specific EU guidelines in the identified problem areas;
- Option 3: A Communication and a partnership with Member States in the identified problem areas.

Given that many of the relevant issues are in areas of shared competence the main differences between the options are in terms of the mechanism for focussing and coordinating action at the Community, national and institutional levels. There is a balance to be struck between allowing the necessary flexibility to deal with specific national circumstances and maximising the leverage and spill-over effects of consistent and coordinated action at Community level. In addition to the three policy options explored in more detail in this and the following sections, some other policy options were initially considered as well but rapidly eliminated.

In particular on the present legal basis, Community legislative action would be possible in the areas of social security coordination and supplementary pension rights. However, a new implementing regulation coordinating social security schemes and a directive covering the portability of supplementary pension rights are currently under negotiation and the European Job Mobility Action Plan 2007-2010 announced a systematic investigation to see if the existing legislation and administrative practices regarding worker mobility in general need to be adapted to take account of the changed needs of the new patterns of mobility. .

Similarly, while the directive on the portability of supplementary pension rights currently under negotiation addresses the "acquisition" and "preservation" of such rights, the third key aspect, i.e. their "transferability", is now out of scope. In this area therefore, one of the policy options below includes the possibility of exploring the feasibility of a non-binding instrument (e.g. a Recommendation by the Commission) addressing transferability of supplementary pension rights of highly-mobile categories of workers, such as researchers. If such an instrument were ultimately proposed, it would of course be subject to impact assessment.

Apart from initiatives linked to the implementation of the EU Job Mobility Action Plan, it would be premature to recommend further legislative action in these areas now. Instead, the proposed options will explore the possibility of future legislative or other actions such as Council or Commission recommendations if clear evidence of deficiencies emerges during its planned three year timeframe. Excluding Community legislative action in the realistic policy options today does not therefore rule out possible future legislative action or recommendations to Member States.

Another option would have been to propose a significant reinforcement of the researchers' related elements of the Seventh Research Framework Programme (FP7). However, any substantial reinforcement would not have been possible until the completion of the mid-term review scheduled for conclusion before the end of 2010 and would have required a lengthy co-decision process.

4.2. Policy Option 1. No policy change scenario

Given the existing policy initiatives for researchers and in other relevant areas, the baseline scenario is a dynamic one. Under this scenario of no policy change (no additional EU actions then those already established or foreseen in established or proposed Community policy), the actions based on the current mobility and career strategies would continue.

As part of the policy specific support actions financed from the FP7 “People” programme to foster trans-national collaboration among partners in a European network for proximity assistance and information to mobile researchers, the European Researchers’ Mobility Portal provides access to researchers vacancies, contacts with scientific diasporas, statistical and policy relevant information, and awareness concerning the implementation by research employers and funders of the Recommendation on the European Charter for Researchers and Code of Conduct for their Recruitment.

This is supplemented by substantial support for European level actions from the FP7 “People” programme until 2013 for trans-national and inter-sectoral training and skills development, mobility and careers of researchers at different stages.

Still on training, the Bologna process is set to remedy some of the key aspects relevant to early-stage researchers: curricula development in doctoral programmes, quality assurance and recognition of qualifications. And the proposed Joint Doctorates in the proposed second phase of the Community Erasmus Mundus programme from 2009 would signify a step towards trans-national development of joint curricula and mutual recognition of qualifications of researchers at doctoral level. The European Institute for Innovation and Technology (EIT) is also expected to influence the training agenda for early-stage researchers.

On social security coordination and supplementary pension rights, actions in the frame of the Job Mobility Action Plan 2007-2010 would apply to researchers as to any mobile worker, including those in case the foreseen assessment by 2009 highlights the need for amending or supplementing EU legislation on access conditions for unemployment benefits. As will the Directive on supplementary pension rights, once adopted and ultimately transposed into national legislation.

The current policy therefore covers a broad range of issues, but not necessarily those aspects of the problems identified that are the most relevant or likely to have the highest impact.

Essentially the main current mechanism apart from Community funding is the development of voluntary actions on a potentially very wide variety of issues in the frame of the Open Method of Coordination through a Steering Group for Human Resources and Mobility composed of Member States representatives, with mutual learning as a key component. This does allow a large degree of flexibility to the Member States but does not entail the development of national action plans or any specific coordination of the various efforts.

4.3. Policy Option 2: A Recommendation and more specific EU guidelines in the identified problem areas

Compared to the baseline scenario, this option would be to put forward another Recommendation for voluntary action under Article 165 of the Treaty, focussing on what Member States would be expected to do in the identified main problem areas:

Axis 1: open recruitment and portability of grants;

Axis 2: meeting social security and supplementary pension needs of mobile researchers;

Axis 3: attractive employment and working conditions;

Axis 4: enhanced training and skills agenda.

A new Recommendation would be an opportunity to refocus national efforts on the main problem areas according to a common set of principles and allow the possibility to introduce more specific guidelines of what would be expected from Member States and research institutions and funders respectively. This option would therefore allow actions to be focused to a much greater extent than would be possible under the baseline scenario (Option 1).

The specific support actions described under Option 1 financed from the FP7 “People” programme could be refocused in line with the new Recommendation to better support its implementation.

The other actions under Option 1 concerning training, mobility, career development and social security coordination and supplementary pension rights would also be applicable under this option.

However, such a recommendation would, either, as with the Recommendation on the Charter and Code of 2005, have to set principles of a sufficiently general nature to be relevant to the situation in all 27 Member States or run the risk of being overly prescriptive and failing to take account the specificities in each country vis-à-vis the problem areas, their specific national or regional legislation governing research institutions and funders, institutional settings, practices and traditions, as well as budgetary constraints.

A new Recommendation would also risk creating confusion with the existing Charter and Code. The Charter & Code have established important principles which should underpin the European research system. These principles cover a much wider variety of institutional practices and other important aspects than the priority areas identified above. It would be very unfortunate if the long term take-up of these principles was detrimentally affected by any new initiative.

4.4. Policy Option 3: A Communication and a partnership with Member States

Based on article 165 of the Treaty, this option would seek to bring about a partnership between Community and Member States to jointly drive forward a number of targeted actions in the same four identified problem areas as mentioned under Option 2.

The "partnership" approach would allow actions to be focused to a much greater extent than would be possible under the baseline scenario (Option 1).

Compared to the open-endedness of the baseline scenario (Option 1) and Option 2, the partnership will be time-bound initially to a period of three years. The actions would be selected for their potential impact within the timeframe of the partnership, at the Community, national and institutional levels.

Through the partnership, the Member States would be invited to play a key role in the exact definition, implementation and monitoring of the partnership, which minimises the risks of low engagement and would allow the dynamic evolution of the measures over time. Within the partnership framework, Member States would be expected by early 2009 to adopt a national action plan setting out specific objectives and actions to achieve the aims of the partnership. Given the different national situations each plan will naturally focus on different aspects of the overall objectives of the partnership.

The Commission will seek to optimise existing Community instruments, including those available through the FP7 People programme to reinforce the partnership. As an integral part of the partnership, Member States and the Commission will be expected to identify good practice and where appropriate develop common guidelines; monitor progress at national and EU levels and report annually based on agreed indicators. The partnership will explore the possibility of future legislative or other actions such as Council or Commission recommendations if clear evidence of deficiencies emerges during its planned three year timeframe.

A "partnership for researchers" would be one of five policy initiatives planned by the Commission in 2008 to follow-up the ERA Green Paper “The European Research Area: New Perspectives” It is foreseen that the overall governance of all the ERA initiatives will be overseen by the Competitiveness Council utilising the Lisbon process and national actions to implement each initiative should be reflected in the National Reform Programmes of the Member States. The partnership approach would allow for the more dynamic political management of the initiative over time rather than the implementation of a one-time set of principles as under option 2. However the success or failure of the partnership would depend to a greater extent than with the other options on maintaining the political support and commitment of the Member States. In 2010, an overall evaluation of the situation and results from the actions by the partnership will be made.

Priority actions could include:

Axis 1: open recruitment and portability of grants:

- Member States to ensure open, transparent, competition-based recruitment of researchers, in particular by giving institutions greater autonomy over hiring and by adopting best practice on the recognition of qualifications from other countries
- Member States and Commission to ensure that all publicly funded researchers' positions are openly advertised online, in particular through EURAXESS
- Member States and Commission to ensure adequate information and assistance services for researchers moving between institutions, sectors and countries including through EURAXESS and the EURES platform[37]

[37] European Employment Services network and website www.eures.europa.eu

- Member States and Commission to allow portability of individual grants awarded by national funding agencies and relevant Community research programmes where this enables funders to better meet their research needs and researchers to better manage their careers

Axis 2: meeting social security and supplementary pension needs of mobile researchers:

- Commission and Member States to ensure that researchers and their employers have access to readily available and targeted information on the application of EU social security coordination rules and on the implications for supplementary pensions of transnational mobility, including through improving existing sources at EU and national level such as the EUlisses website[38]

- Member States to better utilise the existing legal framework and agree appropriate bilateral and multilateral agreements on derogations foreseen in Regulation 1408/71for the benefit of researchers

- Member States to include rules easing international mobility of researchers when concluding bilateral and multilateral social security agreements with third countries

- Commission and Member States to assess the need for a Commission or Council Recommendation on easing transfer of supplementary pension rights for highly-mobile workers, including researchers

- Commission and Member States to encourage pan-EU pension schemes targeted at researchers

Axis 3: attractive employment and working conditions:

- Member States, funders and employers to improve the career development opportunities for early-stage researchers by moving towards "flexicurity principles", regular evaluation, wider autonomy and better training; Research funders should take career development into account when evaluating research proposals

- Member States, funders and employers to progressively introduce more flexibility in contractual and administrative arrangements and relevant national legislation for senior and end-of career researchers to reward good performance and allow non-standard career paths

- Employers and funders should ensure that all publicly funded researchers receiving stipends and fellowships can receive adequate social security coverage

- Member States and public research institutions to achieve adequate gender representation in selection and funding bodies, and to systematically adopt policies that enable both men and women to pursue a scientific career with an adequate work-life balance such as developing dual career policies

[38] http://ec.europa.eu/employment_social/social_security_schemes/eulisses/jetspeed/

Axis 4: enhanced training and skills agenda:

- Member States to develop and support consistent "national skills agendas" to ensure that researchers are equipped with the necessary skills to contribute fully to a knowledge-based economy and society throughout their careers

- Member States to ensure better links between academia and industry by supporting the placement of researchers in industry during their training and promoting industry financing of PhDs and involvement in curriculum development

5. ANALYSIS OF IMPACTS

5.1. Policy Option 1: No policy change scenario

While the baseline option of no additional EU action is likely to generate some progress over time in the identified problem areas, this option scores poor in terms of likely overall impact. As until now, it can be expected that the policy initiatives on the mobility and career strategies will continue to raise awareness at government and institutional level across the EU about the problems of mobility and careers of researchers. As work progresses more and more data will become available through studies and data collection.

However, a focused, coherent framework at European and national level addressing both mobility and career issues in a way that takes into account their links and interdependencies in a consistent way, is unlikely to arise organically and within the short timeframe which the urgency of the problems imply. This option does not entail the development of national action plans or any specific concentration of the effort. Policies and measures in principle relevant to the four critical areas will therefore very likely continue to be addressed in fragmented ways in most countries, as one aspect of policies and measures focusing on different main objectives: reform of public research system in particular universities, funding programmes (science and industrial research) promoting industry – university cooperation and technology transfer, developing regional clusters and international cooperation, etc.

Where this fragmentation prevents adequate coordination of responsibilities between different Ministries and agencies dealing at national or regional level with different aspects of the mobility and career issues, this is likely to continue to lead to suboptimal combination of actions in stead of developing a common understanding of the issues and possible actions.

Despite a certain positive side, that the approach under this option gives maximum freedom for Member States to tailor policies and measures affecting mobility and career development to their national environment, this strong focus in most countries on actions defined with a national perspective fails to take into account mutual benefits of acting in a consistent way across countries with a European perspective; for example the opening of positions in public institutions beyond national borders would contribute to a more balanced circulation of researchers and would enhance the impact of such actions on research quality and specialisation at institutional level.

The European instrument of the Recommendation on the Charter and Code addresses issues, amongst many others, that are relevant to the identified problem areas, in particular where it concerns open competitive recruitment and fair employment and working conditions. The consistent implementation and concrete application of its principles in the practice of research institutions in each Member State would certainly contribute. However, since the Charter and Code contain a very wide array of issues, the uptake is a slow process, which is also not enhanced for instance because of the absence of a recognition system at European level for those institutions that do apply the Charter and Code principles or because of legal barriers at Member State level.

The Steering Group for Human Resources in Research (SGHRM) has played a useful role in the development of many of the European level measures until now. It could continue to play a role as a forum for exchange of good practices and contributing to the yearly report on the progress of the implementation of the mobility and career strategies. However, it lacks a clear

own drive for identifying subjects for mutual learning and development the European guidelines, which could improve national action. This together with a lack of the focus of its work, including the by no means exhaustive monitoring of progress, and its overall weak links with other policy areas at national level, make its relevance for decisive progress in a relatively short-span not evident.

Under the baseline scenario the Community financial instrument of FP7, and in particular the People programme, is likely to contribute progressively to stimulate mobility and career development of researchers in Europe. Because of the absence at Member States' level of national strategies to training, mobility and career development taking account of trans-national elements, its impact is likely to remain relatively modest.

And while initiatives, under this scenario, such as FP7 People and Ideas, Erasmus Mundus, the European Institute for Innovation and Technology and Bologna taken together are important for the longer-term progress in the area of researchers' training and skills development, the absence under this baseline scenario of national training and skills agendas developed upon commonly developed European guidelines is not helpful to advance in the short term on the important training objective identified.

On social security and supplementary pension rights actions in the frame of the Job Mobility Action Plan 2007-2010 would apply to researchers as to any mobile worker. On social security coordination, a certain lack of awareness of researchers of their social security rights and the suboptimal use of the existing rules on social security coordination is likely to persist under this scenario. Mobile researchers, as other migrant workers, are likely to benefit from the electronic exchange of data foreseen from 2010 in the field of coordination of social security schemes.

On supplementary pension rights, the current framework based on the Mobility Strategy for the ERA however does not foresee in a coordinated input from the research world into the assessment by 2009 foreseen in the Job Mobility Action Plan whether there is a need for amending or supplementing EU legislation on access conditions for unemployment benefits. The length of the adoption and transposition process into national law of the Directive on supplementary pension rights currently under negotiation is likely to have an impact in the long run, rather than in the desired shorter term.

On this basis, the **social impacts** of this option would include the persistence of the unattractiveness of research relative to other professions for the highly educated and skilled, suboptimal mobility and career paths, continued highly national or regional segmented researchers labour markets in some countries, with unfavourable employment and working conditions particularly affecting younger researchers and women researchers.

Economic impacts include continued loss of human capital to outside the EU and suboptimal contribution of research efforts to the economic development of the EU. The latter because of untapped potential of greater levels of merit based mobility and career development, intra-nationally and intra–EU, that would bring about increased knowledge sharing and quality of research, and balance supply and demand of highly skilled and specialised workers.

The **impact on third countries** of this option is not likely to be negative, as the EU is expected to continue losing out on the most talented researchers that move away from, while difficulties are likely to grow in attracting larger number of talented non-EU researchers.

The **impact on the administrative burden and costs** of this option is limited and mostly on a voluntary basis. For Member States there is no significant burden, other than their efforts in the limited European frame of the SGHRM. Member States costs arise from any own initiative and are usually part of the actions they undertake at national level in other frameworks, e.g. on reform of universities. For research institutions, administrative costs for sorting out individual cases implying several Member States would be likely to continue. Costs by research institutions related to compliance with part or all principles of the Charter and Code can be significant. They are however on a voluntary basis and can be seen as an investment in the attractiveness of the research institutions, rather than as a cost. For the Community the administrative burden and costs of this option would remain unchanged at a relatively modest level of the coordination and support actions paid from FP7 and in part from the administrative budget of the Commission.

5.2. Policy Option 2: A Recommendation with more specific EU guidelines in the identified problem areas

Compared to the baseline scenario, this option would in sum likely have a somewhat higher impact. Although the Recommendation with more specific EU guidelines would still be a framework for voluntary action on what Member States would be expected to do in the identified main problem areas, this would be much more focused than the baseline scenario.

Such a recommendation would, either, as with the Recommendation on the Charter and Code of 2005, have to set principles of a sufficiently general nature to be relevant to the situation in all 27 Member States or run the risk of being overly prescriptive and failing to take account the specificities in each country vis-à-vis the problem areas, their specific national or regional legislation governing research institutions and funders, institutional settings, practices and traditions, as well as budgetary constraints.

Whether Member States will be 'bound in' sufficiently by option 2 in terms of their engagement is crucial for the necessary impact of this option. Based on the experience with the Charter and Code, the expectations would not be overly high that full engagement of all or even a majority of MS could be expected.

A new Recommendation would be an opportunity to refocus national efforts on the main problem areas according to a common set of principles and allow the possibility to introduce more specific guidelines of what would be expected from Member States and research institutions and funders respectively. On the other hand, as in the baseline scenario, once the Recommendation has been issued it remains questionable what the flexibility would be to adapt its guidelines in the course of time. This may also have a (further) negative bearing on the above mentioned level of MS engagement over time.

The impact of option 2 on the above mentioned areas is also likely to be negatively influenced by its open-endedness, just as the baseline scenario (option 1). Even if one would put recommended time targets for achievements in the more detailed guidelines of the Recommendation, MS would not necessarily feel more bound given the 'one-size-fits-all' approach of the instrument.

On the governance and monitoring in option 2, the Recommendation could seek to improve the situation in comparison with the Steering Group for Human Resources in Research (SGHRM) of the baseline scenario. The focus on the four identified problem areas would in principle give more steer to such a follow-up group and could make monitoring also straighter

forward and effective. However, as with other aspects of this option 2, the impact of this hinges on the engagement of Member States, which as has been indicated above is not at all self-evident. For a follow-up group engagement is crucial for the drive to work together on mutual learning, with a view to improve national action, and for the strength of the links with other policy areas at national level.

A new Recommendation would also risk creating confusion with the existing Charter and Code. The Charter & Code have established important principles which should underpin the European research system. These principles cover a much wider range of institutional practices and other important aspects than the priority areas identified above. It would be very unfortunate if the long term take-up of these principles was detrimentally affected by any new initiative.

As in the previous options, the Community financial instrument of FP7, in particular the People programme, is likely to contribute progressively to stimulate mobility and career development of researchers in Europe. To support the uptake and impact of the Recommendation under option 2, the budgetary build-up of FP7 could be used to adapt the actions under the People programme.

In contrast to the baseline option, the Recommendation under option 2 will make it possible to issue guidelines for developing national training and skills agendas, which, depending on the engagement of Member States, may be helpful to advance in the shorter term on the important training objective identified, in addition to longer-term relevant initiatives such as FP7 People and Ideas, Erasmus Mundus, EIT and Bologna.

As in the baseline option, on social security and supplementary pension rights, actions in the frame of the Job Mobility Action Plan 2007-2010 would apply to researchers as to any mobile workers. Also under option 2, mobile researchers, as other migrant workers, are likely to benefit from the electronic exchange of data foreseen from 2010 in the field of coordination of social security schemes. Contrary to the baseline scenario, option 2 could anticipate recommending a coordinated input from the research world into the assessment by 2009 foreseen in the Job Mobility Action Plan, whether there is a need for amending or supplementing EU legislation on access conditions for unemployment benefits. Over and above the baseline scenario, option 2 could foresee in the Commission examining with Member States the feasibility of specific recommendations on the transferability of supplementary pension rights for researchers and other highly skilled workers, to encourage EU-pension institutions to open up for researchers, and to recommend and support an extra awareness raising effort to researchers and their employers on their social security rights and supplementary pension rights. However, as for other aspects of this option 2, the impact of this hinges on the engagement of Member States, which, as has been indicated above, is not at all self-evident.

On the basis of the overall doubtful Member States engagement under this option, the **social impacts** would include the likely persistence in the shorter term of the unattractiveness of research relative to other professions for the highly educated and skilled, suboptimal mobility and career paths, continued national or regional segmented researchers labour markets in some countries, with not unlikely unfavourable employment and working conditions particularly affecting younger researchers and women researchers.

Economic **impacts** possibly include continued loss of human capital to outside the EU and suboptimal contribution of research efforts to the economic development of the EU. The latter

because of untapped potential of greater levels of merit based mobility and career development, intra-nationally and intra-EU, that would bring about increased knowledge sharing and quality of research, and balance supply and demand of highly skilled and specialised workers.

The **impact on third countries** of this option is not likely to be negative in the shorter term, as the EU is not unlikely to continue losing out on the most talented researchers that move away from, while difficulties are likely to grow in attracting larger number of talented non-EU researchers.

The **impact on the administrative burden and costs** of this option is limited and mostly on a voluntary basis. For Member States there is no significant burden, other than their efforts in the limited European frame of the follow-up group for the new Recommendation, which is not expected to be more costly than the involvement for the SGHRM under option 1: the extra effort for the monitoring and reporting would likely be balanced by the reduction of topics as a result of the focusing. If Member States engage in the implementation of the new Recommendation, they would only incur costs arising from guidelines that fit within their own interests and policy agendas. So, although the costs would be higher than under the baseline scenario (Option 1)', they would not incur costs on all issues raised in the guidelines.

Member States and employers and funders of research could be confronted with in some cases significant transitional costs of some of the measures proposed (for instance more attractive working packages). Some of these costs could be covered by using part of the higher investment levels for R&D planned in most Member States. The costs of some of the measures should also be seen as an investment in the attractiveness of the national and with that of the EU research system. However, the actions proposed emphasise that while salary levels play a part in providing attractive employment and working conditions, job satisfaction, how academic performance is rewarded, peer relationships and having a supportive, professional environment where researchers can pursue their own research interests from an early stage and where they can balance their professional and family life are at least as important. Despite important ongoing reforms, compensation and promotion structures in many public research institutions remain rigid and often make it difficult, for universities in particular, to compete in the international academic market. Addressing these issues can be achieved without increasing overall salary costs.

For research institutions administrative costs would not be substantially higher and could even be lower than in the baseline scenario, provided that the Commission and Member States engage in including targeted information on European aspects of social security and supplementary pensions. Costs by research institutions related to compliance with part or all principles of the new Recommendation could be similarly significant as for the Charter and Code under the baseline scenario. Also under this option such costs are however on a voluntary basis and can be seen as an investment in the attractiveness of the research institutions, rather than as a cost. For the Community the administrative burden and costs of this option 2 could be slightly higher than under the baseline option, but would at a modest level of the coordination and support actions paid from FP7 and in part from the administrative budget of the Commission.

5.3. Policy Option 3: A Communication and a Partnership with Member States

This policy option potentially scores significantly higher on likely impacts than both options 1 and 2. This is based on a number of essential elements brought together in this option. Option

3 is seeking engagement of Member States in a partnership, is focused on taking forward a limited number of actions selected from the four identified problem areas to yield concrete results within a clear short-term timeframe.

Although option 3 in principle is as voluntary as options 1 and 2, a number of factors combined are highly likely to have a very positive effect on the engagement of Member States:

– While the Communication would set out the Commissions' viewpoint on the framework and broad objectives of the partnership for better careers and more mobility, it will be **the Member States with the Commission to work on the final content**; Member States can therefore, contrary to the baseline option and to a much higher degree than in option 2, take **ownership of the partnership**; this includes issues on the monitoring of and indicators for progress;

– This ownership would be further strengthened by the fact that Member States would, based on the **overall focus of the partnership**, also develop their own **national action plans**, which would be logically geared to the specific national situations in the four identified problem areas. Each and every Member State can book success through the partnership;

– Moreover, Member States' commitment is backed up by very recent political conclusions at the highest level endorsing the development of a partnership to take forward focused actions in this area. And Member States have responded overall positively on informal consultation on the partnership and its possible orientation;

– Finally, the **time horizon of the partnership (initially 3 years) is highly aligned with the Lisbon process**, while it is important to note that the partnership would be flexible as to allow adaptation of its direction to new developments in case a majority of Member States would wish to do so.

Not only would the partnership option allow actions to be focused to a much greater extent than would be possible under the baseline scenario (Option 1) which as such would make results and impacts more achievable; because of the design of the partnership the different actions in Member States would overall yield results contributing to solving issues in the four identified main problem areas deemed most relevant for the EU.

In contrast to option 2, option 3 would allow some more room for research institutions and funders to continue work to address the implementation of the wider set of issues covered in the Charter and Code, supported by the development and implementation of a European recognition ('label') system. Member States would be free for example to include support for that in their national action plans for the implementation of the partnership.

The partnership and the Commission's participation in it, will allow to fully optimise existing Community instruments, including those available through the FP7 People programme to reinforce the partnership with a view to concrete results and impacts in terms of European added value, in line with the objectives formulated for the four main problem areas.

Social impacts are likely to include an increased attractiveness of the research profession, including to younger people and women, based on better employment and working conditions, catering for an acceptable work-life balance; gradual optimising the contribution to the research effort of senior and end of career researchers, through application of flexicurity

principles; more acceptable mobility and more attractive career options; de-segmenting national or regional researchers labour markets.

Economic impacts would include a more optimal contribution of the EU research efforts to the economic development, through a more effective deployment of the EU research workforce at national level and throughout Europe as a result of lower barriers to merit based mobility and better career options, leading to increased knowledge sharing and quality of research across the EU, as well as a balanced supply and demand of researchers.

The **impact on third countries** of this option would be positive in terms of likelihood to balance flows with highly industrialised countries and the attraction of researchers from outside the EU, thereby as much as possible taking care through the partnership of mitigation of negative effects in case of researchers from neighbouring countries and development countries. The possible higher influx of researchers from outside the EU would require commensurate attention of Member States to take appropriate security measures aimed at preserving their interests and those of the EU in the fields of public security and defence, monetary, economic and commercial matters, and the economic and scientific potential.

The **impact on the administrative burden and costs** of this option is overall higher than in options 1 and 2, but still modest. For Member States there is no significant extra administrative burden. The partaking in the partnership would require an additional effort, depending on the national structures in place, but this may be balanced by the sharing and supply of studies and results among the partnership; monitoring and reporting requirements would be kept as light and proportionate as possible, to be implemented based on existing structures in the frame of the Lisbon programme.

Member States and employers and funders of research could be confronted with in some cases significant transitional costs of some of the measures proposed (for instance more attractive working packages). Some of these costs could be covered by using part of the higher investment levels for R&D planned in most Member States. The costs of some of the measures should also be seen as an investment in the attractiveness of the national and with that of the EU research system. However, the actions proposed emphasise that while salary levels play a part in providing attractive employment and working conditions, job satisfaction, how academic performance is rewarded, peer relationships and having a supportive, professional environment where researchers can pursue their own research interests from an early stage and where they can balance their professional and family life are at least as important. Despite important ongoing reforms, compensation and promotion structures in many public research institutions remain rigid and often make it difficult, for universities in particular, to compete in the international academic market. Addressing these issues can be achieved without increasing overall salary costs.

For research institutions, administrative costs would not be substantially higher and could even be lower than in the baseline option, for instance where it concerns improvement of access to information on the functioning of the EU legislation on social security coordination. For the Community the administrative burden and costs of this option 3 could be slightly higher than under the baseline, but would remain at a relatively modest level of the coordination and support actions paid from FP7 and in part from the administrative budget of the Commission.

5.4. Comparison of the policy options versus the no policy change scenario

Although the impacts of option 3 should not be overestimated, since option 3 as the other options is based on an **essentially voluntary approach**, the credible impacts of this option clearly surpass those of option 1 and of option 2. The **combination of a number of vital elements constituting the partnership approach in option 3**, as highlighted in the previous chapter, **makes the essential engagement of Member States in that option far more compelling** than for option 2.

Even if both options 2 and 3 are addressing the same four identified problems areas on which action would be best directed, **the architecture of the partnership is far more likely to be successful in achieving better results with the highest EU added value** in the short timeframe implied by the urgency of the problems on career development and mobility of researchers in Europe. The greater probability for significantly enhanced engagement is making the difference in expected impacts. The higher administrative costs associated with option 3, in comparison with the other options, are outweighed by the impacts of option 3.

The partnership will build on the current momentum and allow actions to be undertaken at the **most appropriate level but towards the same direction**. **Member States can play their full role in the exact definition and implementation of the process, in a European perspective still** targeting actions to their needs and priorities. Shared ownership of the initiative would minimise the risks of low engagement of the Member States and allow the dynamic evolution of the measures over time. **The Commission will seek to optimise existing Community instruments**, including those available through the FP7 People programme, to complement national actions and support the partnership. Actions should be monitored, at both national and EU-level, and according to commonly agreed indicators for progress.

Table II. Summary of likely impacts of the various policy options

IMPACTS	**No policy change scenario**	**Commission Recommendation and more specific guidelines**	**Communication and a focused Partnership with Member States**
Potential overall impact	Poor impact due to continued low engagement of Member States, the open-endedness of the approach and continued fragmentation of interventions and suboptimal use of existing frameworks. However, some longer progress in the key problem areas from continuation of the Mobility and Career strategies and effects from European level actions in other policy domains	Somewhat higher impact, due to better focusing on the identified key problem areas, but limited by the overall unlikelihood of stronger engagement of Member States	Significantly higher impact, and already in the shorter term, due to the higher probability of Member States' engagement in the partnership approach, the focusing of actions on the key problem areas and adaptation of actions within the Lisbon horizon

Potential Economic Impacts	Continued loss of human capital to outside the EU and suboptimal contribution of research to the EU economic development	Continued suboptimal contribution of research to the EU economic development	More optimal contribution of the EU research efforts to the economic development, through a more effective deployment of a sustainable research workforce at national level and throughout the EU
Potential Social Impacts	Persistence of unattractiveness of research in relation to other professions, suboptimal mobility and career paths, continued segmented research labour markets, unfavourable employment and working conditions, affecting younger researchers and women researchers	Persistence, in the shorter term, of unattractiveness of research in relation to other professions, suboptimal mobility and career paths, continued segmented research labour markets, unfavourable employment and working conditions, affecting younger researchers and women researchers	Increased attractiveness of the research profession, including to younger people and women, based on better employment and working conditions, optimisation of the contribution of senior and end-of-career researchers; more acceptable mobility and more attractive career options; de-segmenting of national or regional research labour markets
Impacts on Third Countries	Continued net outflow from the EU of the most talented researchers	Some net outflow from the EU of the most talented researchers	Positive, more balanced flows between highly industrialised countries
Administrative burden and costs	Limited and mostly on a voluntary basis for Member States, more important for institutions	Limited and mostly on a voluntary basis, although for some aspects they can be more important for Member States and institutions	Still relatively modest and depending on the situation in the Member States; structural reforms can minimise overall expenses / investments

6. EU VALUE-ADDED AND SUBSIDIARITY

Given that the areas covered by the initiative are areas of shared competence, there are clearly issues of EU added value and subsidiarity. **The initiative proposes a partnership with the Member States in order to take different actions at the appropriate level.** The levels of the various actions are consistent with the subsidiarity principles. The Community intervention is complementary to and coherent with interventions at national level and synergy is being sought between interventions.

Many of the actions proposed relate to the reform of the national public system, the national funding programmes, and education policies, which are essentially national competences. Community contributions relate to the coordination of national research policies, the Community funding instruments and policies on coordinating social security and supplementary pension rights. Coordination of actions and cooperation between Member States are needed to make cross-border enforcement work.

Through the partnership, the **Member States are invited to play a key role in the exact definition, implementation and monitoring of the partnership**, which minimises the risks of low engagement and would allow the dynamic evolution of the measures over time. Within the proposed framework, Member States are expected by early 2009 to adopt a national action plan setting out specific objectives and actions to achieve the aims of the partnership. Given the different national situations and priorities, each plan will naturally focus on different aspects of the overall objectives of the partnership.

More engagement of the Member States is also expected because many of the proposed actions are linked to the processes being undertaken in most MS to reform their public research system and their funding. The direction is the same, with different scopes and at different speeds: more autonomy and accountability. As some institutions open recruitment procedures, offer more attractive employment conditions and adopt their doctoral programmes, a dynamic is being created which results in peer pressure on other institutions in the same country or in other countries to do the same.

The Commission will seek to optimise existing Community instruments, including those available through the FP7 People programme to reinforce the partnership. The latter will include refocusing and/or strengthening funding on instrument to support mobility grants and to provide information and assistance services. The Commission will also support the partnership through coordination, mutual learning, exchange of best practices, monitoring and reporting, following the Lisbon process. As an integral part of the partnership, Member States and the Commission will identify good practice and where appropriate develop common guidelines and monitor progress at national and EU levels and report annually based on agreed indicators. **The added value results from the common focusing on closely related issues which concern all Member States in different degree, the partnership process that should mobilise efforts and accelerate progress, the increased benefit for each country by acting together (increased overall brain circulation through opening positions and consistent doctoral programmes) and more effective national policies due to mutual learning and common guidelines.**

Some of the actions at national level, e.g. improving salaries and funding industrial fellowships will require additional financial resources. They are expected to come from increased public budget for research, according to their commitments towards the 3% target,

reallocation between funding instruments and reallocation of budget within institutions (autonomy and financial managing).

The **overall governance of the ERA initiatives will be overseen by the Competitiveness Council utilising the Lisbon process and national actions to implement each initiative should be reflected in the National Reform Programmes of the Member States.**

7. MONITORING AND EVALUATION

In order for the partnership to successfully contribute to the creation of a world class European research system, it is therefore important that **Member States, Council and Commission commit themselves to the common objectives and endorse the proposed actions. To this effect:**

- **Member States should adopt a national action plan by early 2009** setting out specific objectives and actions to achieve the aims of the partnership. Given the different starting positions of each Member State each plan is expected to focus on different aspects of the overall objectives of the partnership; the **priority actions identified should be implemented by the end of 2010;**

- the **Commission should seek to optimise existing Community instruments**, including those available through the FP7 People programme, to reinforce the partnership;

- as an integral part of the partnership, Member States and the Commission should:

  - **identify good practice** and where appropriate **develop common guidelines**;

  - **monitor progress** at national and EU levels and report annually based on agreed indicators, as on the following table;

  - make **maximum use of the existing Community legal framework** for the benefit of researchers;

- in line with its central role in the governance of ERA initiatives, **the Competitiveness Council should monitor and assess progress** in the implementation of the partnership actions;

- at the end of 2010, an **overall evaluation of the situation and results from actions by the partnership** should be made, with the help of *inter alia* the suggested indicators, and the need for further EU action to address specific outstanding issues should be considered. The evaluation should **fully incorporate the views of researchers themselves**. A **single contact point for researchers** to notify the partnership of examples of good practice and ongoing difficulties should be considered as well as the **organisation of a major conference in 2009** to provide a platform for researchers' views.

Problems identified	**Objectives**	**Core Indicators**
Europe does not attract the best talents because of the "closed" recruitment conditions and non portable grants	To accelerate progress towards the removal of remaining barriers to the open, transparent, competition-based recruitment of researchers at institutional, national and Community levels including the increased portability of grants	Percentage of non-national and external researchers recruited by institution and MS; Percentage of public researchers' positions openly advertised on-line by institution and MS; Percentage of individual grants awarded by Community programmes and national agencies that can be portable

Suboptimal use of existing rules coordinating social security throughout the EU for the benefit of researchers	To improve awareness of researchers and employers of and optimise the use of the existing legal framework, through improved access to information on the application of EU social security coordination rules and explore derogations to general rules on legislation applicable; to ease transferability of supplementary pension rights and exploit the possibility for a EU Pension institution	Percentage of researchers working in another MS, by gender and career stage; Number of national administrations[39] providing information on agreements with other Member States and third countries; Number and hits of social security web pages concerning researchers
Unattractive working conditions and career prospects cannot bring the best talents	To bring in more attractive "working packages" especially for young researchers and to progressively introduce more flexibility in contractual and administrative arrangements and relevant national legislation for senior and end of career researchers	Percentage of researchers on fixed term and permanent contracts by institution and by MS; Percentage of senior researchers with alternative career paths; Numbers of women in research and positions of responsibility by institution and MS
Deficient initial and life-long training do not provide for the best innovation-driven skills	To ensure that researchers are equipped with the full range of skills and encourage better links between academia and industry	Percentage of doctoral programmes with industry placements by institution and MS and percentage of researchers that benefit; Percentage of researchers that have worked in or moved between different sectors by institution and MS

[39] Corrected appropriately for the differences in the physical infrastructure of social security at national level which can differ considerably, varying from only a few institutions to a large number of institutions responsible for the different fields of social security

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9. TABLE OF ACRONYMS

BEPG: Broad Economic Policy Guidelines

C&C: Charter and Code

CREST: Scientific and Technology Research Committee

EARTO: European Association of Research Technology Organisations

EAU: European Association of Universities

EIT: European Institute of Technology

EMBL: European Molecular Biology Laboratory

ERA: European Research Area

ERA-NET: European Research Area NETworking

ERC: European Research Council

ERAWATCH: Integrated Information system for ERA

EQF: European Qualification Framework

EURES: European Employment Services

FTE: Full Time Equivalent

FP: Framework Programme

GDP: Gross Domestic Product

HRST: Human Resources in Science and Technology

IA: Impact Assessment

INSCED: International Standard Classification of Education

IORP: Institutions for Occupational Retirement Provisions

ISCO: International Standard Classification of Occupations

MS: Member State

MST: Maths, Science and Technology

NSF: National Science Foundation

OECD: Organisation for Economic Cooperation and Development

OMC: Open Method of Coordination

PRO: Public Research Organisation

R&D: Research and Development

RFO: Research Funding Organisation

RPO: Research Performing Organisation

RTO: Research and Technology Organisation

SME: Small and Medium-sized Enterprise

S&E: Science and Engineering

S&T: Science and Technology

SET: Science, Engineering and Technology

SGHRM: Steering Group for Human Resources in Research

STEM: Science, Technology, Engineering and Maths

TRESS: Training and Reporting in European Social Security

Annex 1: Highlights from the Public Consultation following the ERA Green Paper

Highlights from the positions of national governments and European bodies

Most of the responses by national authorities, received by 31.12.2007, were provided by the ministries in charge of research; some countries (Denmark, the Netherlands, Poland and UK) provided overall national positions and others only sent the conclusions of national consultations[40].

Germany, Sweden and Switzerland highlight the need for European research policies to uphold the principle of excellence. Belgium sees the EU as a catalyst which should create the necessary political consensus to remove problems and barriers to transnational cooperation, fill identified gaps and act where benefits of scale can be realised. The Czech Republic considers that the EU should set common framework conditions while respecting national diversity and reducing bureaucracy. Denmark considers it fundamental for European research and the ERA to be open to cooperation with the best scientists in the world. Switzerland considers that increasing competition between European scientists is the key issue for the ERA rather than addressing fragmentation.

Concerning the single market for researchers, the Czech Republic wants to minimise legislative barriers. Estonia supports the creation of a single labour market for researchers while wishing to ensure that this does not lead to the deterioration of research in less developed regions. France also considers it necessary to create a single market for all research workers, including teachers, engineers and technicians and for all funding to include resources to support new researchers. Spain believes that the European Charter for Researchers and the Code of Conduct for their Recruitment should be made compulsory in the form of a Directive and that the removal of barriers to mobility should also be enforced by regulation. Finland believes that social security practices across the EU should be clarified in general, not just for researchers. Poland would consider arrangements concerning the coordination of social security at the EU level including the possibility of scientists' taking on the role of prime payers, as well as a legal framework covering scientists' rights, duties and salaries.

Sweden considers the lack of portability of social security provisions and the reservation of academic positions for national and/or internal staff as the main obstacles to a single labour market for researchers. Austria emphasises the lack of researchers, particularly women, in some fields. Denmark, Norway and Spain also put special focus on the promotion of women in science. Austria and Italy emphasise the need to focus on exchange rather than brain drain or gain. Italy would like to see a European level database of all researchers and more emphasis on interdisciplinary training.

Denmark, Germany, Ireland and UK instead favour the spreading of best practice and the voluntary implementation of instruments like the Charter and Code. Finland believes that compulsory EU legislation in this area could have highly asymmetric impacts in different Member States given the diversity of national employment legislation and practices. Belgium also does not favour compulsory measures but believes in strengthening existing tools like the Charter and Code. At the EU level, the Netherlands considers the priority to be continuing

[40] See all contributions on http://ec.europa.eu/research/era/progress-on-debate/stakeholder-consultation_en.html)

with measures aimed at promoting the training of researchers and the improvement of career prospects, through improving mobility.

The European Parliament (EP), EESC and CoR support concerted action in this area. The EP makes particular reference to developing an information system, increasing mobility including inter-sectoral, promoting women and improving science education. EESC considers that contract conditions, salaries, portability of social security and "family integrity" are the key obstacles to better carriers and mobility. This is supported by a similar assessment from CoR.

Overall results: Researchers constitute the most important ERA dimension for action at the EU level

All six of the ERA dimensions in the Green paper are considered important by the respondents to the on-line questionnaire. "Sharing knowledge", followed by "Developing world-class research infrastructures", is highlighted as the most significant area contributing to the ERA Vision. However, concerning the level of expected actions (EU, National or Regional), "Realising a single labour market for researchers", followed by "Opening to the world" and "Developing world-class research infrastructures", is the top area of expected action at the EU level. "Realising a single labour market for researchers" is strongly supported especially by individual respondents, PROs and NGOs. At the other end of the spectrum, all groups of stakeholders concur that it is not primarily at the EU level that actions for "Strengthening research institutions" are needed but rather at national level.

Position papers provide insight on the kind of expected action. One organisation expresses it: *"European-wide structures and schemes should constitute a balanced mix of approaches respecting and facilitating bottom-up research activities, combined with strategic guidance and coordination where this serves European policy objectives."* Two universities suggest that *"the EU should be more active in encouraging light-touch regulation to help remove barriers to business-university collaboration"* as well as promoting *"the establishment of open access repositories and supporting academics in using them."*

A majority of respondents endorse the use of various mechanisms to promote ERA such as financial incentives, increased EU budget, reinforced coordination and guidelines. But, there is generally little demand for binding legislative actions at European level. Respondents prefer flexible and adaptable, bottom-up cooperation schemes, networking, voluntary legal frameworks, the exchange of best practices and the establishment of guidelines. While respondents do not welcome regulatory action for public-private partnerships, sustainable bottom-up partnerships among industry and institutions are deemed to be very important, both for knowledge sharing and for strengthening research institutions.

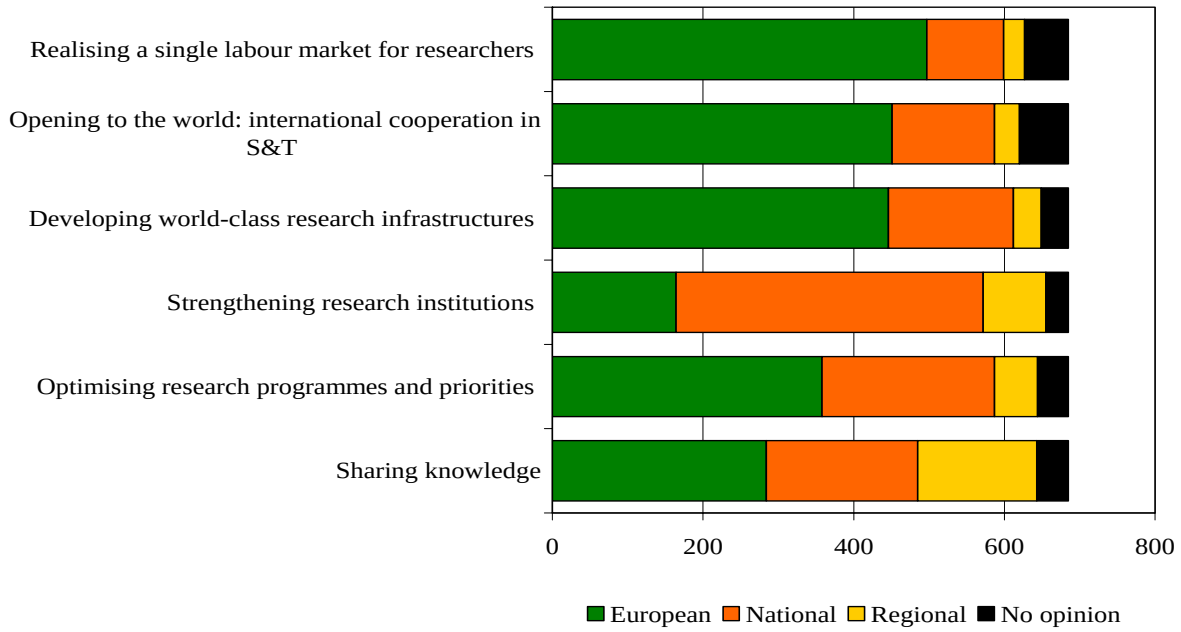

Figure 1: The expected level of action (EU, national and regional) for each of the six ERA areas

Awareness and implementation of the C&C: voluntary versus mandatory actions

Almost half of the respondents to the on-line questionnaire declare that they are sufficiently aware of the European Charter for Researchers and the Code of Conduct for their Recruitment (Charter and Code - C&C) issued in 2005 by the European Commission as a common, albeit voluntary framework for Member States, funders and employers of researchers to take account of the European dimension of research careers, including the transnational opening of vacancies and funding opportunities for researchers. However, the analysis by type of stakeholder reveals that the Charter and Code obtains a better score awareness in higher education institutions, public sector and research funding organisations and that governmental bodies are among the stakeholders that are least aware of the Charter and Code. The C&C are always less known in the private sector.

Three fifths of those responding positively consider that, due to their voluntary nature, the Charter and Code will not become a genuine factor for European research careers. Nonetheless, a number of individual respondents express preference for the C&C to be voluntary rather than mandatory and incentives for compliance are also recommended. It is also underlined that a mandatory C&C would be difficult to achieve in industrial R&D organisations.

The great diversity of research patterns throughout Europe makes implementation of the Charter and Code difficult. Various suggestions are made in order to translate the voluntary principles into concrete implementation. For example, one stakeholder proposes that a concrete measure could be to make research funding from the EU research programmes conditional on recognition and implementation of the principles of the Charter by the institutions receiving EU funding.

There is strong support for the principles of the Charter and the Code in the stakeholder free-format responses. One stakeholder argues: *"The European Charter constitutes a positive initiative, which it would be advisable to prolong by more concrete measurements of coordination."* However, there are divergent viewpoints regarding whether these principles should be mandatory or linked to eligibility for funding support. Serious concern is expressed

regarding the degree of flexibility with which the Charter and Code should be enforced in the private sector and in particular in innovating SMEs, for *"it would be difficult to imagine that SMEs would follow the same rules as big research laboratories."*

Recognition of the profession and salary conditions

Of the main concerns that could be addressed if the Charter and Code were binding (or, at least, if more specific guidelines at European level applied), funding and salary levels come first, closely followed by the recognition and rewarding of mobility, recruitment and working conditions. A number of respondents raise the substantial problems for mobile researchers, including the lack of harmonisation of pension schemes within Europe, non-competitive researcher salaries and the comparatively low professional status of researchers. A number of individual respondents comment on the difficulties linked to mobility, e.g. moving families, in terms of work permits for partners and children needing to adjust to different education systems. Some respondents also identify the potential for a mobility requirement to discriminate against those with disabilities. Others argue that working conditions should ensure access to childcare and also take into account the special circumstances of single parents.

From the overall results, a large proportion of respondents (80%) believe that a "Charter and Code label" should be awarded to employers and funders who are successfully engaged in applying the principles. Indeed, a 'label mechanism' would help speed up implementation of the Charter & Code and is considered preferable to coercive legislation. Some stakeholders recommend that the Open Method of Coordination policy-making approach and the Bologna Process structures could be used for Charter and Code implementation rather than regulatory mechanisms. The substantial administrative burden and costs associated with implementing and monitoring the C&C are also commented on, in particular in relation to decreasing interest and commitment. Nonetheless, a Foundation believes that *"a more aggressive and coordinated approach is required if the ERA is to create the necessary working environment for the research community to thrive on. Initiatives such as the C&C will only be valuable if their implementation is monitored and assessed across Europe."*

Legal status for mobile researchers

The majority of respondents (74.6%) have a mobility experience but most of them did not spend more than three months in another EU country to do some research work (45.3%). A small majority are fellowship holders and only one third may be considered to be "posted" workers as they keep their contract in their country of residence. Only one third respond to this question, perhaps because they do not seem fully aware about their real status during these periods. Some of the researchers think they are fellowship holders because they obtain money from European organisations e.g. Marie Curie fellowships. However, this money is often given to the host organisation which signs an employment contract with the researcher. The researchers are then considered to be salaried workers even if they originally obtained an EU programme fellowship, which may have misled them in this question, as confirmed by the following quote: *"Grants should be inclusive of all compulsory pension and social security contributions, and researchers should be recruited by their host organisation so as to clarify their labour market position and to guarantee pension and social security."*

The limited period of time (one or exceptionally two years) for which a worker, including researchers, posted to another EU country can be subject to the legislation of his or her country of origin can be prolonged based on Article 17 of Regulation 1408/71. Only 6.8% of

the respondents to this question (61.8% of total respondents) used this possibility and more than two thirds of those used this possibility for 1 to 3 times. This may be due to the fact that only a few host organisations know about this system and that researchers may not be considered to be *"certain categories of persons"* allowed to remain within the social security system of their country of origin. The remarks reveal that the application of bilateral agreements on social security signed between different countries is still unknown. Most often, it is up to the researcher to provide this information to the local social security administration. According to the respondents, the lack of information on this existing legislation also reduces the share of researchers who can benefit from this system. A Director of a research institute highlights: *"I tried to defend the interests of personnel we had delegated from another MS. The problem re-occurred regularly and in almost all cases we had to go to high levels in the Foreign Ministries to solve it."*

Problematic issues related to social security for mobile researchers within the EU

The on-line consultation reveals a lack of information on the rights of migrant researchers: they are worried firstly about matters such as statutory pension rights, followed by health insurance, unemployment benefits and family benefits (parental leave). Among the responses to the open questions, pension rights seem the main concern, as most of the researchers will have to claim their pension benefits from different systems, in the different countries they have lived and worked in. According to the respondents, even if the actual European legislation allows for the aggregation of periods completed under different systems, the procedures to obtain the pensions is still very long. Less than 10% of the respondents are of the opinion that "accident at work" coverage is problematic.

Acquisition, preservation and transferability of supplementary pension rights

In the question on supplementary pension rights, the prevailing options include common rules throughout the EU and setting up a "European researchers' pension fund". A large majority (79.5%) of the on-line respondents agree that common rules should apply throughout the EU on the acquisition, preservation and transferability of supplementary pension rights. Out of the comments, the most relevant themes are: the need to ensure a proper pension, to reduce the paperwork involved and to organise transferability of pension rights. Vesting periods and resulting negative effects should be reduced and compensation in salary for pension gaps is voiced as a solution. Over 65% out of the 66% of the respondents to the question agree that researchers would be well served with a European researchers' pension fund to secure their pension rights. Even if several comments showed that respondents would find it difficult to judge this option (because they would need more information to fully understand it), this principle is generally regarded as a potential positive step.

Respondents to the on-line questionnaire are mostly (65%) favourable to the setting up of a "European researchers' pension fund". When looking at the breakdown by type of stakeholder, it is worth noting that large commercial organisations and associations representing commercial interests are mainly opposed to such a step. Comments suggest that the two options, common rules and European researchers' pension fund, are not mutually exclusive but they can coexist next to each other. Respondents point out that there are differences amongst the EU Member States in standards, both for social security, revenue and research level. Therefore, it is important to opt for a solution which takes these differences into account.

The majority of the free-format opinions point out that to achieve truly seamless mobility of researchers, further progress needs to be made to foster portability of social security provisions and pension rights between Member States: *"Vesting periods for portability of pensions should be abolished. Supplementary pension rights obtained should follow the researcher from country to country and from employee to employee."* Higher education institutions assess that the issue of portability of pension schemes requires the European Commission and Member States *"to devote considerable political will to resolve this issue."*

Flexicurity principles and the labour market for researchers

Just under half of those responding to the question (48.1%) on flexicurity believe that its principles could enhance the attractiveness of European research careers. There is a similar level of support for the development of common standards in its implementation. However, support for advancing flexicurity via fora bringing together the key stakeholders is slightly lower.

Free-format contributions provide a variety of viewpoints on flexicurity. Some argue that, in view of national divergence (discussed in the Commission Member State Employment Committees' paper, May 2006, regarding Denmark, Holland and Sweden), *"flexicurity should not be forced upon the Member States through binding common principles or prescriptive routes."* An organisation comments that the concept of flexicurity is not sufficiently well defined or its benefits readily identified; on the other hand, a research network suggests that flexicurity could make scientific careers more attractive.

Industry warns that binding/enforceable measures at European level may smother the labour market for knowledge workers in the EU. The best people are interested in research jobs worldwide and are available on the labour market only very briefly (1-2 weeks) until they are hired. Since EU-level measures may introduce additional steps that could slow down processes, Europe risks losing the flexibility and attractiveness that are essential to retain the top candidates.

An association argues that policies of fostering and retaining talents are critical in successful ERA implementation. However, for this to occur, most of the association members stress the importance of flexicurity principles, being at the same time concerned by the impact of its implementation on future careers as well as on the working environment.

Attracting young talents to a research career

Three quarters of the on-line respondents agree that the lack of information on careers in research is a major barrier towards greater up-take, with a relatively much smaller proportion of respondents, however, believing that information on careers is good but that the careers themselves are unattractive and not competitive with other options. As to how information could be improved, just under two thirds of respondents (60%) agree that the role of career advisors could be enhanced; whether parents need more information is less clear with nearly half agreeing this can have positive effects, one third disagreeing, and 18% of the respondents stating they have no opinion.

A number of stakeholder organisations favour more active engagement of scientists with the public and particularly with schools: *"the concept of research should be introduced at an early age."* The JetNet "Youngsters and Technology Network" in the Netherlands is cited as an example of successful engagement with schools, while science festivals are a prime example of engagement with cities.

About a quarter of respondents provide additional comments regarding attraction and retention issues. These include a plea to establish genuine career paths for researchers, along with competitive remuneration and family-friendly workplace policies. Honesty about career opportunities available in particular fields of research is also considered important and a number raise the problems of partners/spouses with dual careers finding satisfactory employment opportunities for both. In relation to support for mobility of families, an organisation recommends greater provision of international schools in Europe. This initiative is seen as one way of substantially reducing the disadvantages often experienced by children of mobile researchers when changing national education systems.

The disenchantment regarding employment opportunities for young researchers is commented on by a number of free-format contributions. An organisation suggests that the Commission should investigate why some countries regard scientists highly and others do not and use the outcomes in the development of appropriate policies. Some free-format contributions suggest that it is not enough to attract young talents, but it is also important for researchers to *"acquire multidisciplinary as well as soft skills that will enable them to cope more easily with change such as cross-border mobility or moving from one research environment to another."*

Several stakeholder organisations comment that the Green Paper is much more focused on the supply side of skilled in Science, technology, engineering and maths (STEM) workers needed for innovation than on the demand side. This is clearly emphasised by an industrial confederation as follows *"Currently ERA policies focus firmly on the "Push" side of the equation – generating research activity and collaboration, facilitating researcher movement, increasing infrastructure. All of these are important and necessary, but the "Pull" side must also be addressed: creating markets, creating intelligent customers (public and private, corporate and individual) and creating demand for innovation. These are the real drivers of research investment and innovation in the economy."*

More women in research, in particular in more senior positions

Working conditions enabling a better work/life balance are considered important for increasing the recruitment and advancement of women in research careers by a large number of respondents (88%). As to the idea of benchmarking recruitment and funding of researchers at institutional level, the results are less clear with nearly half agreeing this can have positive effects, one third disagreeing and 20% of respondents stating they have no opinion. The proportion of those that disagree with this suggestion is higher among the men (38%) than among the women (25%). Comments added by respondents confirm the often 'hidden' or subtle discrimination of women in the scientific world and plea for more effective changes than a 'benchmarking' effort. However, just under half of all respondents (and two thirds of the male respondents) is not supportive of positive discrimination in recruitment regarding women.

A number of the stakeholder responses identify obstacles to the participation of women in research careers and suggest model initiatives which could help the reconciliation of family and professional life. For example, the Project Juno Code of Practice in the UK aimed at advancing the careers of women in physics and the Nusslein-Vollhard programme within the Max-Planck Society. Incentives such as employment packages including childcare facilities are also discussed. Attention is also drawn to the pressure on researchers to demonstrate mobility as a factor in the underrepresentation of women scientists.

The potential of end of career researchers

Just over two thirds of respondents consider that greater use of end of career researchers for mentoring and advisory functions could be facilitated through the provision of new job opportunities/incentives targeted at this group. However, less than half are supportive of legal changes which enable later retirement. Also some respondents are concerned that retaining end of career researchers could impede the creation of positions for younger researchers. A number of stakeholder organisations also provide support for the more effective utilisation of end of career researchers in specific roles such as mentoring. Scientists from outside Europe are also considered to be an obvious source for increasing the talent pool.

Attracting the European scientific diaspora and best world talents

Countries such as China and India have developed a wide range of policies and initiatives aimed at the strategic management of their scientific diaspora for national economic growth and development. Over half of the respondents (58.6%) agree that joint programming and funding approaches along with sharing of information throughout Europe would enhance linkages with expatriate researchers. About half of the respondents are also supportive of initiatives which would better enable non-European researchers based in Europe to keep in touch with other fellow nationals.

Approximately three fifths of respondents agree that mobility and recruitment of researchers irrespective of nationality would be enhanced through the exchange of good practice regarding fellowship programmes aimed at re-attracting researchers. Similar support is provided for fellowship and funding programmes that entail a transnational dimension and are not limited by the nationality of the applicant. There is also support for joint funding in a number of stakeholder responses. However, it is recommended that attention is also given to researchers form poorer economies and that the movement of researchers is not unilateral.

Education and life-long training

Transnational networking of doctoral training programmes is considered by around two fifths of respondents as one way of accelerating the development of high quality, industry relevant researchers. The development of common standards and exchange of good practices regarding these programmes is also considered important.

In relation to life-long training, just over half of respondents agree with the proposal to raise awareness amongst stakeholders on the importance of this issue. Around half agree with the proposal for a European-wide exchange on good practice. And slightly less than half are supportive of establishing common standards regarding life-long training across Europe.

Just under 15% of respondents provide additional comments on life-long training, standardisation of training and acquisition of transferable skills (e.g. project management and communication). Whilst some advocate standardisation of doctoral training and research programmes in Europe, others comment on the importance of maintaining national diversity arguing that the introduction of common standards could stifle innovation rather than raise the quality of education and research. Some also recommend much greater linkage between the number of PhD places and industry demand and others express concern about common standards increasing an already heavy administrative burden for researchers. It is also mentioned that mobility could be detrimental to career prospects on return to the home country.

Many stakeholders who submitted position papers mention that education is not adequately present in the ERA Green Paper although it is seen as a pre-requisite for spreading scientific knowledge and attracting young people to science and therefore could have been the seventh axis of the ERA vision.

According to the UK Higher Education Sector, there is a need for engagement with the ERA agenda at the earliest stages, i.e. at school level. It is also important that effective and reliable information is available through careers services when young people are making their initial career choices. The opportunities to be mobile and experience the advantages that a period spent living and working abroad offer, could also be highlighted at an earlier stage. This argument is supported by a European Industry Council as follows *"The Bologna model should be used for building researcher education with a strong ERA scope. An opportunity could be European wide programmes that aim at supply of world-class researchers in areas prioritised by European research initiatives such as European Technology platforms."* One comment concludes: "*the EU must also grow its own quality researcher base and this must start at the earliest stages. Schools should provide a stimulating environment for learning STEM (science, technology, engineering and maths) subjects and should take every opportunity to bring those with relevant practical experience into teaching and demonstration roles."*

The importance of operating in a global context and increasing collaboration between public and private sector R&D organisations have made the concept of a conventional career path in science obsolete. In this regard, a range of the stakeholder organisations comment explicitly on the importance of Early Career Researchers acquiring transferable/soft skills to enhance their employability. These skills include project and financial management; knowledge and data management, working in a multicultural environment, etc. The new UK/Irish Institute for Knowledge Transfer is suggested as a model for the provision of such training and could be made open to all researchers across Europe.

Annex 2: Data and figures

The professional category "Researcher" is not a defined occupation ascribed a code under the International Standard Classification of Occupations (ISCO)[41] and this is the source of problems in data comparability and harmonisation. Doctoral students (who are students but also researchers and are often employed as such) are classified under the International Standard Classification of Education (ISCED97), which is used to define tertiary education programmes that lead to the award of an advanced research degree (ISCED Level 6). For the definition of this level this typically requires the submission of a thesis of publishable quality, representing the product of original research and a significant contribution to knowledge. In addition this level is also considered to prepare graduates (one assumes through training programmes) for faculty posts in institutions offering largely theoretically based taught programmes (ISCED level 5A). As doctoral students may also at the same time be employed in faculty posts, in differing institutions within differing educational systems, with differing employment conditions and time lengths for completion of doctoral studies, difficulties again arise in terms of data harmonisation and comparability.

An increasing amount of quantitative and qualitative data become now available (EC 2007a-e, 2008). Some of these data are derived from Eurostat's education database but caution has to be exercised because the European education systems differ between countries, and for some countries duplications of degrees might exist. Eurostat and the OECD are also developing improved harmonised data collections in several areas. Eurostat/OECD and UNESCO are involved in harmonising national surveys on the Careers of Doctorate Holders (CDH): currently 17 countries have such surveys but with various objectives, populations and frequencies which currently hamper comparability.

In order to fill the information gaps on "researchers", studies and reports often use proxy indicators such as Human Resources in Science and Technology (HRST)[42] as defined by the Canberra Manual on the measurement of human resources devoted to scientific and technological activities (OECD 1995), sub-classifications of which include *Science & Engineering* (S&E) workers and *doctorate holders*. The table below shows the size for each population according to the proxy used in comparison to *Research and Development personnel* and *Researchers*.

Table III. Why proxy indicators shouldn't be used when describing the population of researchers. Comparison of various proxy indicators for researchers in EU25, 2005

	Active population	**HRST**	**HRST core**	**Scientists & engineers**	**R&D personnel**	**Researchers**
In Persons (Million)	213.8	86.30	31.8	9.4	2.9	1.8 (1.3 FTE)

Source: Eurostat

41 See http://www.ilo.org/public/english/bureau/stat/isco/docs/draft08.pdf

42 HRST is defined according to the *Canberra Manual* as a person fulfilling one of the following conditions: Successfully completed education at the third level in a S&T field of study; not formally qualified as above, but employed in an S&T occupation where the above qualifications are normally required

As population sizes are very different, **none of the proxy indicators can inform adequately on *research and development personnel* or *researchers***, except if one hypothesizes that the proxy populations have the same mobility patterns and social characteristics as the population of *researchers*. Similarly, **some *researchers* are *doctorate holders* but others are not**. A recent study based on data from the European Patent Office found that only a minority of patent holders are *doctorate holders*[43].

Table IV. Number of job posted on the Researchers Mobility Portal

	On-line	XML	Total
2005	799	589	1,388
2006	1,749	3,074	4,823
2007	2,176	2,626	4,802

Source: Researchers Mobility Portal http://ec.europa.eu/eracareers/ (last update, January 2008; online refers to job posted directly, XML refers to exchange of information with other portals). As an element of comparison, 101,000 doctoral degrees were granted in 2005 (EC 2007d).

Table V. Indicative Best practices

In the UK, a number of the Research Councils including the Arts and Humanities Research Council (AHRC), the Biotechnology and Biological Sciences Research Council (BBSRC) and the Engineering and Physical Sciences Research Council (EPSRC) and the two main Research Council, in Ireland have career development as an integral part of the peer review process.

In some countries, concrete actions have been undertaken to enhance contractual conditions for post-docs, such as for instance the "RCUK academic fellowship", a post-doc scheme, which provides funding for 5 years and offers tenure positions after the fellowship providing a successful evaluation. At EU level, the ERC 5-year "Starting Independent Investigators" grants represents a successful initiative of a similar nature, which should be replicated at a wider scale.

Junior professorship in Germany is a new career path for young scientists. The French National Institute for Health and Medical Research (INSERM) has launched a tenure track model for biomedical research, in collaboration with hospital and universities. The position offers tenure with, depending on professional experience, a fixed yearly salary and a five-year renewable contract with complementary salary paid by the hospital or university. The INSERM "Interface Programme" is designed for researchers with tenure positions who are offered mobility opportunities for 3 to 5 years in hospitals, universities or industries; the partner hosts the INSERM researcher and will pay 1/3 of his/her salary while INSERM maintain the researcher on its payroll for 2/3.

Norwegian universities have 20% Professor II positions on "time-bank" terms for employees holding senior positions in industry, research institutions, hospitals etc. or at another

[43] See http://ideas.repec.org/p/ssa/lemwps/2005-20.html

university (e.g. abroad) as add-on to their main position – financed by either party. Vice versa, a 100% university professor may also hold a part-time position in e.g. a hospital or at another research institution. Norway's Centres of Excellence offer corresponding flexible part-time positions for foreign researchers who want to keep their home.

In the UK, the Athena SWAN Charter is a scheme which recognises excellence in Science, Engineering and Technology (SET) employment for women in higher education and research. The Charter was launched in June 2005 and any university or research institution which is committed to the advancement and promotion of the careers of women in SET in higher education and research can apply for membership. Over twenty five per cent of all eligible universities are now members. Since the project's establishment in 1999 Athena's work with its partner HEIs has improved the understanding of the SET and employment cultures of HE and has produced a wealth of evidence based good practice.

In Switzerland, two programmes, namely "Re-start" and "Dual-career", offer starting grants to facilitate the recruitment of researchers returning to science (left for any reason, not only child care). The support is for 2-4 years, but there is a certain degree of pressure on the institutions to promote the permanent hiring of the successful cases.

ErhversPhD in Denmark, Casimir in the Netherlands, CIFRE in France, CASE in the UK, Sweden, and others are examples of schemes for doctoral candidates. In Spain, the Torres Quevedo Programme offers labour contracts of up to three years to researchers holding a doctoral degree or having more than one year postgraduate R&D experience, who will develop their research activity in enterprises and technological centres.

The University of Manchester & UMIST (University of Manchester Institute of Science and Technology) Careers Service, are working with large companies and SMEs to develop placement but also to support local business by involving SMEs in curriculum development, by partnering with 13 other Careers Service in the region to offer a pool of 50,000 students placement and graduate jobs, and to help SMEs access resources at universities. PRO INNO II in Germany supports the placement of doctorate candidates in SMEs. France will implement in 2008 the "doctorant-conseil" initiative which will provide the opportunity for all doctorate candidates to have internships in companies in exchange for consultancy services.

Novo Nordisk currently co-finances 60 PhDs. Plans include more funds in the frame of the Innovative Medicine Initiative (IMI), one of the Joint Technology Initiatives.

Some Member States are developing national skills agenda for researchers, in particular for doctoral candidates and post-docs. Following the review by Sir Gareth Robert, the UK government is allocating funds to academia for employability skill training. Key employment skills are mandatory in the UK for professional development for doctoral candidates and post-docs under contracts with the Research Councils. The training is equivalent to 2 weeks training given by professionals. The UK GRAD Programme provides support, advice and resources to postgraduate research students, their supervisors and their universities.

In the UK, the Leadership Foundation offer development on leadership, governance and management to current and future leaders within higher education institutions (http://www.lfhe.ac.uk/). In the US, the Association of University Technology Managers (AUTM) offers courses to both academia and industry.

The national research funding agencies regrouped in the EUROHORCs[44] have piloted the so-called "money follows researcher" scheme for trans-national transfer of individual grants.

[44] EUROHORCs is a European association of the heads of RFO and RPO http://eurohorcs.drift.senselogic.se/initiativesandactivities/moneyfollowsresearcher

Annex 3: Highlights from the report of the independent Expert Group on "Realising a single labour market for researchers"

(*citations* from the Executive Summary)[45]

"It has become increasingly evident that a more concerted strategy is necessary to address the human resources needs of the European Research Area (ERA). Such a strategy should establish realistic goals and develop clear methods for their implementation. The present (Expert Group - ed) Report addresses the Policy Options that the Expert Group 'Realising a single labour market for researchers' (EG Researchers) has identified in order to ensure more attractive careers for researchers and to progressively eliminate the obstacles hampering their mobility.

"We have chosen an architectural image in order to highlight the complementary nature of the components of the tetrahedral structure that we have conceived. For each of the proposed **four cornerstones** we identify the obstacles and hindrances that, in our view, continue to hamper the development of ERA, and provide some 'case studies' in order to illustrate concerns.

"We then provide Policy Options, some of which have already been successfully tested and could therefore be generalised almost immediately, others could be implemented progressively.

"The recommendations in this report are addressed to all bodies in receipt of public funds for research. This is meant to include the funding agencies who disburse funds and those who receive them, in the public and private sector (universities, research centres and companies). All must take individual and collective responsibility for the implementation of the recommendations; in our opinion they will determine whether Europe does indeed become a single labour market for researchers."

"Obstacles and hindrances that continue to hamper the development of the ERA:

"First cornerstone – attraction, ethical recruitment and retention of researchers

"There are often substantial obstacles that threaten our capacity to maintain and boost the regional pool of skilled researchers needed to fuel the EU research and innovation system. Namely:

– a lack of transparent recruitment and career progression mechanisms;

– the complexity of employment application procedures;

– an imbalance between demands of the workplace and personal life;

– a lack of attractiveness for young talents;

– the remaining 'insufficiently equal' opportunities, particularly for women."

[45] The views expressed in the published Expert Group report are the sole responsibility of the author and do not necessarily reflect the views of the European Commission

"Second cornerstone – mobility in all its facets (geographical, sector, disciplinary and 'demographic')

"Other issues continue to hinder the mobility of researchers within Europe as well as between Europe and Third countries. These include:

– a lack of resources to support the direct and indirect costs of mobility;

– an insufficient weight given to mobility as a valuable component of the researcher CV;

– the persisting reluctance to move between the public and the private sector;

– the lack of a strategic approach to the accumulated experience of senior and/or retired researchers."

"Third cornerstone – researcher-friendly social security and supplementary pension systems

"Significant challenges remain in promoting an equitable and cohesive social system for researchers within the EU. These include:

– lack of awareness of social security and supplementary pensions rules and rights;

– the need to improve cooperation between national administrations, research authorities and institutions both in social security and supplementary pension areas;

– relatively little tailoring of social security rules of Regulation 1408/71 (883/2004) to individual researcher profiles (whether EU citizens or Third-country nationals);

– need to exploit potentialities of current instruments to set up (a) pan-European Pension Fund(s) for researchers;

– the need to encourage the use of tax incentives to facilitate the participation in supplementary pension schemes."

"Fourth cornerstone – ***The European Charter for researchers and Code of Conduct for their recruitment*** **as a dynamic process**

" (…..) The *'Charter & Code'* were undersigned by a considerable number of (public) research institutions. Yet, there is scant awareness of this document among researchers and its implementation by institutions."

"POLICY OPTIONS

"First cornerstone – attraction, ethical recruitment and retention of researchers

"Any organisation in receipt of public funds for research is required:

- to advertise externally any research position vacancy supported by those funds, especially on the European Researcher's Mobility Portal; to take concrete actions aimed at simplifying application procedures, thus encouraging participation by external applicants;

- to treat researchers, from the early career stages, as professionals, also in terms of remuneration and social security, irrespective of the type of contract;

- to clarify in a transparent manner the long term career prospects of each position;

- to promote the achievement of scientific independence by the youngest stratum, through, for example, reserved funds such as the ERC Starting Investigation Grants;

- to ensure that transferable skills are included in the evaluation procedures for researcher recruitment and career progression, to promote and assist the transition from team members to team leaders;

- to take positive and urgent actions for promoting fair gender representation among all (selection) committees, boards and governing bodies;

- to adopt a dual career policy, inspired by successful existing models;

- to allow researchers who are eligible for pregnancy (or parental) leave while working in a fixed-term contract to receive an extension of their contracts, and the associated funds, for the duration of their pregnancy and/or parental leave.

- to develop, when it is entitled to award doctoral degrees, structured doctoral programmes, moving away from the traditional, highly individualised apprentice model, oriented only to academic profession to a new model, oriented to a wider employment market, to give PhD graduates multiple career options in the Knowledge Society;

- to limit, whenever possible, the number of 'research products' (e.g. publications) to be attached to an application for a researcher position, in order to favour an assessment based on 'performance relative to opportunity', rather than on absolute performance."

"Second cornerstone – mobility in all its facets (geographical, sector, disciplinary, virtual and 'demographic')

"Any organisation in receipt of public funds for research is required:

- to consider and value mobility in all its facets as an integral part of the researcher curriculum;

- to allocate incentives to compensate direct and indirect costs of mobility (e.g. in the case of intersectoral mobility, grant incentives for the public institutions, and career incentives for the researcher, and make best use of direct and indirect fiscal incentives for companies);

- to avoid that talents attraction is practiced to the detriment of less developed regions, promoting Institutional partnerships, within which mobility of researchers is anchored to overall development projects for the partner institutions;

- to promote and support virtual mobility activities and infrastructures (e-conferences, e-seminars, electronic newsletters, thematic portals, e-fora and chats, video-conference infrastructure; virtual labs etc.), as effective and efficient complements to physical mobility."

"Any organisation in receipt of public funds for research is encouraged to investigate how best to systematically involve retired senior researchers in value added activities such as non-salaried mentoring of early career researchers and the promotion of the excitement of science and research careers to school children and to the public generally;

"At European level, the EC is urged to establish an 'international placement agency' for retired senior researchers who are willing to act as mentors, experts, conference organisers and peer reviewers. The agency would direct this highly valuable support at less well endowed research groups in Europe and in developing countries."

"Third cornerstone – research-friendly social security and supplementary pension systems

"The addresses are invited to take actions according to their responsibilities.

"**Information, training and cooperation between social security players**

"Addressed to: European Commission (EC), Member States (MS), Training and Reporting on Social Security (TRESS), ERA-MORE – Feasible in: mid-term

- to systematically organise EU and national training sessions on EU coordination Regulations for research institutions' staff and ERA-MORE Mobility Centres;

- to draft new, and spread awareness of existing EU and national social security info packages (websites, guides, etc.) for mobile researchers;

- to establish close cooperation between the EC, Ministries in charge of Research, the Administrative Commission on Social Security for Migrant Workers, TRESS network and ERA-MORE Mobility Centres to ensure information flows, exchange of good practice, best use of existing rules and assess feasibility and appropriateness of new rules to remove further obstacles to mobility of researchers."

"**Posting & 'Article 17 agreements' – (specific to researchers)**

"Addressed to: European Commission, TRESS and Member States – Feasible in: mid term

"To promote, by gathering data on future application of both 'Article 17 of Regulation 1408/71 agreements' and EU rules on 'posting' of researchers, to promote their wider application to the benefit of researchers by also making an extensive use of Recommendation 16/84 of the Administrative Commission on Social security for Migrant Workers to researchers".

"Access to unemployment benefits and specific rule(s) on conflict of law – (not specific to researchers)

"Addressed to: EC, MS – Feasible in: mid-term

"Within the context of EU 'Action Plan for Mobility 2007-2010' to:

- explore the feasibility of amending unemployment benefits exportation rules for migrant researchers/workers (Article 68 of Regulation 1408/71 (Art. 64 of Reg. 883/2004);

- explore the relevance and the impact of a specific rule of conflict of law applicable to 'new forms of mobility', in view of inserting them, if appropriate, in the EU legislation."

"Third-country researchers: agreements, information, Directive 2005/71 – (specific to researchers)

"Addressed to: MS, EC – Feasible in: mid-term

- to encourage (e.g. through a Commission or Council Recommendation) the signature of (or the amendment of existing) bilateral and/or multilateral social security agreements between

EU Member States and non-EU countries including appropriate rules for mobile researchers;

- to set up more efficient information systems on social security agreements by for instance making full use of the European and National Researchers' Mobility Portals.

- when monitoring the implementation of Directive 2005/71 on the admission of third-country researchers to the EU, to pay specific attention to a correct application of Article 12 of that Directive concerning equal treatment with national as regards social security rights."

"**Pension subsidies attached to fellowships – (specific to researchers)**

"Addressed to: MS, EC – Feasible in: short-term

"Target group and pension pillars: research fellowship holders, supplementary and private pensions

"To introduce subsidies for research fellows who are not covered by any domestic pension system, by also facilitating their building up of pension rights with a financial institution (third pillar)."

"**Setting up of a Pension Support Centre in the Member States**

"Addressed to: EC, MS – Feasible in: mid term

"Target group and pension pillars: researchers (pilot group), statutory and supplementary pensions

"After assessing its legal and concrete feasibility, to set up a Pension Support Centre by also making use of existing information tools/services."

"**Promoting the setting-up of National Pension Registers in the Member States**

"Addressed to: MS, EC – Feasible in: mid term

"Target group and pension pillars: researchers (pilot group), statutory and supplementary pensions

"To promote by the EC the setting-up of national information systems (pension registers) on accrued pension rights in each MS and promote their interlinking."

"**A Pan-European Pension Fund (IORP) for Researchers**

"Addressed to: IORP pension schemes – Feasible in: mid term

"Target group and pension pillars: researchers, supplementary pensions

"For the EC to launch a feasibility study and furthermore stimulate the development of supplementary pension pan-EU schemes for researchers based on the 'IORP' Directive."

"Promoting the introduction of tax incentives for participating in second and third pillar systems

"Addressed to: MS, EC – Feasible in: mid term

"Target group and pension pillars: all workers, supplementary pensions

"To promote by the EC national tax relief systems for contributions paid to supplementary (including 'IORP') schemes and to financial institutions managing private pension schemes."

"Fourth cornerstone – The European Charter for researchers and a Code of Conduct for their recruitment as a dynamic process

"Any organisation in receipt of public funds for research which signed the C&C is required:

- to promote knowledge and awareness of C&C; the EC should provide human, structural and financial means for the management and organisation of a European information campaign including the establishment of an ERA and C&C promoters' network;

- to define and advertise a Human Resources Mission Statement, in line with the C&C spirit, focusing on the recruitment, career development and retirement procedures of their respective researchers; the European Commission should play a proactive role in the dissemination and promotion of the institutional HR mission statements."

"The European Commission is urged to design and promote a 'ERA – Researchers' Human Resources Label' indicating research institutions, which

- participate actively in the network of ERA and C&C promoters;

- advertise and monitor the implementation of their specific Researchers' Human Resources Mission Statement;

- accept some form of external monitoring."