



Researchers' Report 2014

Country Profile: Ireland



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1. Key data

National R&D intensity target

“Ireland has a national R&D intensity target of 2.0% of GDP or 2.5 % of GNP, by 2020. In 2011, Irish R&D intensity was 1.72% of GDP¹, with a public sector R&D intensity of 0.56% and business R&D intensity of 1.17%. Over the decade 2000-2010, R&D intensity in Ireland grew at an average annual growth rate of 4.9%, one of the highest growth rates in the EU. One of the main challenges for Ireland would be to return to a trend of increasing public investment in R&D which, if more related to business needs, would raise the R&D intensity of Irish firms. If this line were followed, the shift of the Irish economy towards a knowledge-based economy, already very visible, could be pursued over the years and a more ambitious target could be envisaged at the occasion of the mid-term review of the Europe 2020 targets (2014/2015). This would be more in line with the country's clear potential, illustrated by the trend in the growth above.

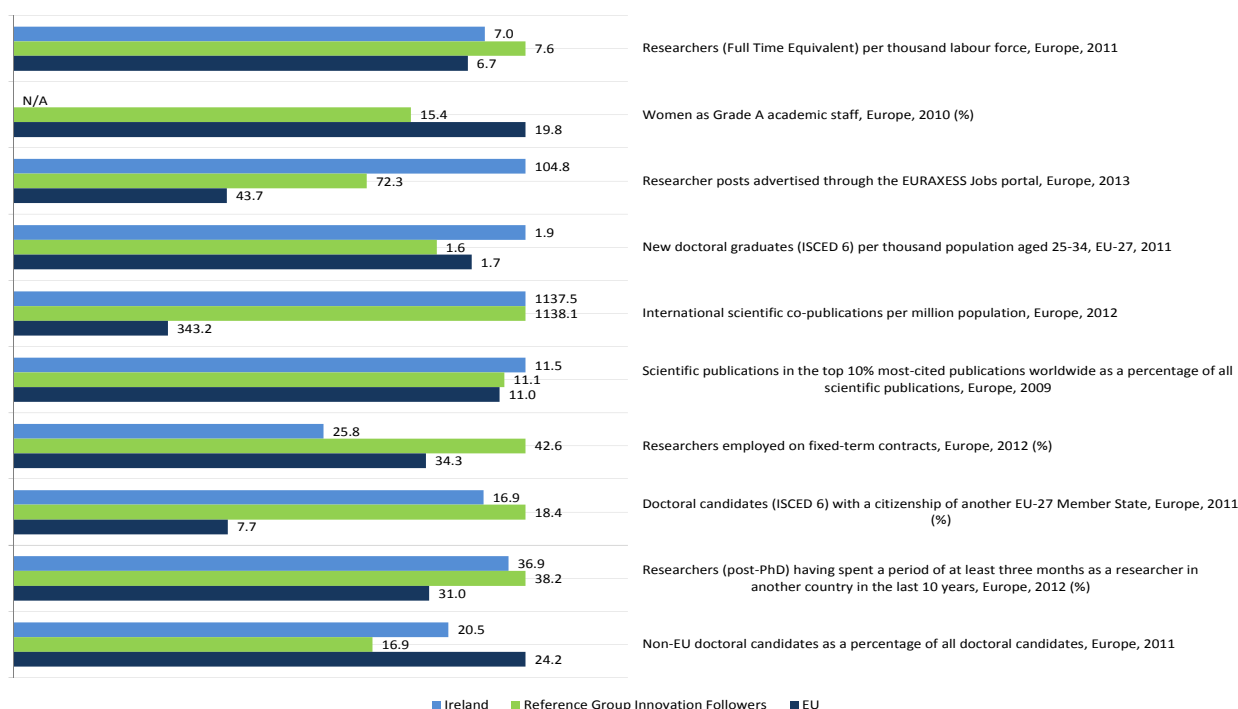
In absolute terms, public R&D funding reached a peak in 2008. R&D investment by firms appears not to have been seriously affected by the economic crisis. Where BERD is supported by government, Ireland has a relatively low level of direct support, according to the OECD Indirect support was almost 3 times higher than direct support. Business R&D investment in real terms has continued to rise and reached a peak in 2010. Overall, firms have almost doubled their R&D investment in real terms over the period 2000-2010. The amount of GERD financed from abroad at 15.6% is almost twice the EU average and reflects the policy of attracting FDI with a large R&D component. In order to reach its national target by 2020, R&D intensity in Ireland would have to grow at an average annual rate of 1.1% over the decade 2010-2020. This growth would depend on sustained incentives to attract and boost business R&D investment”.²

Under the ERDF Programme, Ireland has been allocated EUR 163.5 million for research, innovation and entrepreneurship. This represents 21.8% of the total ERDF funds for Ireland. Under FP7, beneficiaries from Ireland received EUR 572 million³ of which EUR 149 million went to SMEs. Overall, Irish applicants had a close to average success rate.

Key indicators measuring the country's research performance

The figure below presents key indicators measuring Ireland's performance on aspects of an open labour market for researchers against a reference group and the EU average⁴.

Figure 1: Key indicators – Ireland



¹ In 2012, R&D expenditure was 1.72% (Eurostat, 2014).

² European Commission (2013), “Research and Innovation performance in EU Member States and Associated countries. Innovation Union progress at country level 2013”

³ According to CORDA July 2013. National estimate of EUR 572 million as of July, 2013.

⁴ The values refer to 2013 or the latest year available

Source: Deloitte

Data: Eurostat, SHE Figures, EURAXESS Jobs Portal, UNESCO OECD Eurostat education survey, Innovation Union Scoreboard 2014, MORE2. Notes: Based on their average innovation performance across 25 indicators, Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, Netherlands, Slovenia and the UK show a performance above or close to that of the EU average. These countries are the "Innovation followers"⁵.

Stock of researchers

The table below presents the stock of researchers by Head Count (HC) and Full Time Equivalent (FTE) and in relation to the active labour force.

Table 1: Human resources – Stock of researchers

Indicator	Ireland	EU Average/Total
Head Count per 1 000 active labour force (2011)	10.22	10.55
Head Count (2011)	22 131	2 545 346
FTE per 1 000 active labour force (2011)	7.01	6.75
Full time equivalent (FTE) (2011)	15 172	1 628 127

Source: Deloitte

Data: Eurostat

2. National strategies

The government of Ireland has adopted a package of measures aimed at training enough researchers to meet its R&D targets and at promoting attractive employment conditions in public research institutions⁶. The table below presents key programmes and initiatives intended to implement the strategic objectives to train enough researchers to reach Ireland's R&D targets, to promote attractive working conditions, and to address gender and dual career issues.

Table 2: National strategies

Measure	Description
National Development Plan 2007-2013 Transforming Ireland — A Better Quality of Life for All	Under this Plan, researchers are encouraged to develop collaborative cross-border relationships, to have up-to-date training as well as to go and work abroad. The Plan intends to grow the stock of researchers quantitatively and qualitatively by increasing the funding, recruiting top-level researchers from home and overseas, developing career paths and promoting mobility mechanisms. All government departments and public sector organisations are responsible for its implementation. In November, 2011, the Government announced that the National Development Plan was to be succeeded by a Capital Investment Plan. This scheme began on 1st January, 2012 and runs until 2016.
National Strategy for Higher Education to 2030 (2011)	The National Strategy for Higher Education, implemented by the Department of Education and Skills, and the Higher Education Authority, provides for better researcher mobility, increased career opportunities and strong collaboration between higher education researchers and the business sector. The Strategy also encourages researchers in Ireland to be connected with leading researchers internationally and become involved in projects which are demonstrably world class.
Programme for Government - Government for National Recovery 2011-2016	The Programme for Government states that the Government will promote Ireland's full engagement in the 'Innovation Union'. It focuses on supporting investments in technology research, development and commercialisation beyond basic research supported by Science Foundation Ireland (SFI), as well as removing barriers to innovation. The Programme also aims to establish a network of Technology Research Centres focused on applied technological research in specific areas, to be linked to appropriate higher education institutions. Finally, the Programme points out the necessity to overhaul the student visa system and encourage high-value research students (together with their families) to come to Ireland to work. All government departments and public sector organisations are responsible for its implementation.
Report of the Research Prioritisation Steering Group 2012	This report sets out the recommendations of the Research Prioritisation Steering Group which met between October 2010 and September 2011. The Group were asked by the Irish Government to identify a number of priority areas for future publicly performed research to contribute to enterprise development, employment growth, job retention and tangible improvements in the quality of life. The report made

⁵ European Commission (2014), "Innovation Union Scoreboard 2014"

⁶ Note: the majority of publicly funded research in Ireland is carried out in Higher Education Institutions (Universities and Institutes of Technology), predominantly in the universities. A small number of publicly-funded research organisations are also in existence, for example, Teagasc, which carries out research in the area of agriculture and agrifood.

Measure	Description
	recommendations on 14 priority areas of focus and on wider science, technology and innovation investment over a five-year period. The majority of public research funding will be aligned with the 14 priority areas, particularly in the form of jobs, and monitoring systems have been developed and approved by Government to measure the outputs and impact of funding provided. Six underpinning Platform Science and Technology areas, as well as key integrating infrastructure, are also included in the scope of the report. Research for policy (e.g. environmental and health research for which there is a public policy need or indeed an international obligation) and research for knowledge (covering an array of underpinning skills and areas of expertise necessary to produce excellent outputs from research) were also identified as two overarching goals of public investment. The report also recommended a number of measures which are required to improve the efficiency and effectiveness of the STI system in order to support the implementation of Research Prioritisation. The Government agreed to the adoption of the report's recommendations as a whole-of-Government policy goal, and the future alignment of the majority of public STI investment with these 14 areas of opportunity. Action Plans have been developed for each of the Priority Areas and approved by Government; implementation of Research Prioritisation is being progressed by the cross-Departmental and cross-Agency Prioritisation Action Group (PAG), under the chairmanship and political leadership of the Minister for Research and Innovation and the broader authority of the Cabinet Committee on Economic Recovery and Jobs. The individual Action Plans for the Priority Areas and the Framework for Monitoring Public Investment in Science, Technology and Innovation were published in July 2013. A key economic goal in the implementation of the Research Prioritisation process is a significantly enhanced focus on collaborative research with enterprise and on commercialisation by growing the number of researchers in enterprise and enhancing the flow of researchers between academia and enterprise. An Intellectual Property Protocol has been published, outlining a clear, robust and industry-friendly policy for the commercialisation of intellectual property arising from state funded research. Implementation of Research Prioritisation is a responsibility of the Prioritisation Action Group (PAG) which includes representatives of all key Government Departments and all research funders. Moreover, the Group will engage in discourse with other informed stakeholders, including universities, Institutes of Technology and industry representative bodies, as well as national/ international experts.
Report: Towards a Framework for Research Careers 2008	This report, by the Advisory Council for Science, Technology and Innovation, recommended a major restructuring of science careers in Ireland in order to encourage people to take up a career in science. The report recommended the adoption of a structured researcher career path across industry, academia and the public sector.
Report: The role of PhDs in the Smart Economy 2009	This report, by the Advisory Council for Science, Technology and Innovation, highlighted Ireland's need to maintain a competitive output of PhDs in relevant disciplines in line with other developed countries, and set out a list of recommendations to maximise the development of structured PhD education in Ireland and its critical relevance to enterprise and society.
Strategy for Science, Technology & Innovation (SSTI) 2006-2013	Since 2006, the Irish authorities have been implementing the Irish Government's Strategy for Science, Technology & Innovation (SSTI). The objective of the Strategy was to make Ireland internationally renowned for the excellence of its research and to develop a knowledge economy to contribute to national economic and social progress. The SSTI also takes account of developments at EU level, in particular the ERA targets, the European Partnership for Researchers, the Europe 2020 Strategy, as well as the Innovation Union. According to a progress report on implementation of the SSTI, good progress was made in achieving the key targets and objectives in the SSTI. The Strategy aimed to double the number of postgraduate researchers by 2013, with significant numbers of these going on to take up employment in the enterprise sector. It has also facilitated flows of researchers into and out of the country and from academia to enterprise. The Research Prioritisation Exercise, now at the Priorities Action Group - implementation stage, is the natural successor to the SSTI.

Measure	Description
	Evaluation Reports: Reviews of the SSTI were performed in 2008, ⁷ 2009, ⁸ and 2011 ⁹ . There has been no further update and no further evaluation was planned at the time of this report.
The National Recovery Plan 2011-2014	Ireland's National Recovery Plan, implemented by all government departments and public sector organisations, takes account of the need for focus on collaboration between industry and research providers, and the need to bring the outputs of research and innovation activity to the marketplace. The Plan requires research investments to be concentrated in areas where Ireland secures the greatest economic and social returns and it provides for the number of industry-led research competence centres to be doubled to ensure that industry drives research agendas. There are currently 14 industry-led researcher competence centres in place and 2 others are in the process of being established.

Source: Deloitte

3. Women in the research profession

Measures supporting women researchers in top-level positions

National legislation¹⁰ prohibits any discrimination based on gender. However, each Higher Education Institution (HEI)¹¹ applies its own procedures for promoting gender equality, including the 'European Charter for Researchers' and the 'Code of Conduct for the Recruitment of Researchers' principles.

As part of gaining the 'HR Excellence in Research' label, all institutions will have to plan progress towards gender equality in all aspects of research life, and consider how dual career couples can be accommodated to build a research career in Ireland.

A number of Irish organisations are partnering in FP7 projects to support women in the research profession. These include:

- FESTA - Female Empowerment in Science and Technology in Academia.¹² Irish Partner: University of Limerick;
- GENOVATE - Transforming Organisational Culture for Gender Equality in Research and Innovation.¹³ Irish Partner: University College Cork;
- INTEGER - Institutional Transformation for Effecting Gender Equality in Research.¹⁴ Irish Partner: Trinity College Dublin;
- GENDER-NET - Promoting gender equality in research institutions and the integration of the gender dimension in research contents.¹⁵ Irish Partner: Irish Research Council (Higher Education Authority).

The Irish Equality Authority has the overarching role in promoting equality in the workplace, including the promotion of gender equality for researchers.

Women have since 2006 been encouraged to take science to an advanced (doctoral) level by the initiatives of the Centre for Women in Science & Engineering Research (WiSER)¹⁶. WiSER aims to recruit, retain, return and advance women in academic science, engineering and technology by developing sustainable practices to ensure that women's scientific expertise, knowledge and potential are nationally recognised. From 1st May, 2014, Irish HEIs have been eligible to sign up to the Athena SWAN Charter for Women in Science and apply for individual Athena SWAN Awards, which recognise and celebrate good practice in recruiting, retaining and promoting women in STEMM (Science, Technology, Engineering, Mathematics and Medicine) in higher education. The project will be comprehensively reviewed after three years (May, 2017). In addition, the

⁷ First Report on the Strategy for Science, Technology and Innovation: <http://www.djei.ie/publications/science/2008/firstreportonSSTI.pdf>

⁸ Science, Technology and Innovation Report 'Delivering the Smart Economy': http://www.djei.ie/publications/science/2009/Delivering_the_Smart_Economy.pdf

⁹ Strategy for Science, Technology and Innovation Indicators: http://www.djei.ie/publications/science/2011/SSTI_Indicators_December2011.pdf

¹⁰ Employment Equality Act of 1998, Equal Status Act of 2000, Equality Act of 2004

¹¹ The term Higher Education Institution describes any provider of tertiary education in Ireland, and includes the seven Irish Universities (www.iua.ie), the Institutes of Technology (www.ioti.ie) and the Royal College of Surgeons in Ireland

¹² <http://www.festa-europa.eu/>

¹³ <http://www.genovate.eu/>

¹⁴ <http://www.tcd.ie/wiser/integer/>

¹⁵ http://cordis.europa.eu/projects/rcn/111445_en.html

¹⁶ Available at: <http://www.tcd.ie/wiser/>

Women in Technology and Science Programme (WITS) has since 2008 aimed to facilitate and support women in returning to a career in science and technology.

Science Foundation Ireland aims to improve the representation and career progression of women in Science, Engineering and Technology (SET) in Ireland. The primary purpose of the SFI Advance Fellowship Programme is to provide female researchers with the opportunity to remain in or return to high quality research, to undertake further training and to increase their employability in academic, industrial or policy roles in the SET sector in Ireland.

Measures to ensure a representative gender balance

Institutions have full autonomy in setting quotas to ensure a representative gender balance for researchers. However, a general government commitment requires the institutions to increase female participation on State Boards up to 40%.

The Irish Research Council launched its Gender Strategy and Action Plan 2013-2020 in 2013. This Research Council Gender Strategy and Action Plan addresses two main issues in regard to gender in research:

Due to under-representation by gender, Ireland, like other countries, is currently under-utilising a significant cohort of the population of highly talented researchers; 2) There is also a gender dimension to the definition of research projects. This may not always be relevant in terms of the research content, it is well established that, where it is, failure to integrate sex and gender analysis into the design, implementation, evaluation and dissemination of the research can lead to poor results and missed opportunities.

The Strategy and Action Plan includes both sexes, and aims to provide equal outcomes for both men and women. The Council will also only fund excellent research, and excellent research fully considers whether a potential sex and/or gender dimension is relevant to the research content and fully integrates sex/gender analysis where relevant.

Parental leave

For researchers who are employees of a Higher Education Institution (i.e. recognised, established and leading researchers), maternity leave is automatically provided for, as long as they have sufficient length of service. Usually the person may return from maternity leave to complete the project, but it is up to the research funder to decide on any replacement or not.

For doctoral candidates (Research Profile R1), who are not normally employees of the University/Institute of Technology, there is no automatic entitlement to maternity leave. This is at the discretion of the research funder and/or Higher Education Institution.

Science Foundation Ireland (SFI) has adopted the Principal Investigator Career Advancement (PICA) scheme (catering for researchers returning from maternity leave) which is now incorporated into all its grant schemes. The PICA scheme supports outstanding researchers returning to active research after a prolonged absence including maternity, paternity, parental, and adoptive leave.

Female researchers funded by the Programme for Research in Third-Level Institutions (PRTL) as well as by the Irish Research Council are allowed to interrupt and extend their contract to go on maternity leave. Payment in addition to welfare payments during maternity leave is at the discretion of the host institution or the research funder.

4. Open, transparent and merit-based recruitment

Recruitment system

The Researchers' Report 2013 presented data from the MORE2 Study¹⁷ which indicates that Ireland is amongst the top three European Union countries in terms of open recruitment for research positions in the public sector. Over 70% of researchers in the public sector are satisfied with the extent to which research job vacancies are advertised externally by their institution. This is higher than the European Union average of 60%.

¹⁷ MORE2 study "Support for continued data collection and analysis concerning mobility patterns and career paths of researchers", IDEA Consult (2013)

The Employment Equality Acts (1998 to 2011) and the Equal Status Acts (2000-2011) cover a broad spectrum of activities including recruitment and selection, determination of pay and the composition of terms and conditions of employment.

The Universities Act (1997) provides that Universities are allowed to appoint staff “having regard to available resources and accountability for use of public funds”. The Fixed Term Workers Act (2003) ensures that researchers employed on fixed term contracts are eligible for the same entitlements as comparable permanent employees.

For example, across the seven universities, positions for Research Profiles R2-R4, and many at R1, are advertised internationally and recruitment is based on the quality of the candidates. Nearly 40% of PhD students are foreigners (with about 15% of non EU-nationals in the total) and 35% of post-doc researchers are foreigners (half coming from another EU country and the other half from third countries). In 2011, the ratio of international academic staff ranged from 26% to 42% across the universities. No subsequent figures are available, but the ratios are thought to be broadly the same.

In the last quarter of 2014, the seven universities collaborated in developing a new e.recruitment system www.universityvacancies.com to provide greater global visibility on university jobs. Depending on the success of the portal, the system may be rolled out to other HE institutions.

Open recruitment in institutions

The table below presents information on open recruitment in higher education and public research institutions.

Table 3: Open recruitment in higher education and public research institutions (Researcher Profile R2-R4 only)¹⁸

Do institutions in the country currently have policies to ...?	Yes/No	Description
– publish job vacancies on relevant national online platforms	Yes	Institutions as well as some funding schemes have policies to publish job vacancies on relevant national online platforms. The seven universities will use the new e-recruitment system www.universityvacancies.com .
– publish job vacancies on relevant Europe-wide online platforms (e.g. EURAXESS)	Yes	Institutions have policies to publish job vacancies on relevant Europe-wide online platforms.
– publish job vacancies in English	Yes	English in the main language for publishing job vacancies.
– systematically establish selection panels	Yes	Institutions have policies to systematically establish selection panels.
– establish clear rules for the composition of selection panels (e.g. number and role of members, inclusion of foreign experts, gender balance, etc.)	Yes	Institutions are obliged by law to establish clear rules for the composition of selection panels.
– publish the composition of a selection panel (obliging the recruiting institution)	Yes	Institutions have policies to publish the composition of a selection panel.
– publish the selection criteria together with job advert	Yes	Institutions are obliged by law to publish the selection criteria together with the job advert.
– regulate a minimum time period between vacancy publication and the deadline for applying	Yes	Institutions have policies to regulate a minimum time period between vacancy publication and the deadline for applying.
– place the burden of proof on the employer to prove that the recruitment procedure was open and transparent	Yes	The burden of proof to prove that the recruitment procedure was open and transparent is by law placed on the institutions.
– offer applicants the right to receive adequate feedback	Yes	Institutions are obliged by law to offer applicants the right to receive adequate feedback.
– offer applicants the right to appeal	Yes	Institutions are obliged by law to offer applicants the right to appeal.

Source: Deloitte

¹⁸ For positions at Research Profile R1 (doctoral candidates), open and transparent recruitment procedures are the norm, even though that there are no fixed policies in place regarding this across the HEIs, nor any obligations in law to do this.

EURAXESS Services Network

In 2013, the number of researchers posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector was 104.8 in Ireland compared with 72.3 among the Innovation Union reference group and an EU average of 43.7¹⁹.

All publicly funded (and research-active private) organisations are encouraged to advertise research positions on the EURAXESS Ireland portal (www.euraxess.ie) and can request access to the national and EU researcher CV database. Information on entry conditions, transfer of social security and pension contributions, accommodation and administrative assistance is available at EURAXESS Ireland. EURAXESS Ireland provides a range of information services for researchers and their families wishing to enter the country or to go abroad. SFI jobs are published on the SFI website and on the EURAXESS Jobs portal.

Since its launch in May 2013, the role of EURAXESS has been extended significantly especially with the development of the EURAXESS Business portal <http://www.euraxess.ie/business/>. This provides a dedicated entry point for companies focusing on key EURAXESS services of industry relevance. The online Funding Search facility provides companies with a full suite of business development and research funding opportunities (based on sector, size and location). This development is key in attracting researchers and research-active organisations in the private sector and fostering industry academia collaboration.

Although Ireland is not in the Schengen area, it opted in to the Third Country Directive and has put in place a 'Hosting Agreement' to fast track non-EU researchers and their families wanting to come to Ireland with the support of the EURAXESS Ireland Office. Between the commencement of the scheme in October 2007 and 31 December 2013, the EURAXESS office processed almost 2 000 Hosting Agreements for researchers and academics involved in research. See also Chapter 8 "Mobility and international attractiveness".

5. Education and training

Measures to attract and train people to become researchers

As part of the implementation of the revised primary school curriculum, science was introduced to all primary schools from September 2003 to help children develop scientific skills.

In the same year, the Irish government introduced Discover Science and Engineering (DSE) as its national science awareness programme at the primary and secondary level, which in the longer term will feed into the third level, (i.e. universities and Institutes of Technology) and also the PhD level. The programme promotes an awareness and understanding of the importance of science and engineering in a modern knowledge-based economy and develops effective ways of engaging students, teachers and the public in science, technology and innovation²⁰. DSE has been within Science Foundation Ireland since the spring of 2012. Hands-on training sessions are provided for all teachers participating in the initiative, while a range of resources are then supplied to participating classes. These include access to the website where there are a number of science and maths hands-on activities, helpful hints for teachers, explanations of the science background for each activity, and how they relate to the SESE curriculum.

In addition, the government in 2003 launched a revised syllabus in Junior Certificate science. The revised syllabus was supported by a comprehensive programme of professional development for teachers, and investment of some EUR 16 million in 2004 in resources and laboratory facilities. As a result, in 2013, 90% of students sat 'Science' in the Junior Certificate examination²¹.

The 2012 OECD PISA results (published December 2013) show that Ireland has seen the most improvement in science. At 9th out of 34 OECD countries, it is up five places from 2009. PISA 2012 shows that it takes time for initiatives to impact on performance. It is only now that Ireland is seeing the positive impact of revisions to the science curriculum at primary level in 1999 and the Junior Cycle in 2003 which focused on practical investigation by students.

¹⁹ See Figure 1 "Key indicators – Ireland"

²⁰ An independent evaluation of DSE in 2009 by an International Panel noted that DSE represents very good value for money and plays an important role in encouraging young people to study science and technology. Following specific recommendations, maths was included in the scope of DSE and it has been refocused on second level education, as a support for Project Maths

²¹ Available at: <http://www.examinations.ie/index.php?l=en&mc=ca&sc=sc>

Engineers Ireland's STEPS programme was established in 2000 to encourage primary and post-primary students to explore the world of science and engineering. STEPS is managed by Engineers Ireland and is supported by the Department of Education and Skills, Science Foundation Ireland and a number of major engineering employers. (The name STEPS was originally conceived as an acronym for Science, Technology and Engineering Programme for Schools.) The STEPS programme encourages primary and post-primary students to explore the world of science, technology, engineering and mathematics while also promoting engineering as a career choice. The STEPS team develop programmes for various audiences which include primary and post-primary students, teachers, guidance counsellors and parents. STEPS materials and activities are continually updated with input from relevant stakeholders.

National annual events, such as the Smart Futures Conference, ICT Champions Programme, Engineering Week, Science Week and Maths Week, also drive awareness among students and provide new opportunities for engagement in science and maths projects.

A further successful initiative to encourage interest in science among young people is the BT Young Scientist and Technologist Exhibition, which takes place in Dublin in January of each year. Now in its 50th year, the exhibition invites Young Scientists from both primary and secondary schools to compete for the right to demonstrate their project at the event and win one of the national awards for excellence in science and technology. The event attracts 45 000 people, many of them schoolchildren, and encourages interest in research and science through the 550 school projects on display and many interactive exhibits.

Since its inception, more than 65 000 students have entered over 31 000 projects for exhibition. The 2013 exhibition was the biggest ever, with 1 879 ideas entered from 4 189 students from 362 schools. This exhibition plays a very important role in promoting STEM education and creating a sense of excitement in schools about science and technology. It also plays an important role in supporting the development of the skills and dispositions required in the 21st century.

The success of this initiative is evidenced by the fact that it is now being replicated throughout Europe. However, Ireland's track record of producing young scientists of excellent potential is also shown by the fact that 14 Young Scientist winners have received the first prize award in the 22 years of the EU Contest for Young Scientists to date²². Many previous winners have also gone on to significant business and academic success²³.

Undergraduate students in higher education generally undertake a research project during the final year of undergraduate study. They work with established research teams at their institutions and in this way they have the possibility of research as a viable career path. As part of structured PhD delivery, students undertake modules, such as advanced research and analytical techniques to assist in carrying out high level research.

The seven Irish universities, the Institutes of Technology and the Royal College of Surgeons in Ireland are committed to strengthening their graduate research capacity. Over 90 per cent of Irish higher education research takes place in Ireland's universities, and they are lead participants in achieving the national policy of increasing the country's research output and increasing Ireland's innovative capacity through investment in graduate education.

The majority of Irish Higher Education Institutions have introduced structured PhD frameworks. The key principle underpinning the Irish structured PhD is a series of measures to ensure high-quality supervision, support and ongoing assessment of the progress of the student, with a particular emphasis on the provision of training and coursework, both at disciplinary level and with a view to developing generic and transferable skills which will benefit the student during and after their studies. In 2013, the EURAXESS Ireland website developed a specific "landing page" for those interested in studying for a PhD in Ireland.²⁴

Students have the opportunity to gain experience in relevant employment areas and there are often placements in companies for training or research. Alongside the universities, there is a strong Institutes of Technology sector, which also provides PhD and Master's research opportunities. There are 14 Institutes of

²² Full list of winners available here <http://www.btyoungscientist.com/downloads/2013-BTYSTE-factfile.pdf>

²³ Examples of the success of previous winners and wider facts about the effectiveness of the event are provided in: <http://www.btyoungscientist.com/downloads/2013-BTYSTE-factfile.pdf>

²⁴ <http://www.euraxess.ie/phd/default.aspx>

Technology located across Ireland, and the postgraduate education on offer builds on their strong links with industry and inter-connection with the regional landscape.

All universities and Institutes of Technology have school liaison programmes and open days to increase young people's interest in science, technology, engineering and mathematics (STEM) subjects. Moreover, a decision was taken by HEIs in 2010 to apply an additional award for attainment in mathematics in entrance criteria for higher education to encourage more students to take mathematics at a higher level in secondary education.

There are currently a number of initiatives in place to target young people studying maths and science within the school system to ensure that they develop a practical skillset relevant to industry. These range from the new Project Maths syllabus (fully rolled out to all schools in September 2012), the roll-out of a revised Junior Cycle with a focus on key skills [the new science specification will be finalised in 2014 to roll out to schools in 2015], work on revising the senior cycle sciences (specifications to be finalised in 2014), revision of the applied mathematics syllabus (background paper for consultation in 2014) and revision of the primary mathematics curriculum (background research papers to be published in 2014).

Project Maths involves the introduction of revised syllabuses for both Junior and Leaving Certificate Mathematics. It involves changes to what students learn in mathematics, how they learn it and how they will be assessed. Project Maths aims to provide for an enhanced student learning experience and greater levels of achievement. Greater emphasis is placed on student understanding of mathematical concepts, with increased use of contexts and applications that will enable students to relate mathematics to everyday experience.

The initiative also focuses on developing students' problem-solving skills. Assessment will reflect the different emphasis on understanding and skills in the teaching and learning of mathematics. The initiative is led by the NCCA (National Council for Curriculum and Assessment) and the Department of Education and Skills. Project Maths commenced for incoming first year and fifth year students in September 2010 and involved training of mathematics teachers in the form of Continuous Professional Development (CPD) as well as a fully funded post-graduate diploma in mathematics for out-of-field teachers offered by the NCE-MSTL at UL. As of September 2012 all five strands of Project Maths had been rolled out to all mainstream schools. Information on the timing and phasing has been widely disseminated. Funding is made available from the Department of Education and Skills as required.

Bonus Points have also been applied for the Leaving Certificate results in Honours Maths since 2012. All third level institutions collectively decided to operate a bonus points scheme for Higher Level Mathematics for a four-year trial period from 2012 to 2015 with a review in 2014. This, together with the introduction of the new syllabus, has led to a much larger percentage of the Mathematics cohort presented at higher level in 2013 than at any time in the past (25.6% in 2013 compared to 22.1% in 2012 and 15.8% in 2011). This represents a 62% increase over 3 years.

Research has been carried out by the national foundation for education research (NFER) into the impact of Project Maths on student achievement, learning and motivation. Overall it included 145 schools, 11 000 students and 900 teachers. It explored the impact of Project Maths on student achievement, learning and motivation in:

- the initial post-primary schools (phase one schools), which introduced the revised mathematics syllabuses in September 2008
- post-primary schools (non-phase one schools), which introduced the revised mathematics syllabuses in September 2010.

The first interim report was published in November 2012²⁵. The final report, also available on line, gives clear indications of the system's strengths and weaknesses and highlights areas where support is required. Students at both Junior Certificate and Leaving Certificate appear to be performing well in many aspects of the revised syllabus, in particular in Strand 1 (Statistics and Probability). Their performance is lowest in Strand 5 (Functions) and Strand 4 (Algebra). These findings are consistent with those from other assessments such as PISA, TIMSS and the state examinations.

Overall, the progress being made is in the right direction. Students are growing in confidence in their mathematical ability and real gains have been made in their achievements in statistics and probability, which

²⁵ www.ncca.ie/projectmaths

are comparable with high international standards. Progress in other areas of mathematics is slower. At this stage of the curriculum's implementation, however, the revised mathematics syllabuses taken as a whole do not appear to be associated with any overall deterioration or improvements in students' achievement.

The new Junior Cycle describes what students should know, understand, value and be able to do at the end of the three-year cycle in 24 statements of learning.

The new Junior Cycle, which is being introduced on a phased basis from 2014 will also embed key skills in all subject and short course specifications. It gives schools and others the opportunity to develop short courses which are particularly relevant to a school's context and interests. The possibility of short courses in STEM disciplines is being actively explored by a number of stakeholders.

The Higher Education Authority and the *Irish Independent* (Newspaper) host an annual competition inviting postgraduate research students in any discipline at an Irish higher-education institution to make a short submission on the difference that their research work will make to a particular aspect of Irish life, to the country as a whole or internationally. The objective of this competition is the effective communication of research to a lay audience. Applicants are invited to explain why and what they are doing matters to Irish society or in a global context. Entrants must be registered students on a postgraduate Master's or Doctoral programme at a higher education institution on the island of Ireland. Finalists' research is profiled in the *Irish Independent*.

A Dublin City of Science 2012 initiative was held in tandem with Dublin's hosting of the prestigious Euroscience Open Forum (ESOF) and this saw over 600 000 people take part in a celebration of science with over 160 events and activities held countrywide, crossing the worlds of art and culture to entertain the public and bring science to life.

In Ireland, the major funding agencies focusing on STEM disciplines are Science Foundation Ireland (SFI)²⁶, Enterprise Ireland (EI), the Health Research Board (HRB), the Irish Research Council (IRC)²⁷ and the Environmental Protection Agency (EPA).

Total university Masters graduates in SET (Science, Engineering and Technology) and HSS (Humanities and Social Sciences) increased from 6 193 in 2005 to 8 109 in 2012. There were also an additional 1 701 Masters graduates from the Institute of Technology sector in 2012. The number of PhD graduates increased from 774 in 2005 to 1 436 in 2012 from the university sector (+85%). The number of SET PhD graduates increased from 576 in 2005 to 920 in 2012 (+60%), with an additional 73 SET PhD graduates from the Institute of Technology sector.

Science Foundation Ireland (SFI) aims to fund PhD Fellowships in Science, Technology, Engineering and Maths Education (STEM) that are designed to support the requirement for fourth-level professionals in STEM education to educate and prepare teachers at all levels, but especially in primary and post-primary schools. This will include the effective implantation of STEM education and evidence-based research into teaching and learning in the STEM disciplines.

Furthermore, the SFI Discover Programme will support national and regional projects in STEM education and outreach in Ireland with the aim of engaging and scientifically informing the general public. The SFI has committed approximately EUR 2.1 million to the Discover Programme in 2014. The Programme will fund both large-scale national and regional projects as well as smaller local events concerning public engagement, education and outreach and STEM careers awareness.

Doctoral graduates by gender

The table below shows the number of doctoral graduates in Ireland by gender as a ratio of the total population.

²⁶ For example, SFI funds in the broad area of STEM with a focus on the 14 priority research areas described in the [Report of the Research Prioritisation Steering Group 2012](#)

²⁷ The Irish Research Council was established in 2011 via a merger of the Irish Research Council for Science, Engineering and Technology and the Irish Research Council for the Humanities and Social Sciences

Table 4: Doctoral graduates by gender

Indicator	Ireland	EU Average
New doctoral graduates (ISCED 6) per 1 000 population aged 25-34 (2011)	1.9	1.7
Graduates (ISCED 6) per 1 000 of the female population aged 25-34 (2011)	1.8	1.6
Graduates (ISCED 6) per 1 000 of the male population aged 25-34 (2011)	2.0	1.8

Source: Deloitte

Data: Eurostat

Funding of doctoral candidates

The table below summarises different funding opportunities for doctoral candidates.

Table 5: Funding schemes available to doctoral candidates

Funding scheme	Description
Fellowships	Over the period 2009-10 (most recent figures available), approximately 60% of PhD students in Science, Engineering and Technology and 19% of PhD students in the Humanities and Social Sciences were in receipt of fellowships from national funding agencies. Fellowships normally include a stipend and fee. The main funding options for doctoral candidates are: 1) Individual Scholarships/Fellowships – awarded by a number of bodies, including the Irish Research Council (IRC), and the Health Research Board (HRB) (e.g. clinical scholarships to enable medical practitioners to do a PhD); 2) Scholarships/Fellowships through structured PhD programmes – awarded through the HEA programme for Research in Third Level Institutions (PRTL), Irish Research Council Graduate Education Programmes (GREP's), the Health Research Board PhD Scholarship Programme, Marie Curie Initial Training Networks and ERASMUS MUNDUS; and 3) Participation in funded research projects, e.g. Science Foundation Ireland and FP7. According to the one-off Irish Universities Study (IUS)²⁸, over 80% of PhD students receive funding from a sponsor (public or private). Key funders were Irish Research Council (21%), SFI (16%) and Universities (16%).
Stipends/grants	More than 90% of PhD students receive a stipend/grant.
Employment contracts	Fewer than 10% of PhD students sign an employment contract.

Source: Deloitte

Measures to increase the quality of doctoral training

To achieve the objective of developing PhD graduates with the skills necessary to develop and manage their careers across a broad range of employment sectors, including academia, universities are providing more structured support for students, incorporating research and generic skills development opportunities. The seven Irish universities, the Institutes of Technology and the Royal College of Surgeons in Ireland are committed to strengthening their graduate research capacity with a concomitant increase in graduate students.

The majority of Irish Higher Education Institutions have introduced structured PhD frameworks. The key principle underpinning the Irish structured PhD is a series of measures to ensure high-quality supervision, support and ongoing assessment of the progress of the student, with a particular emphasis on the provision of training and coursework, both at disciplinary level and with a view to developing generic and transferable skills which will benefit the student during and after their studies.

The Institutes of Technology have also developed structured support programmes in support of postgraduate students. The Graduate Research Alliance project initiated as a pilot project in 2007 and officially launched in 2009, brought together Institutes to develop graduate skills training modules that together would offer a 60-credit Level 9 Special Purpose Award in Research Practice. This equipped postgraduates with essential wider skills, such as research methods, research management, communication skills, creativity and entrepreneurship, data handling and analysis, communications and personal development. The modules are currently being rolled out across a number of Institutes in support of their postgraduate provision.

In addition, the national funding agencies for research and innovation also provide support for human capital development. Science Foundation Ireland includes provision for training researchers in line with national targets in its funding programmes. The Irish Research Council identifies and supports excellent early career

²⁸ Irish Universities Study (2009), Report on Undergraduate and Taught Postgraduate Students in Irish Universities, IUS 1/09.

researchers throughout the research system across all disciplines, with a focus on career development. The National Academy for Integration of Research and Teaching and Learning (NAIRTL) provides training for academics to develop their supervising and mentoring skills.

Finally, the National Strategy for Higher Education to 2030 recommends that a consistent quality framework be developed for Irish PhD education, based on critical mass. The Higher Education Authority (HEA) and Irish Research Council completed the framework in 2014 and will work with HEIs to ensure greater consolidation and collaboration among HEIs and funders. The HEA has a particular focus on supporting and enhancing human capital development, mostly at the graduate level through policy drive and support for a doctoral education system characterised by a structured PhD model.

Skills agenda for researchers

For Doctoral candidates (R1): to help develop and support consistent national skills agendas, the Irish Universities Deans of Graduate Studies Group has developed a statement to communicate to students, supervisors and employers the skills and attributes of a PhD graduate²⁹. It also aims to aid students, graduate schools, graduate programmes and other advisory committees in establishing skills development needs and training structures. Typical PhD programmes enable the students to identify a tailored set of relevant course modules to develop disciplinary, transferable and generic skills. The seven universities have a collaborative agreement that ensures that courses taken in one university are recognised in all others through the European Credit Transfer System (ECTS).

For Research Profiles R2-R4: a number of HEIs have recently launched programmes to support skills development for post-docs. An example is the Research Careers Framework operated by University College Dublin³⁰. This establishes a structured and supportive skills and early career development model for non-tenured research staff at the university. These programmes are primarily aimed at researchers at R2 level. Researchers at R3 and R4 levels can take advantage of the Continuing Professional Development (CPD) programmes offered to all staff members at HEIs³¹: many of these programmes offer tailored courses for researchers.

6. Working conditions

Measures to improve researchers' funding opportunities

The table below summarises specific action taken by the Irish government and research entities to promote the attractiveness of research in Ireland.

Table 6: Measures to improve funding opportunities for researchers

Measure	Description
Irish Research Council (ongoing)	The Irish Research Council offers funding opportunities for early-career researchers across all disciplines. All funding competitions are open to all qualified candidates from anywhere in the world. Competitions are based on the merit of the individual applicants rather than allocating awards to specific research disciplines or areas. IRC has also funded researchers via participation in transnational funding calls such as the EUROCORES programme administered by the European Science Foundation, and calls run by the members of ERA Networks. In addition, IRC successfully secured three rounds of funding (in 2008, 2009 and 2011) from FP7 Marie Curie Actions to co-fund international mobility fellowship programmes for post-PhD researchers, with a total EU contribution of EUR 13 million (40% of the total programme budget). Five additional Irish funding programmes for post-doc researchers are supported by FP7 co-funding; these are offered by the Royal College of Surgeons in Ireland, HRB, SFI, University College Dublin, and the charitable organization DOCTRID.³²
President of Ireland Young Researcher Award (PIYRA) (ongoing)	The President of Ireland Young Researcher Award (PIYRA) is SFI's most prestigious award for recruiting young researchers, currently based around the world, to carry out their research in Third Level Institutions in Ireland. This programme emphasises the importance that SFI places on the early development of academic careers. The award recognises outstanding engineers and scientists who, early in their careers, have already demonstrated or shown exceptional potential for leadership at the frontiers of knowledge. Awardees are selected on the basis of

²⁹ Irish Universities Study (2009), Report on Undergraduate and Taught Postgraduate Students in Irish Universities, IUS 1/09

³⁰ Available at: <http://www.ucd.ie/hr/rcf/>

³¹ For an example, see <http://www4.dcu.ie/hr/training/index.shtml>

³² Available at: <http://www.iaa.ie/irish-marie-curie-office/funding-calls/cofund/>

Measure	Description
	exceptional accomplishments in science and engineering that underpin biotechnology, ICT, and energy and, on the basis of creative research plans built on work that has attracted international attention. The PIYRA Programme also has the aim of encouraging entrepreneurial efforts that couple the research body and Irish-based industry in appropriate ways. PIYRA Awards run for a period of five years and, through this award, SFI is able to identify the most promising of top-tier, cutting edge, researchers.
Science Foundation Ireland (ongoing)	Young researchers: schemes to develop career opportunities for young researchers include: – the TIDA entrepreneurial training scheme (see chapter 8 “Collaboration between academia and industry”), the SFI Industry Fellowship Programme, and co-funding of the Irish Research Council-SFI employment-based programme providing PhD students and post-graduate researchers with an employment-focused educational experience. – SFI Research Centres (see chapter 8 “Collaboration between academia and industry”) also provide a rich educational environment that expands the career opportunities for young researchers, with approximately 40% of these young researchers moving to industry as a first destination from current SFI Centres. – SFI Internship Programme (since 2013), providing with the opportunity to work in the grant administration and policy sectors of SFI. Early and mid-career researchers: SFI is also committed to supporting and developing early and mid-career researchers with the greatest potential to become excellent, fully independent research leaders, and has launched or revised a comprehensive suite of funding programmes to achieve these objectives, including: – The SFI Starting Investigator Research Grant (SIRG) for excellent post-doctoral researchers who wish to take steps towards a fully independent researcher career. The award provides funding for a postgraduate student, who will be primarily supervised by the Starting Investigator (SI). The SI works with an associated mentor, who provides the necessary support and infrastructure for the project to take place. SIRG awards run for a period of four years. The objectives of the SIRG Programme are to: • Enable those at an early career stage to establish themselves as independent researchers; • Provide the support and infrastructure to carry out novel research in areas that underpin biotechnology, ICT and energy; • Gain important experience towards a full-time academic position, including the supervision of the postgraduate student supported by the award; • Enable the award holder, together with his/her postgraduate student, to carry out their work in Ireland’s public research bodies, including universities and Institutes of Technology; • Offer funding opportunities that help third-level institutions attract and develop researchers and their careers. – The SFI Career Development Award (CDA), launched for the first time in August 2013, supports early and mid-career researchers who already hold a salaried, independent research post and who are looking to expand their research activities.
Ulysses Programme (ongoing)	Since 2006, IRC has participated in the Ulysses Programme for research visits between Ireland and France. This has opened up research collaborations between these two countries, and in many cases, has led to the creation of pan-European research networks which have received large-scale support from EU Framework Programmes.

Source: Deloitte

Apart from IRC and SFI funding schemes, the Irish government promotes international and bilateral cooperation programmes, and greater EU FP involvement as well as participation in Joint Programming projects.

Remuneration

The majority (>90%) of doctoral candidates (R1) receive a stipend (at a recommended rate of EUR 16,000) the value of which depends on the source of the funding, although efforts to standardise the stipend amounts are ongoing³³. This stipend is non-taxable and in general does not provide the recipient with social security coverage or pension benefits.

³³ In most cases the stipend offered and recommended by the funding agencies is EUR 16 000 (keeping in mind that this is neither subject to tax nor social security deductions).

All post-doc researchers (R2-R4) working at Irish HEIs are employees, and thus are provided with a salary package that includes social security coverage and pension benefits. For non-tenured researchers a process of standardising researcher salary scales is ongoing: Researcher Salary Scales³⁴ were developed by the Irish Universities Association in 2011 and adopted by many HEIs and the national research funding agencies. However, these scales are guidelines only and are not legally binding. The majority of tenured researchers at universities are appointed as lecturing staff whose responsibilities include teaching in addition to research. The salary of these researchers is determined according to the operating pay scale in the institution. Despite the general reduction recently in salary levels due to the downturn in economy, Irish researcher salaries remain competitive with private sector salaries³⁵.

For non-EU researchers entering Ireland to be employed as a researcher, there are strict criteria on salary levels set out in the Hosting Agreement scheme (2007)³⁶ to ensure there is no discrimination.

For further information, see the country profile on remuneration of researchers from the MORE2 study on the EURAXESS website³⁷.

Researchers' Statute

In Ireland, the majority of doctoral candidates have the same status as all other tertiary education students. They do not have employment contracts and do not have the same employment rights as staff members. A number of doctoral candidates funded by some sources, including FP7 Marie Curie and Industry, are on an employment contract (not more than 10% of the total), and hence have full employment rights.

Based on the Fixed Term Workers Act (FTWA) of 2003, all non-tenured researchers who are employees of an HEI have employment contracts and enjoy the same rights (including social security entitlements) as permanent staff, and have full access to all opportunities for continuous professional development.

For those on employment contracts, all national funding agencies provide full funding for research including entitlement to social security and pensions

'European Charter for Researchers' & the 'Code of Conduct for the Recruitment of Researchers'

All seven Irish universities and some Institutes of Technology (IoTs) have voluntarily signed up to the EU 'Charter & Code' and thus operate a policy of open recruitment. Science Foundation Ireland (SFI) also applies criteria for research grant funding based on the 'Charter & Code'.

In addition, IRC and the Irish Universities Association are spearheading an initiative to have all Irish Higher Education Institutions receive the Commission's endorsement of their recruitment policies and working conditions for researchers via permission to use the 'HR Excellence in Research' label. This initiative has so far resulted in the award of the logo to University College Dublin, University of Limerick, National University of Ireland, Galway, and University College Cork and put three of the remaining Irish universities³⁸, six Institutes of Technology,³⁹ and three other research performers⁴⁰ on the path to receiving the label, in addition to IRC, who are also implementing the process.

Autonomy of institutions

According to Universities Act (1997), Irish universities have full autonomy to appoint their employees, taking into account the resources available and accountability for use of public funds.

Universities may pay employees such remuneration, fees, allowances and expenses as approved from time to time by the Minister for Education and Skills. However, a university may depart from these levels of

³⁴ Available at: <http://www.iua.ie/research-innovation/researcher-salary-scales/>

³⁵ According to Irish Universities Association (2010), Guidelines for Contract Researchers Salary Scales and EU funded study in 2008 (CARSA)

³⁶ The Hosting Agreement Scheme enables approved research active organisations to recruit researchers from outside the European Economic Area to carry out research in Ireland without the need for a Green Card or Work Permit: <http://www.iua.ie/iua-activities/HostingAgreementScheme.html>

³⁷ <http://ec.europa.eu/euraxess/index.cfm/services/researchPolicies>

³⁸ Dublin City University, Trinity College Dublin, National University of Ireland Maynooth

³⁹ Athlone Institute of Technology, Cork Institute of Technology, Dundalk Institute of Technology, Limerick Institute of Technology, Institute of Technology Sligo, Waterford Institute of Technology

⁴⁰ Royal College of Surgeons in Ireland, Dublin Institute for Advanced Studies, Teagasc

remuneration, fees, allowances and expenses in accordance with a framework agreed between the university and the Higher Education Authority in an effort to attract and retain key research staff. Funding for salary top-ups can come from public or private sources.

Table 7: Types of institutional autonomy⁴¹

Organisational	Financial	Staffing	Academic
– Selection procedure for the executive head: the process is determined and conducted by the university governing authority in accordance with procedures specified in a university statute – Selection criteria for the executive head are determined by the university governing authority – Dismissal of the executive head: set out in Universities Act (1997)⁴² – Term of office of the executive head: 10 years as prescribed in Universities Act (1997) – Inclusion and selection of external members in governing bodies based on the composition of governing authority as set out under Universities Act (1997) – Capacity to decide on academic structures: universities decide their academic structures – Capacity to create legal entities: provided for under the Universities Act 1997.⁴³	– Length and type of public funding: annual recurrent block grant (which incorporates a core recurrent grant and a grant in lieu of fees for national/EU undergraduate students) – Ability to keep surplus: no restriction – Ability to borrow money: universities may borrow subject to restrictions agreed under a Framework for Borrowings and Loan Guarantees – Ability to own buildings: no restrictions – Ability to charge tuition fees for national/EU students (BA, MA, PhD): in accordance with the Universities Act (1997), a university may determine and charge fees subject to review by the Higher Education Authority. The HEA, having consulted with the Minister, will then advise the universities on the fees which in its opinion should be charged.⁴⁴	– Capacity to decide on recruitment procedures (senior academic/senior administrative staff): set out under employment equality legislation and Universities Act (1997)⁴⁵ – Capacity to decide on salaries (senior academic/senior administrative staff) with due regard to current government policy and legislation. – Capacity to decide on dismissals (senior academic/senior administrative staff): set out under employment equality legislation and Universities Act (1997)⁴⁶ – Capacity to decide on promotions (senior academic/senior administrative staff) with due regard to current government policy.	– Capacity to decide on overall student numbers: universities may decide on overall student numbers at an aggregate level, and also at a programme level for most programmes⁴⁷ – Capacity to select students (BA, MA): universities have statutory responsibility for selection and admission policies and practices – Capacity to introduce programmes (BA, MA, PhD): universities may decide on the portfolio and timing of programme offerings, assuming that the necessary conditions (proven demand, academic, financial, accreditation, etc.) have been met where required – Capacity to terminate programmes: universities may likewise decide if and when to terminate a programme, following due consultation with relevant stakeholders – Capacity to choose the language of

⁴¹ Data in this table relates to the seven universities only: for more information, see 'University Autonomy in Europe II: The Scorecard', European Universities Association 2011: <http://www.eua.be/university-autonomy-in-europe>

⁴² 'Only in accordance with procedures, and subject to any conditions, specified in a statute made following consultation through normal industrial relations structures operating in the university with recognised staff associations or trade union'

⁴³ 'A university may establish by incorporation in the State or elsewhere, or participate in the establishment of, such trading, research or other corporations as it thinks fit for the purpose of promoting or assisting, or in connection with the functions of, the university'.

⁴⁴ Note: these "fees" have, since 1997, not covered the cost of tuition, which is covered by part of the annual recurrent block grant (see above). The "fees" charged by universities (and all other publicly funded HEIs) under this mechanism have been referred to as a "student charge" or "student contribution". The level of "fees" charged under this mechanism is identical across all publicly funded Irish HEIs

⁴⁵ 'A university may, in accordance with procedures specified in a statute or regulation, appoint such and so many persons to be its employees as it thinks appropriate, having regard to (a) the efficient use of its available resources, the requirements of accountability for the use of moneys provided to it by the Oireachtas, and the policy relating to pay and conditions in the Public Service as determined from time to time by the Government'

⁴⁶ 'A university may suspend or dismiss any employee but only in accordance with procedures, and subject to any conditions, specified in a statute made following consultation through normal industrial relations structures operating in the university with recognised staff associations or trade unions, which procedures or conditions may provide for the delegation of powers relating to suspension or dismissal to the chief officer and shall provide for the tenure of officers'

Organisational	Financial	Staffing	Academic
	– Ability to charge tuition fees for non-EU students (BA, MA, PhD) universities may determine and set tuition fees for these categories of students.		instruction (BA, MA): universities are free to choose the language/s of instruction in any programme – Capacity to select quality assurance mechanisms and providers: universities and other HEIs are not free to select their own external quality assurance mechanisms. These are provided, in a variety of forms, for Irish HEIs through the Quality and Qualifications Ireland agency⁴⁸ – Capacity to design content of degree programmes: universities may decide on the content of degree programmes at all levels. In a number of professional areas (e.g. engineering, medicine, teacher education, nursing, etc.), this content must be agreed with the relevant professional or regulatory bodies, in order to ensure that graduates have a license to practice in these areas.

Source: the information in this section relates to Irish Universities Association Members only.

Career development

As an example, the majority of universities in Ireland have introduced their own research career structure (e.g. in some cases, the post-doc phase is limited to 4-5 years in order to ensure the researcher's progress). Progression to a more senior role is dependent on the ability of individuals to compete for work and win research grants. Permanent academic positions are filled through open international recruitment. For more information on professional skills development for researchers, see chapter 5 "Education and Training".

Shift from core to project-based funding

In Ireland, research funding has been always project-based. Core funding exists only for teaching activities and does not directly fund research. However, in the seven universities, the salary of tenured academic staff is provided from core funding: their job description includes teaching and research duties. This is in contrast to the Institutes of Technology, where academic staff are only required to teach.

⁴⁷ Exceptions exist in a number of professional areas where employment is predominantly in the public sector (e.g. teacher education, medicine, nursing, etc.)

⁴⁸ www.qqi.ie

Social security benefits (sickness, unemployment, and old-age)

Post-doctorates (R2-R4) are treated as employees and therefore covered for social security purposes, whereas the majority of pre-doctorates (doctoral candidates, R1) are treated as students and do not come under the Social (Welfare) Security code. Approximately 90% of PhD candidates in Ireland are full-time registered students and not employees. Therefore, they are not covered by employment-related social security.

Students are not entitled to receive social welfare payments such as unemployment, supplementary welfare or illness payments⁴⁹ while attending a full-time course of study. The Fixed Term Workers Act 2003 ensures that researchers employed on fixed term contracts (non-tenured) are eligible for the same entitlements as comparable permanent employees, in contrast to doctoral candidates who are regarded as students. Hence, all non-tenured researchers have the same sick leave entitlements as permanent employees.

The Programme for Research in Third-Level Institutions (PRTL), and IRC grants for post-doctoral researchers include provision for an employer's Pay Related Social Insurance (PRSI) contribution, which can entitle employees to benefits such as maternity and illness benefits, and jobseeker's (unemployment) allowance.

All funding awards for non-tenured researchers include an employer and employee pension contribution.

7. Collaboration between academia and industry

The Government places a strong emphasis on industry-academia collaboration. The national funding agencies for research and innovation promote collaboration between academia and industry. The ongoing Research Prioritisation Exercise (which was commenced in 2012) involves a significantly enhanced focus on collaborative research with enterprise and on commercialisation of research by growing the number of researchers in enterprise and enhancing the flow of researchers between academia and enterprise.

In June, 2012, the Government published a new national Intellectual Property Protocol. It sets out the Government's policies to encourage industry – from start-ups and small and medium-sized enterprises to multinational corporations – to benefit from the research and development performed in Ireland's public research institutions. It also describes the practical arrangements for accessing the research. A key recommendation of the report centres on the development of a "one-stop shop" for businesses seeking to use IP deriving from publicly funded research. It recommended that this be achieved through the establishment of a "central Technology Transfer Office" (cTTO) to provide an effective interface between industry and the research community, and also drive a world class technology transfer system in Ireland, ensuring it is responsive to the needs of both industry and academia.

The cTTO Director, Dr. Alison Campbell, was appointed in July 2013, and the new office will work closely with existing Technology Transfer Offices in the Colleges and Universities, sharing good practice and ensuring a consistent adoption and interpretation of national IP policy by all stakeholders. Enterprise Ireland, the Irish Government agency tasked with developing indigenous industry, has been working, in conjunction with the Irish Universities Association, to operationalise the cTTO and the office will be formally launched in 2014. This is considered a major step in making it easier to commercialise and ultimately create jobs from ideas developed through publicly funded research. The IP Protocol is part of a suite of actions being taken to improve the potential for economic return by encouraging the commercialisation of all forms of intellectual property arising from research in the publicly funded sector. It will complement Research Prioritisation, which places the focus of research investment in areas that offer the greatest economic impact for the country, the extension of the remit of Science Foundation Ireland into the applied research arena, and the continued development of venture capital supports for companies taking new opportunities to market.

The universities and Institutes of Technology also, of course, have dedicated Technology Transfer Offices (TTOs) to forge close links to industry. Enterprise Ireland has provided staff for TTOs in ten Higher Education

⁴⁹ "Entitlement to health services in Ireland is primarily based on residency and means, rather than on payment of tax or pay-related social insurance (PRSI). Any person, regardless of nationality, who is accepted by the Health Service Executive (HSE) as being ordinarily resident in Ireland, is entitled to either full eligibility (Category 1: medical card holders) or limited eligibility (Category 2) for health services." More info available at:

http://www.citizensinformation.ie/en/health/entitlement_to_health_services/entitlement_to_public_health_services.html

Institutes, including each of the seven universities⁵⁰. The TTOs support and manage the Intellectual Property generated by the universities' researchers, including helping the researchers to forge links with industry. Moreover, the Health Research Board (HRB) has a strong focus on translational medicine and funds a number of programmes designed to enhance collaboration between biomedical researchers, clinicians and medical practitioners.

The following table summarises programmes designed to develop boost collaboration between academia and industry, and to foster doctoral training in cooperation with industry.

Table 8: Collaboration between academia and industry

Measure	Description
ELEVATE scheme (2013 to 2018)	The Irish Research Council (IRC) has secured Commission co-funding to develop the ELEVATE scheme. This scheme will allow experienced researchers to spend two years at an enterprise/industry host laboratory outside Ireland, followed by a return year at an Irish Higher Education Institution. The Scheme offers researchers the opportunity to develop skills and gain additional beneficial experience and insight into the commercial arena while completing their research. It provides industry with flexible and easy access to an exceptional pool of competitively selected, high calibre researchers and the opportunity to build links with relevant academic research groups. The Council aims to offer 45 three-year fellowships via two calls for proposals, of which the first has been launched and awards made.
Enterprise Ireland Commercialisation Fund (ongoing)	The Enterprise Ireland Commercialisation Fund Programme aims to convert the outputs of state funded research into innovative new products, services and companies. The Programme supports researchers in Higher Education Institutions and Research Performing Organisations to undertake research that has the potential to result in the commercialisation of new innovation by way of licences to improve the competitiveness of Irish Industry or through the spin-out of new start-up ventures.
Enterprise Partnership Scheme (ongoing)	The Enterprise Partnership Scheme is an innovative initiative whereby the Irish Research Council, in partnership with private enterprises and public bodies, awards co-funded postgraduate scholarships and postdoctoral fellowships to the most promising researchers in Ireland. The Scheme offers researchers the opportunity to gain additional beneficial experience and insight into the commercial arena while completing their research. It provides industry with flexible and easy access to an exceptional pool of competitively selected, high-calibre researchers, and the opportunity to build links with relevant academic research groups. It facilitates the establishment of new relationships and the strengthening of existing ones between enterprise and academia while offering financial support to researchers at an early stage of their career development.
Enterprise Ireland New Frontiers Programme (ongoing)	This programme is a successor to the Institutes of Technology (IoT) Enterprise Platform Programme and aims to start up innovative businesses on campus, linking with the innovation centres in place across all of the IoTs. There is strong evidence of the success of this 'spin-in' model, where new and growing firms which locate on campus are then supported by research teams to become more innovative and achieve sustainable growth ⁵¹ .
HRB-SFI Translational Research Awards (TRA) (ongoing)	Fundamentally, Translational Research involves the translation of scientific discoveries into practical applications in order to improve human health. The Translational Research Award (TRA) joint initiative aims to support the research funding strategy of both the Health Research Board (HRB) and Science Foundation Ireland (SFI), with reference to the Department of Health's Health Action Plan 2009. In keeping with the strategic goals of HRB and SFI, these awards fund investigator-driven research projects with clear milestones and realistic deliverables, focus resources in areas which offer the greatest potential for translation into impacts and benefits for health and long term economic development, as well as foster more efficient and effective collaboration between researchers based in an academic setting and those working in a service delivery/clinical setting who are engaged in translational research.

⁵⁰ <http://www.enterprise-ireland.com/en/researchers/technology-transfer-support-system/technology-transfer-offices-contact-details-.html>

⁵¹ Case study examples of this programme helping new companies to become more innovative and grow are available at: <http://www.ioti.ie/rdi/delivering-impact-for-industry>. This also provides examples of other industry-academia partnerships across the Institutes of Technology in Ireland

Measure	Description
Industry-led Research Networks Programme (ongoing)	Enterprise Ireland's Industry-Led Research Networks Programme supports medium-term 'shared agenda' research activity among groups of companies that could not afford to fund such research on their own. The model used engages a wide spectrum of companies with a common interest. This leads to success because the risks and benefits associated with large research projects are shared, as are the skills and knowledge built up through working with academic researchers. Projects generally take between nine months and two years to complete, and the research is contracted out to a publicly-funded research institution with significant funding available from Enterprise Ireland. The amount of funding awarded depends on the scale of the proposal and the potential of the research project.
Innovation Vouchers (ongoing)	Enterprise Ireland's Innovation Voucher initiative was developed to build links between Ireland's public knowledge providers (i.e. higher education institutes, public research bodies) and small businesses. Innovation Vouchers worth EUR 5 000 are available to assist a company or companies to explore a business opportunity or problem with a registered knowledge provider.
Innovation Partnerships (ongoing)	Enterprise Ireland's Innovation Partnership Programme encourages Irish-based companies to work with Irish research institutes resulting in mutually beneficial co-operation and interaction. Companies can access expertise and resources to develop new and improved products, processes, services, and generate new knowledge and know-how. The participating company benefits in terms of its growth, the evolution of its strategic research and development, and the creation of new knowledge that it can use to generate commercial advantage. The research institute benefits in terms of developing skillsets, intellectual property and publications. Grants of up to EUR 250 000 are available for collaborative projects between companies and higher education research teams.
IRC Employment-based Postgraduate Programme (2012-ongoing)	This programme provides postgraduate researchers with an employment-focused educational experience. The programme offers researchers the opportunity to undertake a Master's or PhD degree while employed by a private company or public organisation based in the Republic of Ireland. This programme was launched as a pilot programme in late 2012 to fund postgraduate research opportunities at both PhD and Master's level to be undertaken within companies or other external organisations under the supervision of higher education authorities. It offers the dual benefits of helping industry to become more innovative while increasing the employment potential of postgraduates. Following the successful pilot, the programme has evolved to become a national instrument, with other national funders supporting and funding the scheme to address needs across a range of sectors.
SFI Spokes Programme (ongoing)	The Spokes Programme is a vehicle to enable the addition of new industrial and academic partners and projects to a SFI Research Centre, thus allowing the Centre to expand and develop in line with new priorities and opportunities. This will ensure that the Research Centre retains its ability to carry out cutting-edge research and maintain its industrial relevance, and so enhance sustainability. The Spokes Programme also provides a vehicle to link different Research Centres. The Programme has been designed to deliver excellent, basic, oriented research results and discoveries in targeted projects associated with SFI Research Centres and hence deliver significant economic and societal impact during the lifetime of the Programme. The Spokes programme has run in two parts. The fixed call closed in November 2013 but the Spokes Rolling Call has no closing date (until further notice). This call requires an industry partner to make a minimum 50% cash contribution to the research programme.

Measure	Description
SFI Research Centres Programme (2012-2017)	Consolidating SFI's earlier Centres for Science, Engineering & Technology (CSETs) and Strategic Research Clusters (SRCs), and launched in 2012, SFI's new Research Centres Programme was designed to link scientists and engineers in partnerships across academia and industry to address crucial research questions, foster the development of new and existing Irish-based technology companies, attract industry that could make an important contribution to Ireland and its economy, and expand educational and career opportunities in Ireland in science and engineering. Research proposals under this new programme are required to have substantial industry participation. The programme launched in 2012 will run over six years to create new research centres, or to extend the activity of existing research centres, and will generate opportunities for growth during the lifetime of each centre by enabling them to apply for funding for additional targeted projects, on the lines of a 'hub-and-spoke' model. The SFI Research Centres Programme aims to deliver excellence-oriented research results and discoveries in research areas informed by, and of interest to, Ireland-based technology companies, and hence to deliver significant economic or societal impact during the lifetime of the programme ⁵² .
SFI Industry Fellowship (2013 onwards)	The Industry Fellowship Programme was launched in March 2014. The purpose of the programme is to facilitate the exchange of people at all levels between academia and industry (both SME and multinational company). Fellowship funding is provided across the entire academic salary scale for awards for up to one year. At present there are two deadlines open – 10 th June 2014 and 10 th December 2014.
SFI Strategic Partnership Programme (ongoing)	The Strategic Partnership Programme is open on a rolling basis to applications involving strategic opportunities within all areas covered by SFI's legal remit, where significant co-funding from a company, collection of companies, funding agency, charity, philanthropic organisation or Higher Education Institution is viable. The Strategic Partnership Programme is specifically aimed at funding compelling research opportunities on a flexible basis that are not otherwise served by other national funding programmes. The scheme aims to support stand-alone initiatives of scale with strong potential for delivering economic and societal impact to Ireland.
SFI Short-term Industry Visiting Fellowship (2014 onwards)	This programme has been designed to promote the exchange of investigators and industry leaders between academia and industry (both SME and multinational for short periods of time). Fellowship funding is provided for awards of approximately one month or equivalent. These schemes enable industry to gain a deeper understanding of the skills/knowledge base – expertise/resources and facilities within the Irish academic sector and enable knowledge transfer between the two, allowing the host organisation to engage the fellow in path-finding, expert workshops and other mutually beneficial activities.
SFI Investigators Programme (IvP) (ongoing)	Arising out of the earlier Principal Investigators (PI) programme, the overriding objective of SFI's Investigator Programme (IvP) is to continue the development of world class research capability and human capital in areas of science, engineering and mathematics that demonstrably support and underpin enterprise competitiveness and societal development in Ireland. In particular, IvP awards made by SFI have the objectives of building research capacity, expertise and reputation, promoting links amongst researchers and partnerships with industry, as well as the support of technology development. The Investigators Programme covers areas of science, engineering and mathematics that underpin Ireland's competitiveness and development, and which address challenges and opportunities in the broad areas of biotechnology, ICT and energy.
SFI/EI Technology Innovation Development Award (TIDA) (ongoing)	The objectives of TIDA awards are to facilitate greater interaction of SFI-funded researchers with industrial partners, and to enhance the generation of new applied technologies. The initiative was introduced to bridge the gap that exists between basic and applied research activities. TIDA has a threefold focus, on: – Further enhancing the commercial value of SFI programme (SFI Principal Investigator and SFI Investigator programmes) and project (Research Frontiers Programme) grants (the SFI Principal Investigator and RFP programmes have been consolidated into the SFI Investigator Programme (IvP) that was first launched in 2012); – Getting PhD students and Post Doctorates industry-relevant experience; and – Further influencing "bottom-up" investigations by Industry. TIDA is based on a recognition that making SFI-funded researchers more industry-aware, and encouraging them to interact with industry collaborators, benefits both the researchers and the industrial sector. And by stimulating such interactions through TIDA, the potential opportunities to further develop technologies arising from SFI-funded

⁵² Note: The existing SFI CSET and SRC programmes will not terminate immediately when the new Centres come into being, and all three programmes will run concurrently to ensure smooth progression into the future

Measure	Description
	research along a more applied or commercial path are enhanced. Due to its nature, the TIDA programme is open to existing SFI award holders under selected programmes.
Technology Centres (ongoing)	In line with the government's commitment to generating economic value from publicly funded research, it has provided funding to establish industry-led Technology Centres. These Centres – collaborative entities established and led by industry. They are resourced by highly qualified researchers associated with research institutions, who are empowered to undertake market-focused strategic R&D for the benefit of industry. This is a joint initiative between Enterprise Ireland and IDA Ireland ⁵³ allowing Irish companies and multinationals to work together in these centres. There are currently 14 Technology Centres in operation with a further two due to be launched in 2014 in the Dairy Technology and Connected Health sectors. EUR 100 million has been approved in funding for the Technology Centres and over 300 companies are already benefiting from Ireland's largest industry-led research programme driving innovation and delivering results in the areas of cloud computing, analytics and learning technologies, manufacturing and materials, energy, food and health, financial services and business processes.
Technology Gateway (formerly Enterprise Ireland Applied Research Enhancement (ARE) Centre Programme) (ongoing)	In 2013, Enterprise Ireland rolled out a new programme enabling the establishment of a new network of Technology Gateways. The Technology Gateways are based upon the platform created by Enterprise Ireland's Applied Research Enhancement (ARE) Programme. The Technology Gateway Programme seeks to harness the innovation and technological expertise in the Institutes of Technology (IoT's) for the benefit of Irish-based industry on a regional and national basis. Under the Gateway Programme, a nationwide network of 12 industry-focused Gateways was established in eight IoT's, representing a EUR 23 million investment over five years from January 2013 to December 2017. The Gateways are based regionally in Waterford (3), Cork and Athlone (2 each), a joint consortium between Limerick and Tralee IoT's, with one Gateway each in Tralee, Dublin and Letterkenny IoT's. During 2013, these Gateways completed 208 industrially relevant projects for companies, and 210 collaborative projects are planned for 2014.
The Programme for Research in Third-Level Institutions (PRTL) (ongoing)	The PRTL was initiated in 1998, under the responsibility of the Department of Education and Skills, and responsibility for the Programme transferred to the Department of Jobs, Enterprise and Innovation in 2010. Currently in its fifth cycle, which commenced in 2011, the PRTL is administered by the Higher Education Authority on behalf of the Department of Jobs, Enterprise and Innovation. The PRTL enhances PhD education and training, so as to deliver PhDs with skillsets for working across the spectrum of the public and private sectors. In addition, many of the structured PhD programmes funded through the PRTL and other sources ensure that the PhD students are trained in a high quality research environment with opportunities for acquiring both transferable/generic skills and experience in a related employment sector. For example, the Bio AT (BioAnalysis and Therapeutics) Structured PhD is a collaboration between three universities and three Institutes of Technology in partnership with hospitals and pharmaceutical companies. In summary, PRTL reflects the capacity needs of the entire policy and research system across a range of sectors including enterprise, new technologies, energy, agriculture, marine, health and creative domains. As a coherent package of projects, PRTL Cycle 5 is addressing both immediate and short-term PhD education, as well as research infrastructure requirements.
The SFI US-Ireland R&D Partnership Programme (ongoing)	The US-Ireland R&D Partnership is operated under an arrangement between Science Foundation Ireland (SFI), and the Health Research Board (HRB), the National Science Foundation (NSF) and the National Institutes of Health (NIH) in the USA, and Invest Northern Ireland (Invest NI) and the Department for Employment and Learning (DEL) in Northern Ireland. The Partnership involves the Governments of Ireland, Northern Ireland and the USA working together to advance scientific progress by awarding grants for research on a competitive basis. The scope of the jointly funded programme is to support research and education, particularly in the areas of Nanoscale Science & Engineering, Sensors & Sensor Networks, Telecommunications, Energy and Sustainability, and Health, through competitive awards via existing (core) programmes in the case of SFI and HRB in Ireland, NSF and NIH in the USA, and via the R&D funding mechanisms of the two Northern Irish organisations. Every successful proposal is required to have a minimum of one Principal Investigator (PI) from each jurisdiction. Proposals are evaluated not only in terms of intellectual merit, but also in broader terms to assess the international collaboration in terms of mutual benefits, true intellectual collaboration among the international partners, benefits to be derived from the expertise and specialist skills and resources of the international counterparts, and (where applicable) active research engagement of students and early-

⁵³ IDA Ireland is the Government agency tasked with attracting foreign direct investment in Ireland

Measure	Description
	career researchers. The Partnership: – Helps to link scientists and engineers in partnerships across academia and industry to address crucial research questions; – Fosters new and existing industrial research activity that could make an important contribution to the respective economies; and – Expands educational and research career opportunities in science and engineering.

Source: Deloitte

There is strong evidence of the success of the Enterprise Ireland funded Applied Research Enhancement (ARE)/Technology Gateway programme (see table 8). Between 2008 and 2013, the ARE centres and their successors, the Technology Gateways, have undertaken 730 innovation-based industry collaborations with in excess of 400 companies. During this period there was a deepening of the level of research engagement with companies from short-term projects to longer-term partnerships, the numbers of directly funded industry research projects increased eightfold and the level of the industry contribution to overall project activity was over 40%, comparing very favourably with other industry/academic research centre programmes. Full results are shown below.

Table 9: AREs/Technology Gateways, Industry projects undertaken 2008-2013

Project Type	2008	2009	2010	2011	2012	2013	Total
Total No. of Projects	36	69	117	150	150	208	730
Of which - Innovation Voucher	20	45	70	52	64	71	322
Of which - Innovation Partnership	2	7	13	19	13	19	73
Of which - 100% Funded by Industry	14	17	34	79	73	118	335

Source: Enterprise Ireland

8. Mobility and international attractiveness

In 2011, the percentage of doctoral candidates (ISCED 6) who were citizens of another EU-27 Member State was 16.9% in Ireland compared with 18.4% among the Innovation Union reference group and an EU average of 7.7%⁵⁴. In the same year, the percentage of non-EU doctoral candidates as a percentage of all doctoral candidates was 20.5% in Ireland compared with 16.9% among the Innovation Union reference group and an EU average of 24.2%⁵⁵.

Measures aimed at attracting and retaining 'leading' national, EU and third country researchers

There are no nationality restrictions associated with applying for either research funding or research positions in Ireland. As an example, the post-doctoral fellowships offered by the Irish Research Council are open to researchers of all nationality, including those who are resident outside Ireland at the time of application.

The table below summarises key measures implemented by SFI to attract and retain leading national, EU and third-country researchers.

Table 10: SFI measures to attract and retain leading national, EU, and third-country researchers

Measure	Objectives
E.T.S. Walton Visitor Awards Programme (Science Foundation Ireland) (ongoing)	The E.T.S. Walton Visitor Awards Programme enables high-profile international academic and industrial researchers to visit and collaborate with Irish research groups for a fixed period of time. The programme also aims to support the transfer of skills and knowledge to Irish research groups, develop international networks as well as facilitate links with industry. SFI is strategically enhancing research links – apart from with the EU and the US – with other countries such as Australia, Brazil, Canada, China, India, Japan,

⁵⁴ See Figure 1 "Key indicators – Ireland"

⁵⁵ Ibid

Measure	Objectives
	Russia, Singapore and South Korea.
Research Professor Programme (Science Foundation Ireland) (ongoing)	The Research Professor Programme aims to attract outstanding research talent from abroad to Ireland. The Programme is intended to support national strategic priorities by assisting research bodies in their recruitment of world-leading researchers for professorial chairs, or similar research leadership positions in targeted scientific areas within the life sciences, information and communication technology, and energy sectors. Funding of up to EUR 5 million is being provided in total to successful applicants for a five- year programme of work. This also includes a contribution towards the SFI Research Professor's remuneration package for each year of the award.

Source: Deloitte

Inward mobility (funding)

To facilitate the inward migration of third country researchers, Ireland has implemented the Hosting Agreement (the Scientific Visa) scheme. By availing themselves of a hosting agreement, researchers' entry visas are fast-tracked and researchers can work in Ireland without recourse to the usual work permit or Green Card. This scheme also allows the researcher's immediate family to live in Ireland for the duration of their contract, and entitles their spouse and dependents to apply for a work permit allowing greater ease of access to employment in Ireland. This has most certainly helped in attracting non-EU researchers to both the public and private sectors. Between the commencement of the scheme in October 2007 and December 2013, the EURAXESS office processed nearly 2 200 Hosting Agreements with a total of 42 accredited organisations. This includes the seven Irish universities, twelve Institutes of Technology, ten other research institutions and sixteen industrial organisations.

Eighty-five percent of researchers covered by hosting agreements are employees of the Irish universities. The number of researchers working in Ireland on hosting agreements varied from 500 to 550 in the first quarter of 2013. This marks an increase of an average of 100 researchers, or 23%, since 2011. Eighty-six per cent of the researchers on Hosting Agreements are employees of the seven universities (as of May 2013). Most non EEA-researchers found employment in ICT/computer science and life sciences (27% and 26% respectively) across a range of Irish research institutions. A significant number of researchers on Hosting Agreements work in the engineering sector (23%), while physics and chemistry attracted 17% and 15 % of the non-EEA researchers respectively.

The researchers on hosting agreements in Ireland come from 87 different non-EEA countries. The top two nationalities with hosting agreements are Indians, with 400 issued in total (103 employed as of December, 2013,) and Chinese, with 366 in total (92 employed as of January 2014) agreements. They are followed by US nationals with a total of 201 hosting agreements to date (44 currently employed as of January 2014). There are at present 28 Pakistani, 22 Iranian and 18 Russian nationals with hosting agreements in Ireland (January 2014).

By January 2014, a total of 850 researchers (43% of all hosting agreement holders) had availed themselves of the immediate family unification opportunity, and as of January 2014, 217 had their dependants with them for the duration of their research projects in Ireland. The Hosting Agreement Extranet contains constantly updated details of agreements issued to all researchers under the scheme, and has been regularly used by immigration authorities in Ireland as well as by Irish embassies abroad (e.g. Beijing, New Delhi, Moscow and Abuja) for verification purposes. This minimises the visa application process for the researchers. Ireland is also taking part in the Science without Borders programme,⁵⁶ aiming to attract a significant number of students from Brazil to undertake their doctoral degree in Ireland. This initiative is advertised via a dedicated page on euraxess.ie.

The table below summarises the funding measures to support researchers' inward mobility offered by the main research funders.

⁵⁶ <http://www.euraxess.ie/page.aspx?SP=176>

Table 11: Measures supporting researchers' inward mobility

Measure	Description
Irish Research Council Suite of Funding Programmes	The funding programmes operated by the Irish Research Council are designed to enable the Irish research community to contribute to the body of global knowledge across a range of disciplines, recognising the importance of research and scholarship for all aspects of social, cultural and economic development. The majority of the post-doctoral fellowship and doctoral scholarship programmes operated by the Irish Research Council are open to researchers of any nationality and residence, as long as the research supported by the award is undertaken at a research organisation in the Republic of Ireland.
Health Research Board Suite of Funding Programmes	The Health Research Board's Research Strategy (2010-2014) will gradually concentrate resources into research that offers the most potential for translation into impacts and benefits for people's health. Their funding programmes will support patient-oriented research, clinical, including applied biomedical, research, as well as health services and population health sciences research. HRB Schemes, in the main, have a requirement for the applicant to hold an employment contract with a recognised host institution for the duration of the award: there are no restrictions regarding nationality or residency prior to applying for the award.
President of Ireland Young Research Award (PIYRA) (Science Foundation Ireland) (ongoing)	See chapter 6 "Working conditions".
Starting Investigator Research Grant (SIRG) (Science Foundation Ireland) (ongoing)	The SFI SIRG Programme (see also chapter 6 "Working Conditions") provides an opportunity for excellent early-career-stage investigators to carry out independent research in the fields of science and engineering that underpin biotechnology, information and communications technology (ICT), and sustainable energy and energy efficient technologies. The objectives include to: – Allow early-career investigators of all nationalities to enhance their experience in Irish HEIs; and – Allow early-career investigators who have been employed outside of Ireland to return to work in an Irish HEI.
SFI Research Professorship Programme	The SFI Research Professorship Programme is intended to support national strategic priorities by assisting research bodies in their recruitment of world-leading researchers for Professorial Chairs or similar leadership positions in targeted scientific areas. The Programme may also act as a mechanism to support the recruitment of individuals who possess a strong industry background, as well as directorship roles in established research centres within Ireland. The recruitment of iconic scientists and engineers will build the national research and enterprise base, and enhance Ireland's reputation as a centre of excellence for research.

Source: Deloitte

Outbound mobility

In Ireland, international mobility is perceived as a strongly positive addition to a researcher's track record, and is often necessary to gain a permanent academic position.

SFI programmes (short-term travel fellowships, Walton scholarship scheme) and the IRC's ELEVATE Programme aim to encourage researchers to spend some time as a researcher in another country. See also chapter 7 "Collaboration between academia and industry".

Promotion of 'dual careers'

The Hosting Agreement scheme, as implemented by Ireland, allows for the spouse of a Hosting Agreement holder to accompany the researcher and to seek work without obligation to satisfy a 'Labour market Needs Test'⁵⁷. Similar exemptions apply in the case of the spouse of a 'Green Card' holder (special categories of skilled workers).

Portability of national grants

Publicly funded R&D grants and fellowships provided via public funding are always linked to Irish R&D centres. The legal and grant beneficiaries are the Irish institutions and consequently, the grants are not portable to other EU countries. However, the research can be carried out in foreign countries, subject to the terms of the relevant call.

⁵⁷ Available at: <http://www.djei.ie/labour/workpermits/labourmarketneedstest.htm>

Access to cross-border grants

In Ireland, national grants or fellowships are open to non-residents, but research must be carried out in Ireland.