Interview: Prof. Mark Ferguson – Director General, Science Foundation Ireland; Chief Scientific Advisor to the Government of Ireland

Ireland is on a fantastic trajectory in terms of our innovative output and the quality of Irish science, which have both been improving steadily year on year

15.09.2016

Tags: Innovation, Ireland, PPP, Research, R&D, Government

Professor Mark Ferguson, Director General of Science Foundation Ireland and Chief Scientific Advisor to the Government of Ireland, highlights Ireland's recent spectacular success in fostering research and innovation; the government's strategy to further promote Irish science, Innovation 2020; the priority of building academia-industry partnerships; and his mission to turn Ireland into an 'Innovation Leader.'

Professor Ferguson, congratulations on seeing Ireland move up two spots in the EU Innovation Scoreboard this year. To begin, could you expand on this important advancement?

Ireland is on a fantastic trajectory in terms of our innovative output and the quality of Irish science, which have both been improving steadily year on year. Looking at the EU Innovation Union Scoreboard, Ireland has advanced from tenth in 2013 to ninth in 2014, eighth in 2015 and now sixth in 2016. Similarly, we have seen consistent improvements in the global rankings for quality of science, moving up two places to 14th this year.

If we dig a bit deeper, we have had some really remarkable results in domains very relevant to the life sciences – this year, we were ranked globally second for scientific nanotechnology and

chemistry so it is clear that the pharma industry has ample reasons to strongly invest in Irish research in these fields. We are also very happy to see that while we funded EUR 154 millions of research last year, our researchers were able to raise EUR 130 million from other sources, nearly a one to one ratio; we aim to raise that ratio to two to one. Moreover, EUR 79 million of the 130 million came from competitive EU funding programs, which is triple our 2014 performance.

What needs to be done to continue to improve Ireland's innovative output and quality of science?

[Featured_in]

The government's new strategy for Irish science, R&D and innovation was approved in December 2015, under the title Innovation 2020, with the three key themes of Excellence, Talent, and Impact. It is fiercely ambitious, seeing us more than double expenditures on R&D between now and 2020, which means attracting EUR 2 billion more from the private sector and investing EUR 1 billion more from the public sector.

Aside from strengthening and expanding certain programs, which includes opening more SFI research centers, it also seeks to introduce several new programs and mechanisms. One of the most interesting is challenge-based funding, under which we will set clearly articulated challenges following consultation with industry, academia, and the general public, and then with private sector partners we would co-fund several teams with interesting proposals for trying to address these challenges – a prize would be set for the winner, be it a cash prize, the implementation of their solution, a change in government policy, etc. This program would address a current gap in the government R&D funding system in Ireland, which does not feature either prize funding or a funding stream available for all, including the general public. When one considers that lone inventors are the second top category of patent filers in Ireland, after companies and ahead of academia, it is clear that there is significant innovative potential within the general public that is not currently being supported or fostered by government policy.

Remarkably, Ireland's public science budget was little affected throughout the recession years, and clearly this commitment has brought significant results. With this strong recent track record and growth GDP growth of 7.8 percent last year, what is the current political climate towards increasing public investment in Science?

Innovation 2020 has received support from all major political parties, and it's fantastic that there is this consensus. The challenge now is getting science funding in general to the top of the governments priority list so we can get the budgetary increases needed to progressively

implement this strategy effectively. As both Director General of the SFI and the Chief Scientific Advisor to the Government of Ireland, I certainly carry a large portion of the responsibility to articulate the case for science to be a top political priority. However, it is critical that the rest of the academic community and industry join their voices with mine to ensure that this case is communicated clearly and with strong emphasis.

There are several key arguments for why Ireland should increase investment in science. First, although not specific to the Irish context, is that investing in science is one of the few areas that can bring short, medium, and long-term benefits; within a matter of months increased science funding would help create jobs, help drive the creation of indigenous startups, increase industry competitiveness, and attract FDI investment. In the medium, investment in research will help to train a skilled workforce for the future, and in the long term there will be cases where researchers make major scientific breakthroughs and disruptive discoveries.

[related_story]

As for why Ireland specifically should invest more in scientific research, our investment strategy clearly works given recent progress, it’s clear that the projects funded by Science Foundation Ireland and other entities are delivering, and according to EU statistics Ireland is actually the most efficient EU country in terms of innovation output. That said, we have achieved all of this with a level of public expenditure on science which is below the EU average. Therefore, we argue that with our effective, efficient, and impactful research infrastructure and strategy in place, further investment in scientific research by the Irish government will deliver disproportionately large returns.

What would you identify as the key to Ireland’s best-in-Europe innovation efficiency?

First, I think it is important to point out that our recent performance has to a degree been an after effect of the severe recession we experienced a few years ago. Given the severe financial constraints the government faced, we really had to justify the existence of SFI and each of our programs, and as such many programs were reformed and a myriad of changes made. At the end of this process, we had really “put the ship in shape” so to speak, and made sure that every Euro of taxpayer money was going into something not only excellent but that would also bring value. This process certainly played a role in making Ireland the most efficient country in the EU in terms of innovation output.

The most critical aspect and pervasive theme without our strategy has been our focus on building partnerships. We want Ireland and Irish research institutions to be considered partners of choice at

the global level, for companies, research institutions in other countries, charities, and any other entities. Ireland is a small country and we can't do everything alone, and by promoting and leveraging partnerships we are able to give our excellent researcher communities access to greater resource. In general, Science Foundation Ireland funds collaborative projects that are at least 50 percent funded by the private sector. As such, meaningful partnerships where all parties involved get value from their participation, is at the very core of Science Foundation Ireland's strategy. Last year, SFI was involved in 1220 industry collaborations with 372 multinational companies and 437 SMEs, some companies participating in multiple projects or programs simultaneously.

Partnerships also provide a structure that tends to facilitate or encourage research impact. Many partnerships grow over time if they prove mutually beneficial. One of my key impact metrics for Science Foundation Ireland Research Centers is "repeat industrial business of escalating financial value," the idea being that if an industry partner funds EUR 1 million in contract research one year and then comes back to invest EUR 5 million the next year, clearly something has gone well and the partner feels they got good value for the money they invested. For my part, seeing Irish Research Institutions engaging in repeat industrial business of escalating financial value is just as interesting as seeing them publishing papers in Nature, Science, or other academic publications.

When you were last interviewed by Focus Reports in 2012, you commented that while basic science funding was quite strong in Ireland, there was a gap around translational R&D. How have you addressed that gap over the last four years?

The current trend in research funding circles is called ABC, or 'Applied and Basic Combined', and we have strongly embraced this methodology. In fact, Ireland is really at the forefront of embracing this methodology which essentially is based on the concept that there is no real division between basic and applied research but rather that both exist within a continuum. A capable team of excellent scientists with access to the right infrastructure are equally able to tackle short term applied challenges to be solved over a period of six months to a year and at the same time pursue groundbreaking research with the potential to be disruptive or transformative. This is exactly what our SFI Research centers are designed to do.

What is your vision for Ireland five years from now, in terms of research and innovation?

I hope that in five years' time Ireland will be an 'innovation leader.' At present we are classified as 'strong follower' in EU terminology, which is a fairly accurate description of our current positioning,

but in five to ten years I would like to see more scientific discoveries and disruptive inventions take place in Ireland.

> I hope that in five years' time Ireland will be an 'innovation leader'

Certainly we must maintain the balance between FDI investments in R&D and indigenous startups, as these industry-segments currently have a mutually beneficial symbiotic relationship. Multinationals want to buy startups, and having access to foreign capital is essential to the success of many of our indigenous startups.

Finally, I hope to see Ireland maintain its agility and adaptability such that we are able to build expertise and establish a position in the development and commercialization of technologies that we haven't yet heard about today. The world changes very quickly, and we in Ireland need to be able to catch on swiftly and adapt rapidly. We want to lead and win more competitive large European Research projects. I would ideally like to see Ireland develop further as a test bed, e.g. for convergent projects in Pharma and IT or Pharma and Manufacturing 4.0. Ireland is small enough to collaborate and test but large enough to scale and succeed.

See more interviews