Towards a Framework for Researcher Careers

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Forfás

Advisory Council for Science Technology and Innovation
An Comhairle Eolaíochta

Foreword

This is a very welcome report from the Advisory Science Council (ASC). The ASC continues to play a crucial role in ensuring that Ireland develops into a strong, vibrant knowledge economy. The advice, information and access to stakeholder opinion that the council provides is a critical input to the shaping and refinement of our policies and policy instruments for delivery of the goals of the Strategy for Science, Technology and Innovation (SSTI).

Given the Strategy's recognition of the vital contribution that highly educated, professional and effective researchers can make to the development of the knowledge economy, it is important that conditions are put in place to facilitate our Higher Education Institutions, Public Sector Research Institutes and private enterprise to recruit and retain such researchers, and that persons embarking on 4th level studies have a clear sense of career path options, whether they be in academia, enterprise or administration.

This ASC report provides a very valuable analysis and diagnosis of the challenges that now have to be addressed. Developing attractive career paths in research is vital to our wider interest in ensuring that our brightest and best are encouraged to pursue research opportunities and in ensuring that we build on Ireland's international reputation as a destination of choice for the best available research talent in what is a highly competitive global market. The report also makes recommendations regarding the crucial issue of researcher mobility, and addresses the importance of facilitating movement between the various sectors of the Irish research community and between academia and enterprise. Enhanced international researcher mobility is important in increasing the value and relevance of our research activity, as barriers to mobility hinder Irish researchers who wish to gain valuable experience abroad, and can prevent Ireland from fully realising its potential as an attractive location for international researchers.

Many of the challenges that we face as we move to develop a knowledge economy need to be addressed not just at national level, but at European level also. We have engaged with our EU partners to address these issues, and a key dimension of the European Commission's 2007 Green Paper on the European Research Area concerns the need to ensure that Europe maintains its position as a prime location for the performance of research in an increasingly competitive world.

We would like to thank the ASC for the critically important work that they have carried out in producing this report. We would also like to thank the Higher Education Institutions, research funders, researchers and those in industry and the public sector who have assisted the ASC in its preparation. The recommendations contained herein set out a clear path which can be developed further within the operational structures of the Strategy for Science, Technology and Innovation. In particular, the report will greatly assist the work of the Researcher Careers Working Group, comprising relevant Government departments and agencies, which was established under the SSTI to specifically focus on career paths for researchers in the higher education sector.

The principles set out in this report can, when implemented, greatly enhance Ireland's position as an attractive research location for both Irish and International researchers. We hope that the opportunities that now present themselves can be exploited to the benefit of all stakeholders and to the overall benefit of the Irish economy.

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Executive Summary

The Strategy for Science Technology and Innovation (SSTI) has set out a vision:

"To make Ireland by 2013 internationally renowned for the excellence of its research and to the forefront in generating and using new knowledge for economic and social progress within an innovation driven culture".

World-class researchers will drive our research and innovation system and to do this we need to ensure that they develop their careers in enterprise and the public sector as well as in the higher education system. Without this mobility between the three sectors, the economic and social impact of investments in research cannot be maximised. Given the increasingly important role that researchers fulfil in a knowledge society, it is timely that we consider how we can better support and structure researcher careers and address any barriers to full mobility while still ensuring research excellence.

The commitment in the SSTI to effectively double the number of PhD graduates between 2006 and 2013 is very welcome. The significant inflow of funding from SFI, PRTLI and other funding agencies ensures that Ireland has expanded its research expertise, critical mass and infrastructure to generate world-class researchers. It has also created more opportunities for postdoctoral researchers in the higher education sector and an unprecedented retention rate within these institutions. While the increase in research capacity is a welcome development, it presents a new set of challenges for higher education institutions (HEIs), the funding agencies and enterprise to ensure that the overall goals of the SSTI are achieved. These challenges include: continuing to assure world-class research excellence through an appropriate academic career structure within the HEIs; ensuring that there is mobility at all levels between HEIs, enterprise and the public sector; ensuring that international research networks are built and strengthened through international mobility and finally that the contribution of all researchers and all research fields, including humanities and social sciences, are optimised.

A critical element of the Government's Strategy on Science Technology and Innovation is to build the R&D capacity of enterprise and the public sector in Ireland. By creating attractive career opportunities for researchers in enterprise and the public sector, the research capacity of both will be greatly enhanced and the research links between all three sectors will be strengthened. It is therefore anticipated that a higher proportion of PhDs will pursue careers outside the HEIs and this is essential to create the economic and social progress envisioned under the Strategy. PhD students and researchers at all levels must be encouraged to prepare for career paths outside academia and the appropriate skills and experience should be embedded in their education and training. The Council has therefore recommended that a national programme be established that provides information and advice on career planning. Structured graduate education programmes will provide an opportunity to embed practical business skills, such as project management, in PhD programmes and should also facilitate placements where appropriate. Employers in the three sectors should collectively develop a researcher careers competency framework that enables a mutual recognition of experience and skills and therefore will facilitate mobility.

International and national mobility within and between all sectors is strategically important both for the Irish research system and also for the individual careers of researchers. The increase in the availability of funding in Ireland has enabled Irish HEIs to attract international researchers and encouraged Irish researchers, who left Ireland early in their careers, to return to Ireland to lead research teams. This strengthens the Irish research system. However there are indications that the increase in funding may also have discouraged the mobility of Irish researchers, limiting their enterprise and international experience. Efforts must be made to ensure that postdoctoral researchers are encouraged and supported to pursue opportunities abroad to build international research networks and develop world-class knowledge and skills, thereby enabling them to progress to senior levels of the researcher career path of any sector. The Council therefore recommends that funding should be made available to promote inward and outward mobility of researchers.

In order to continue to assure world-class excellence there should be a structured career path within the Higher Education Institutes for researchers with rigorous international competition at all levels. There has been a significant increase in the number of postdoctoral contract researchers in the HEIs and most are employed on fixed-term contracts funded by external agencies which have created a triangular relationship between the researcher, the HEI, who is the legal employer, and the funding agency. The introduction of the Protection of Employees (Fixed Term Work) Act 2003[1] (FTWA) has therefore raised a number of issues including funding and sustainability within the HEIs. Fixed Term employees who fulfil the eligibility conditions of the FTWA have in general gained a statutory entitlement to no less favourable benefits, including pension benefits, than a comparable permanent employee. The Council acknowledges the considerable work that continues to be undertaken by the HEIs and funding agencies to resolve the issues that have arisen and which are causing uncertainty among both employers and employees. The implementation of the Act 2003 has also created expectations among contract researchers that after a number of contracts of limited duration they will automatically be employed permanently irrespective of whether funding is available for their positions and without a competitive selection process. By implementing a clear career structure with consistent terms and conditions that is funded through a sustainable economic costing model much of the uncertainty around researcher careers can be removed. The Council has recommended a career path with distinct stages with a rigorous internationally competitive selection process at each stage. Competitive research fellowships and senior research fellowships would provide independent funding for researchers who would have already completed the first phase of their career gaining practical experience under the supervision of a Principal Investigator.

By facilitating international exchange and promoting inquiring and innovative skills, research helps to bring about a society which is both an effective base for wealth creation and which ensures a high quality of life for all its citizens. The contribution of all researchers and all fields of research should be optimised to ensure continued economic and social well-being. Women are significantly under-represented by international standards at senior levels in the Irish research system. Efforts to create parity within the academic system are vital if the skills of female researchers are not to be lost. The Council therefore

1 http://www.irishstatutebook.ie/2003/en/act/pub/0029/index.html

recommends that a programme be established to ensure that Ireland reaches the EU average of female participation rates at senior academic levels. It is crucial for economic and social prosperity that research in the fields of humanities and social sciences be promoted and encouraged and the ASC therefore recommends that funding for these fields of research should be increased. The increase in the number of researchers across all sectors will require a large pool of talent to draw from and therefore it is important that students at an early stage are aware of the opportunities that a career in research can hold and the contribution that they can make across all economic and social spheres.

1. Introduction

In building a knowledge society and increasing the proportion of GDP spent on R&D, Ireland has substantially increased the size of its research community. Under the Strategy for Science Technology and Innovation (2007-2013) (SSTI)[2] there is a commitment to further double the numbers of PhD graduates while maintaining excellence and the highest standards in research, education and training.

The knowledge and expertise gained through investment in people and innovation will position Ireland at the forefront of technology, improve the health and quality of life of its citizens, increase international competitiveness and foster a strong economy.

While the Higher Education Institutions (HEIs) are responsible for educating and training researchers, it is recognised that the majority of these researchers will pursue careers in enterprise and the public service and that a much smaller proportion of PhD graduates will find research careers in academia in future due to the increase in PhD numbers.

The Advisory Science Council (ASC) appointed a Task Force on Researcher Careers to develop a vision and a strategy to drive a step change in the career structure and mobility of researchers in both the fields of science, engineering and technology and also in humanities and social sciences. This strategy will address careers in all sectors: the higher education, enterprise and public sector.

Technopolis Ltd. was commissioned to carry out a study on its behalf and under its guidance, involving large-scale questionnaire-based and interview-based consultations with the Irish research community, enterprise leaders and funding stakeholders along with desk research and good practice studies of initiatives in the UK, Sweden, Finland and the Republic of Korea. The results of this study formed the basis for the Task Force's deliberations and both are available on www.sciencecouncil.ie.

The ASC has also recently established a Task Force on optimising the contribution of 4th Level Ireland to Enterprise and this group will specifically look at researcher careers in enterprise and the public sector and measures to facilitate mobility between the three sectors.

While preparing this high level policy report the ASC acknowledges the ongoing work of the Higher Education Research Group (HERG), which has responsibility for the implementation of the SSTI as it relates to the higher education sector. The HERG has appointed a Working Group on Research Careers and regular consultation was held with this group during the course of this ASC study.

2 Strategy for Science, Technology and Innovation 2006-2013: http://www.entemp.ie/publications/science/2006/sciencestrategy.pdf

2. A New Framework for Researcher Careers

Continuing to assure world-class research excellence will require an appropriate academic career structure that will enable the professionalisation of researcher careers. The Council recognises that researchers pursue careers in many sectors. However, a defined researcher career structure within Higher Education Institutions will better prepare researchers for roles in enterprise and the public sector. The implementation of the Fixed Term Work Act 2003 has improved conditions for those on fixed-term contracts and the HEIs have been addressing some of the issues that have arisen from this. The FTWA has created expectations among contract researchers that after a number of contracts of limited duration they will automatically be employed permanently irrespective of whether funding is available for their positions and without a competitive selection process. While the HEI is the legal employer, funding for such researchers is usually dependent upon a third party, such as a funding agency, which effectively establishes a triangular relationship. Without third party funding, the HEIs lack the capability to pay researchers. This creates an unsustainable model for HEIs as they will either have to fund the researcher salaries and associated costs from their block grant allocation or where the funding is not available, the HEIs will have to make researchers redundant, which may deter people from pursuing a career in research. HEIs and funding agencies need to develop an agreed full economic costing model that would address these challenges and also ensure that, like all other professions, there is consistent terms and conditions of employment for example pensions, irrespective of the funding source. Within this context, therefore, the challenge is to create a researcher career path that assures excellence and that is sustainable into the future.

The Council recognises that the researcher path is part of the overall academic career track, but within that path there should be levels that reflect experience and responsibilities. Research and lecturing are part of the same academic continuum. While researchers are primarily concerned with research they also contribute and should continue to contribute to the other functions of the HEIs: mentoring, teaching and training in the same way that lecturers carry out research.

As part of the professionalisation of researchers there should be recognition that the researcher career path has levels with different roles, responsibilities and remuneration that are based on experience and skills. All researchers within HEIs, at similar levels, should have the same terms and conditions including pension provision irrespective of the source of funding and furthermore efforts should be made to ensure that remuneration within the third level sector is compatible with that of researchers in enterprise and the public sector to facilitate the required mobility. Progress through the levels would be based on a competitive, transparent, peer-reviewed process that is based on research excellence and merit. This process should reward and facilitate both national and international mobility within and between all the sectors and two way mobility between HEIs, enterprise, the public sector and research institutes. This path will create and formalise a path for researchers in the HEIs up to Senior Research Fellows. Further progression would be through the existing academic tenured track.

PhD graduates are not at a stage to apply for or manage independent research programmes or to act as mentors. Therefore, the first level of the researcher career would begin with an initial postdoctoral research phase which could be considered as an internship phase where the researcher can acquire supervised, practical experience. This is a level where the researcher will further develop their skills and augment their domain specificity. At this stage, the funding is usually provided by a Principal Investigator. This level would last up to approximately four years and may be undertaken in more than one HEI or in enterprise or the public sector. Postdoctoral researchers should be evaluated through a systematic and continuous professional development and appraisal system, led by Human Resources with input from the Principal Investigators and Deans of Research where appropriate. A particular emphasis during this stage should be placed on acquiring international experience in institutions abroad and/or acquiring enterprise- or public sector-related transferable skills.

The next level on the researcher career path is that of Research Fellow following a transparent and competitive selection, when a researcher would be eligible to apply for their own independent, external funding whilst still being associated with a Principal Investigator who would act as their mentor and facilitate access to the research infrastructure. A new Research Fellow Programme should therefore be established and funded by the appropriate restructuring of the flow of funding from the existing agency allocations. These Research Fellow awards should be based on external peer review requiring research excellence and should provide funding for the researcher's salary, technical support and limited consumables. The Research Fellowship contracts should be aligned to the term of the Research Fellow awards.

Research Fellows should be then eligible to apply for a very limited number of highly prestigious Senior Research Fellow positions but progression to this phase would be subject to an international, peer-reviewed competition. Senior Research Fellows should receive contracts of indefinite duration from the HEI that would, however, be subject to funding being available. They should be eligible to apply for larger funds for research teams and capital equipment.

Recommendations

- Clearly defined levels within the researcher career path should be established with continuous professional development and to maintain excellence there should be transparent and rigorous competition at all levels;
  - The first phase of the researcher career path should be regarded as an internship where the PhD graduates would gain practical experience while supervised by the Principal Investigator (PI) who has secured funding for the position.
  - The second phase should be that of a Research Fellow, who has completed the first phase of the research path, has personally secured funding and, in association with a Principal Investigator as mentor, will have access to research facilities. This will involve an open, peer-reviewed selection process based on research excellence and merit. This will require establishment of a new internationally competitive programme for support of these researchers. The new programme could be funded by restructuring the current funding mechanisms within the agencies.
  - A limited number of highly prestigious and rigorously competitive Senior Research Fellowships should be available. Senior Research Fellows should be allowed to apply independently for funding on the same basis as Principal Investigators.
  - To maintain high quality and research excellence, there should be a clearly defined, transparent and rigorous selection process at each transition phase of the career path with ongoing structured performance and personal development reviews throughout the career.
- The terms and conditions under which researchers are employed should be consistent irrespective of the sources of funding for their positions.

3. Professional Career Development

In preparation for all career opportunities, masters and doctoral students, in addition to their academic knowledge and training, need more explicit instruction in planning their careers and acquiring transferable skills. The ASC is keen to promote all career options for postdoctoral researchers to avoid the situation that arose in Japan when a government programme launched in 1995 to triple the number of postdocs led to an imbalance between the supply and demand for PhD-qualified researchers[3]. The recent developments of 3rd and 4th level in Ireland are most welcome and will better align undergraduate and PhD skills with enterprise and public sector needs of humanities and social sciences and SET researchers. Some options to gain generic research and transferable skills are also being developed for new PhD students coming through the system as part of the '4th Level Ireland' agenda. However, this needs to be addressed uniformly across all domains to avoid fragmentation, generate economies of scale and to assure cross-sectoral quality. There is a need also to ensure coherence and coordination of enterprise and public sector placements and the common taught course elements relating to enterprise and commercialisation, for example project management, intellectual property management and continuous improvement methodologies.

Masters and Doctoral students need to be encouraged and facilitated to actively plan their careers. This current lack of awareness and knowledge about researcher careers should be tackled in part through improved careers information at all levels, including HEI careers' services. Supporting such planning requires a combination of actions, inside and outside the HEIs, including a national programme that provides training and knowledge events that are targeted at researchers at all phases of their careers. Finally, students need to be directed towards gaining international and enterprise/public sector experience during their graduate studies, to prepare them for their future careers in these areas.

As part of a continuous professional development process, researchers at all levels of their careers should also be encouraged to manage their own careers with the support of career advice such as provided by the UK Grad programme[4]. Within the initial postdoctoral researcher phase, there should be an emphasis on ensuring that the expectations of postdoctoral researchers are realistic and that information and support is provided in order to ensure that they are aware of the opportunities to progress within the HEI, enterprise and public sector research systems. Having a HR-led systematic and continuous career development process extended to all contract researchers within HEIs could be supported by Principal Investigators and Deans of Research, where appropriate, contributing to a managed and peer-reviewed system of appraisal and development.

3 Ledford, Heidi: "Scientists to Spare", Nature, Vol 449, 25 October 2007

4 http://www.grad.ac.uk/cms/ShowPage/Home_page

Recommendations

- A national programme should be established providing career information, including information on the personal and professional researcher skills required by each sector – HEIs, the public sector and enterprise.
- As the first stage of professional career development of researchers, Graduate Schools should be developed consistently and coherently to ensure PhD students learn practical business skills such as project management, people and financial management, marketing and skills required for the commercialisation of research. PhD programmes in appropriate disciplines should facilitate collaboration with enterprise including formal placements.

4. International Mobility

Mobility, both nationally and internationally within and between all sectors, is essential for research excellence and should be fully supported and facilitated at all levels of the researcher career. As Ireland has increasingly become a more attractive place to do research, the drive for people to leave the country in order to gain valuable research training and experience and build international research networks has been reduced. Faced with the same situation in the early 2000s, as a result of the expansion of the Norwegian research system, the Research Council of Norway[5] set about encouraging PhDs to do at least one year of training abroad and '……an international perspective is to be included as an integral component of all of the Council's funding instruments…….'. Several programmes promote the international mobility of researchers. Many of them are European initiatives, such as the European Network of Mobility Centres[6], or originate in EU Directives. Ireland has its own national mobility centre and portal operated by the IUA[7]. There now needs to be further measures put in place to ensure the international mobility of Irish researchers. The Marie Curie programme has proved very successful in facilitating mobility and the ASC believes that this model should be emulated to encourage mobility, both nationally and internationally, between academia, enterprise and / or the public sector and encourage them to return.

Ireland has succeeded in attracting a significant number of international researchers, in part owing to its recent increase in research funding including its research infrastructure investments. Opportunities in Ireland should make it attractive for many of those who initially come for a short period to stay longer term. Following the full implementation of the EU scientific visa in 2007(2005/71/EC), few obstacles will remain to further recruitment from abroad. The key gap appears to be in measures that permit or encourage short-stay research workers and PhD students to remain in Ireland at the end of their contract or research training period. Another challenge is to provide attractive career paths for senior researchers who come to Ireland.

The European Union has increasingly promoted researcher mobility since the launch of the European Research Area (ERA) in 2000. The ERA inter alia promotes the idea of a common European research labour market. In 2005, the European Commission introduced the European Charter for Researchers[8], which amounts to a non-binding set of good practice guidelines and addresses the roles, responsibilities and entitlements of researchers and their employers or funding organisations. It aims at ensuring that the relationship between these parties contributes to successful performance in the generation, transfer and sharing of knowledge, and to the career development of researchers. The Irish universities have signed the charter and the Irish Universities' Association (IUA) has become an important actor in supporting mobility

5 www.forskningsradet.no/english

6 http://ec.europa.eu/eracareers/index_en.cfm

7 http://www.researchcareersireland.com/Page.aspx?SP=46

8 http://ec.europa.eu/eracareers/index_en.cfm?l1=29&CFID=9051711&CFTOKEN=8f3f305357a892d5-75AA61A4-A6D9-628D-56AF7DD45D129FC2

and research careers by acting as the Irish node in the European mobility network, proposing research career pay scales and providing conference activities. The Commission also published a Communication which analyses the defining characteristics of the profession, identifies structural weaknesses and draws attention to elements of good practice and recommends a number of practical initiatives to foster dialogue among all the stakeholders[9].

Recommendation

- Funding agencies should facilitate international mobility, both inward and outward, among all researchers by providing continuity of funding to those seeking international experience and those that seek to return to Ireland.

9 European Commission Communication: "Researchers in the European Research Area: One Profession, Multiple Careers" July 2003, COM(2003) 436 Final http://cordis.europa.eu/documents/documentlibrary/2063EN.pdf

5. Absorptive Capacity and Mobility of Researchers

There is currently little reported movement between academia and enterprise at any stage of a research career. Currently, industrial research experience often means researchers become less attractive to HEIs because their experience does not include publications or teaching and similarly researchers with pure academic experience can be unattractive to enterprise. There are some enterprise placements on offer to PhDs but these placements should become a more structured part of the postgraduate training and should last for at least six months, where appropriate.

Career opportunities for researcher in enterprise can be both challenging and rewarding and there has been a notable increase in such opportunities[10]. Irish enterprise will require increased numbers of high quality researchers if it is to remain competitive in global markets that are becoming increasingly knowledge intensive. Enterprise and the public sector must continue to develop their absorptive capacity that will allow them to integrate with the research infrastructure and therefore offer attractive researcher careers. While the career path for researchers in HEIs can be defined there is still a need for enterprise to develop a similar career path which is capable of attracting the best and brightest from academic research towards enterprise research. Models of joint sponsorship between academia and enterprise may be appropriate similar to the approach of enterprise supporting the creation of academic chairs. Mobility between enterprise and academia also needs to be addressed from an enterprise perspective, where enterprise can recognise academic research experience. The salary scales that are in place within the HEIs should be aligned with the equivalent position in enterprise to ensure that Irish enterprise is not at a competitive disadvantage. Researchers also must adapt to the new environment by availing of opportunities to improve their knowledge and skills to better prepare for and to sustain their careers in other sectors. To facilitate mobility between the HEIs, public sector and enterprise, representatives of all three sectors should develop and implement a researcher career competency framework. This will enable prospective employers to recognise and evaluate relevant researcher experience and skills. Comparable levels of remuneration across the different sectors are necessary to support this.

Lower industrial demand for PhDs and post-doctoral researchers can, in part, be tackled by measures that stimulate enterprise R&D and promote the placement of PhDs and post-doctoral researchers within enterprise, where their activity can stimulate demand for more, similarly qualified people to be recruited. Research funders in Sweden launched a range of initiatives to tackle similar problems in the mid-1990s, in response to a national perception that there were far too few PhDs in enterprise. The Knowledge Foundation[11] has run Industrial Graduate Schools since 1997, which recruit PhD students from both enterprise and higher education institutes, who have to spend at least 20 percent of their time working in-company on interdisciplinary topics. The costs are shared equally between the Foundation and the companies.

10 Forfás, Research and Development Performance in the Business Sector in Ireland 2005/06

11 http://www.kks.se/templates/StandardPage.aspx?id=895

Ireland has already taken the first steps to increase industrial PhD-intensity through IRCSET's Enterprise Partnership Scheme grants. The association of such schemes with enterprise focussed graduate schools may need to be examined. A scheme aimed at companies without the resources or scale to co-fund doctoral training could provide the required support. In addition, a Strategic Research Cluster model to develop training programs and opportunities to upskill researchers active in enterprise should be followed, to ensure researchers can continue to develop their skills and competency.

Ireland is well advanced in building public-private research partnerships. This principle is accepted and the instruments used are gradually increasing the extent to which enterprise has to be an active partner. In combination with policies to place PhD-level researchers into Irish firms, this should gradually increase the numbers of researchers available with enterprise experience. This appears to be an area where additional action can be easily facilitated, by ensuring that existing measures are exploited as widely as possible and that efforts focus on programmes that require active industrial participation in R&D.

In the non-traded services area (healthcare, education and so forth), it is critical that the public sector develop collaborative relationships with the SET and HSS research communities to develop the research capability of the public sector to support the delivery of innovative services.

As enterprises must move towards higher value added activity to compete internationally, their access to fourth level Ireland to acquire and transform new and existing knowledge into commercial opportunities will become critical. The ASC has established a Task Force that will specifically look at researcher careers in enterprise and the public sector and measures to facilitate mobility between the three sectors which will also build on the work of the ASC Task Force on promoting enterprise-higher education relationships[12].

The ASC welcomes the proposal that Ireland will participate in an OECD-led longitudinal study to collect information on the careers of doctorate holders. This survey will allow both quantitative and qualitative data to be collected in this key area using international definitions and rules, which will facilitate international comparison. Work is on-going between key departments, offices and agencies to develop this new survey metric in Ireland, which will include the establishment of a register of PhD holders. This information will provide useful information on the mobility of PhD holders within the economy, including barriers to mobility.

Recommendation

- The HEIs, public sector research institutes, enterprise and their respective representative bodies need collectively to develop and implement a researcher careers competency framework. This framework should recognize and value the experience and skill sets of researchers in all these sectors to facilitate mobility of researchers between all these sectors.

12 http://www.sciencecouncil.ie/reports/acsti070404/forfas070404_enteprise_higher_education_report.pdf

6. Maximising Opportunities for All

The under-representation of women at senior levels in the Irish research system is significant by international comparison. While women accounted for 55 percent of all PhD students and 41 percent of all PhD-qualified researchers in HEIs in 1998/99 they accounted for only 5 percent of Professors[13]. The EU average was 12 percent. More recent figures[14] available (2003-2004) show that only 12 percent of Associate Professors are female, which is an increase on the previous figures available (1998-1999), of 4 percent. According to the 2003-2004 figures, 8 percent of Full Professors in Ireland are female, an increase of 3 percent. Measures are needed to encourage the presence of a critical mass of women researchers at all – and especially the higher – levels of research. The UK Government launched a Strategy for Women in Science, Engineering and Technology in April 2003 which established a dedicated resource centre to co-ordinate the activities of existing organisations involved in women in SET and to support innovative schemes, such as mentoring, networking, speaker's bursaries and mobility needs[15]. As part of the strategy, a Research Centre for Women in SET was set up which is funded by the DTI and ESF. The aim is to assist 1000 women by the end of 2007 (women returnees, mature women, and those working part-time) in order that they are aware of how to access research grants and funding. Through its website, the centre offers advice on where funding can be obtained and also answers questions on issues such as maternity rights while working on post-doctoral contracts, and updating skills and experience. It also offers advice for teachers who wish to encourage female students to take SET subjects. The Council welcomes initiatives such as TCD's 'Wiser' programme which aims to develop sustainable practices to ensure that women can compete in research on an equal basis using their scientific expertise, knowledge and potential[16].

Creating parity within the academic sphere is vital if the skills of female researchers are not to be lost. The HEA and HEIs should set a target aiming to reach the EU average of female participation rates at senior academic levels by 2018 and in line with the SSTI implementation. The HEIs should address barriers to participation among female researchers and other groups such as carers with specific policies such as childcare, flexible working arrangements and other research supports. To reach the EU average by 2018, funding agencies should also establish a strategic programme for female researchers, which facilitates equality of access.

Recommendation

- The funding agencies and HEIs should establish a programme to ensure Ireland reaches the EU average of female participation rates among researchers at senior academic levels by 2018.

13 Scissors Diagrams for 12 EU Member States (1998-9) - percent female. Third European report on Science and Technology Indicators, Cordis 2003

14 Deparment of Education and Science Se Si – Gender in Irish Education 2007

15 http://www.setwomenresource.org.uk/en/

16 http://www.tcd.ie/wiser/index.php

The contribution of Humanities and Social Science research to economic and social development should be recognised. An analysis of the national economy shows an ongoing sectoral shift towards services. With this sectoral shift and the growing professionalism of the workforce, the largest employment increases are predicted in key growth areas of finance, business services and public administration and health and education. These are among the key employment sectors best served by those from the Humanities and Social Science degrees, with skills in management, sales, marketing and languages. Growth is generally divided between traded services (business, financial, professional and insurance services, transport, communication and distribution) and non-traded services (defence forces, health services, education, social and charitable services, cultural tourism). The growing importance of services to the economy means that there should be a growing role for people with advanced degrees in humanities and social sciences – and therefore also in academia. It is crucial for continued economic prosperity and greater social well-being that humanities and social science research be promoted and encouraged.

Recommendation

- The funding agencies should increase the level of funding available to Humanities and Social Sciences to further support researcher careers in these disciplines.

The increase in the number of researchers across all sectors will require a large pool of talent to draw from. Ireland is suffering from the 'flight from science' phenomenon among younger people that affects most OECD countries, reducing the inflow of potential researchers. A lack of attractive career structure and options may also deter young people from pursuing a career in research. There is a need to map, measure and publicise the opportunities and increase the understanding of the value and benefits of research and research careers in society, including at all school and HEI levels and to promote PhD education around the message that undertaking a PhD will provide rewarding career options in a variety of spheres. Furthermore, initiatives, which aim to create a society that understands the contribution and value of research and is confident about its development, regulation and use and to encourage the development of a community of researchers that is representative of the society it benefits.

7. Implementation

Building a world class research system will depend largely on ensuring the excellence of our researchers. Developing the appropriate career structures, transferable skills and opportunities will ensure that we maximise their contribution to economic and social development. These recommendations should be implemented and monitored through the existing Strategy for Science, Technology and Innovation (SSTI) structures, such as the Higher Education Research Group (HERG).

Recommendation

- These recommendations should be implemented and monitored through the existing Strategy for Science, Technology and Innovation (SSTI) structures, such as the Higher Education Research Group (HERG), to ensure that the increase in PhD output is aligned with both future national requirements under SSTI and researcher career opportunities.

8. Recommendations

Establish a distinctive and transparent Framework for Developing Professional Researcher Careers within the Higher Education Institutes (HEIs) which would also be recognised and have relevance for the enterprise sector.

Framework for Researcher Careers

The Framework would mean that:

1 Clearly defined levels within the researcher career path should be established with continuous professional development and to maintain excellence there should be transparent and rigorous competition at all levels;

a. The first phase of the researcher career path should be regarded as an internship where the PhD graduates would gain practical experience while supervised by the Principal Investigator (PI) who has secured funding for the position.

b. The second phase should be that of a Research Fellow, who has completed the first phase of the research path, has personally secured funding and, in association with a Principal Investigator as mentor, will have access to research facilities. This will involve an open, peer-reviewed selection process based on research excellence and merit. This will require establishment of a new internationally competitive programme for support of these researchers. The new programme could be funded by restructuring the current funding mechanisms within the agencies.

c. A limited number of highly prestigious and rigorously competitive Senior Research Fellowships should be available. Senior Research Fellows should be allowed to apply independently for funding on the same basis as Principal Investigators.

d. To maintain high quality and research excellence, there should be a clearly defined, transparent and rigorous selection process at each transition phase of the career path with ongoing structured performance and personal development reviews throughout the career.

2 The terms and conditions under which researchers are employed should be consistent irrespective of the sources of funding for their positions.

3 The funding agencies and HEIs should establish a programme to ensure Ireland reaches the EU average of female participation rates among researchers at senior academic levels by 2018.

4 The funding agencies should increase the level of funding available to Humanities and Social Sciences to further support researcher careers in these disciplines.

Mobility of Researchers

5 The HEIs, public sector research institutes, enterprise and their respective representative bodies need collectively to develop and implement a researcher careers competency framework. This framework should recognize and value the experience and skill sets of researchers in all these sectors to facilitate mobility of researchers between all these sectors.

6 A national programme should be established providing career information, including information on the personal and professional researcher skills required by each sector – HEIs, the public sector and enterprise.

7 As the first stage of professional career development of researchers, Graduate Schools should be developed consistently and coherently to ensure PhD students learn practical business skills such as project management, people and financial management, marketing and skills required for the commercialisation of research. PhD programmes in appropriate disciplines should facilitate collaboration with enterprise including formal placements.

8 Funding agencies should facilitate international mobility, both inward and outward, among all researchers by providing continuity of funding to those seeking international experience and those that seek to return to Ireland.

Implementation

9 These recommendations should be implemented and monitored through the existing Strategy for Science, Technology and Innovation (SSTI) structures, such as the Higher Education Research Group (HERG), to ensure that the increase in PhD output is aligned with both future national requirements under SSTI and researcher career opportunities.

Appendix 1 - Membership of the Advisory Science Council

Council Members

Ms Mary Cryan, Cryan Associates (Chair)

Prof Anita Maguire, Professor of Pharmaceutical Chemistry, Director, Analytical and Biological Chemistry Research Facility, University College Cork

Prof Tom McCarthy, Chief Executive, Irish Management Institute

Dr Siobhán O'Sullivan, Scientific Director, The Irish Council for Bioethics

Dr Sean Baker, Executive Director, IONA Technologies Plc

Mr. Martin Cronin, Chief Executive Officer, Forfás

Mr Larry Murrin, Chief Executive Officer, Dawn Foods Ltd.

Dr. Reg Shaw, Wyeth Pharmaceuticals

Prof Roger Whatmore, CEO, Tyndall National Institute

Prof Timothy O'Brien, Director, Gene Therapy Programme, REMEDI

Secretariat

Mr John Dooley, Forfás

Ms Karen Hynes, Forfás

Dr Jos Evertsen, Forfás

Appendix 2 - Membership of the Council Task Force

Council Members

Prof Dolores Cahill (Chair), Professor of Translational Science, Conway Institute, University College Dublin

Prof Anita Maguire, Professor of Pharmaceutical Chemistry, Director, Analytical and Biological Chemistry Research Facility, University College Cork

Prof Tom McCarthy, Chief Executive, Irish Management Institute

Dr Siobhán O'Sullivan, Scientific Director, The Irish Council for Bioethics

Additional Members

Prof Janet Allen, Director, Conway Institute, University College Dublin

Prof Michael Cronin, Translational Studies, Dublin City University

Prof Vincent Cunnane, Vice-President Research, Research Office, University of Limerick

Dr Willie Donnelly, Head of Research & Innovation, Waterford Institute of Technology

Prof Brian Fynes, Business School, University College Dublin

Brendan O'Callaghan, Managing Director, Schering Plough (Avondale)

Mr Tom O'Leary, HR Director, University College Cork

Secretariat

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