DELIVERING SCIENCE FOR THE FUTURE

Ireland's Chief Scientific Advisor aims to shape the development of science and technology in Ireland to ensure Ireland's future economic success. Anna Clarke speaks to Professor Patrick Cunningham.

We can't guarantee that what served us well in the last decade is going to serve us well forever. It's inevitable, the competition isn't static," says Professor Patrick Cunningham, who has occupied the position of Chief Scientific Advisor to the Government since January 2007.

The role of Chief Scientific Advisor was created in 2004 to look specifically at how R&D spending was managed in Ireland and how policy and practice were advanced in an integrated manner. Cunningham is charged with delivering the government's strategic plan for the development of the sciences and science-related industry laid out in the Strategy for Science, Technology and Innovation. The office recently increased in number with the employment of Eamonn Ryan as Senior Research Officer.

"Essentially we are required to respond to a request from government for advice on an issue related to science. It might be related to the governance, to the financing, objectives, to the structures, to the performance," he says.

However he is keenly aware of the need to consult with experts in the field specific to the request that lands at his door.

"Our job is to obviously provide the best advice we can. If we can do that from our own resources that's fine, but in general we reach out to the best knowledge on the issues concerned, in this country and internationally," he explains "and I'd like to emphasise that we're independent, we're supposed to operate independently of other agencies. So in furnishing advice on any issue we would attempt to bring together the very best wisdom that we can from the very best sources in this country and internationally."

Since he took office six months ago, Cunningham has been building a network of international contacts and he hopes to continue to do so. This network will enable him to build an awareness of the policy adopted in countries worldwide in relation to particular issues and to ensure that we don't find ourselves reinventing the wheel, so to speak.

Keeping pace internationally

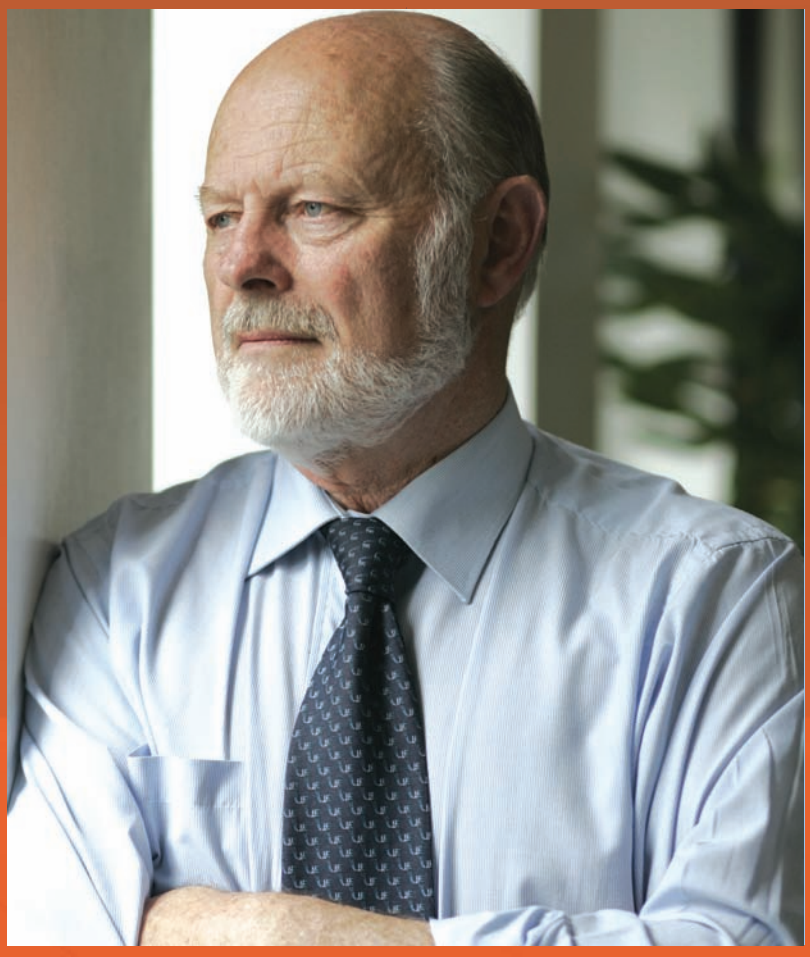
Although Ireland has developed an impressive reputation internationally, on the basis of its highly educated workforce and the level of scientific research that has been undertaken within the country, Cunningham is adamant that the country must continue to progress in order to keep pace with the advancement of the sciences internationally.

"Ireland is a small economy and even at our best we're going to be producing less than 1% of all the new knowledge in the world, if you measure that in publications or similar, so we'll be a fraction of 1% of the knowledge generation. But unless you're actually pulling your weight in that, you're eventually going to loose ground, you can't be just a receiver all the time," he says.

"Up until the mid nineties we had a good internationally competitive higher education system, with a higher percentage participation rate in those years than many other countries, and that served us very well. What we find now, suddenly, is that we're up among the leaders in many respects, per head for example, but that we haven't put our infrastructure in place to retain our position there, and that applies to roads and to electricity supply and it also applies to what is called the knowledge economy," he explains.

Cunningham highlights that although this country has a reputation for producing high technology merchandise and services, the majority of the scientific and technological research that underpins this industry was developed elsewhere.

"On most of the criteria used to judge our investment in and contribution to and ability to profit from the growth of knowledge we're actually at or below average in the OECD rankings at the moment and if we're going to retain our position in the top quarter as far as wealth is concerned, we have to do it with this instrument as well," he explains.



Putting a top floor on the education system

The Strategy for Science, Technology and Innovation contains a recommendation that the number of PhDs and Principal Investigators be doubled over the course of the next ten years. However, while talented researchers might pass through the venerable halls of our higher education institutions, this does not necessarily mean that they will continue to contribute to the Irish economy upon graduation.

"There is a realisation that we've had obstacles in the past to retaining good students as good workers in the economy and that's being addressed. The rules have been adapted and are being adapted," he says. Just one such obstacle is the stipulation that those years spent studying for a PhD do not count towards residency or visa programmes post-graduation, something which appears to run contrary to the Government's objective to increase the number of individuals within the country educated to 4th level.

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However, Cunningham asserts that many aspects contribute to an individual's decision to remain in one location or to relocate to another and that it should be recognised that at that level, brain-power becomes very mobile. "What we would hope is that we would have a very favourable balance of trade, so that at least if we are losing people, we're gaining them as well. We are gaining very well qualified people from other countries. But, I think for the long term

security of the country, we should aim to have the bulk of the scientifically literate and competent community coming through our own system, people whose roots are in this country and who are more likely to remain in this country," he explains.

"Most people coming off the PhD production line are going to be employees rather than entrepreneurs, inevitably, so for that larger number what's important is that they get the normal kind of recognitions that go with being valuable members of society and that hasn't happened here yet," he says.

Cunningham believes that to truly deliver a workable and sustainable knowledge economy, science education must adapt to train graduates to operate within a commercial world.

"The training, at graduate level particularly, has to be more intense and professional and detailed at one level, but I think that we have to deliberately try to parallel this with a broadening of competence," he says. This broader competence would include such skills as people management and an ability to operate basic balance sheets and above all, an understanding of the practical demands of the commercial world.

"I think we've focused our graduate education solely on the particular science that someone is studying, they come out after three years and they're an expert in some particular beetle or something, which may be wonderful, but in today's commercial world, it's not enough," he explains.

A wide scope of experience

Over the course of his own career Cunningham has garnered diverse experience in a wide range of fields and roles. During his tenure as Chief Scientific Advisor he will retain his position as Professor of Animal Genetics at Trinity College Dublin. The outcomes of his research within this specialty have significantly impacted upon our understanding of animal genetics. His investigation of the genetic development of cattle in India and Africa led him to delve into areas such as archaeology, anthropology, palaeontology and essentially, rewrote the history of animal domestication, causing quite a stir on the international scene.

The project, which began with EU funding, was initially developed with the aim of helping development work in developing countries however, when the BSE crisis began, Cunningham and his research partners recognised a commercial application of their research.

"We realised that the techniques we were using to identify and differentiate animals could be used to trace meat in a supermarket and after that grew an idea and we patented that and we started a company," he explains. The company, Identigen, provides the technology to track and trace meat available in a retail outlet back to an original source and the actual animal that it came from. Identigen began operation in Dublin in early 1997 and now operates from locations in Dublin and Kansas, USA.

Although the advent of the BSE crisis appears to have been the impetus for commercialisation, in this case Cunningham highlights that numerous pieces of an overall jigsaw came together to lead to the realisation that a significant market existed for the outcomes of the research.

"We couldn't have done it unless we had had the investment in knowledge to begin with. There were multiple pieces of knowledge, the fact that I had a background in agriculture and know the meat industry and without that we probably wouldn't have made the connection either," he explains.

This multi-faceted experience qualifies Cunningham not only to understand the interplay of the sciences but also to recognise the gaps that may hamper the successful commercialisation of academic research. "It's just too difficult to get funding for ideas and with the funding the support," he says, "They need money not so that they can do everything themselves, but so that rather than funding one person in a garage trying to build a multinational, if you sell your ideas adequately, they'll give you at least enough money to take on a part time accountant and get going in a professional way," he continues.

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Cunningham identifies that within academia, reward and recognition is generally associated with reputation as a good teacher and researcher and with a record of international acclaim.

"Now we've got to add good performance in attracting funds to support the gain and there's nothing wrong with that I think. It's a competitive world and I think that competition drives quality, broadly speaking. Maybe we should find someway of giving recognition also for useful interaction with the outside world, whether it be business or public administration," he says, "We have the beginnings of a realisation that we need more intercalation of the real world and the academic world and having said that, I don't really draw a distinction in my own life. The more we can bring the lab out into the field the better, although every area is different so you can't just say that there is a formula for doing that," he continues.

Profiting from investment

"It's a very good time for science in Ireland, in fact it's a very good time for many fields in Ireland. By good fortune, happily, combined with good policy decisions for the last decade, we've reached a level that was unthinkable a generation ago," says Cunningham.

"We're at a cardinal point, we've come to the end of ten years and we're half way there. We've been delivering upon the inputs and the beginnings of the outputs and I would be very optimistic that in the next ten years we'll be able to profit very much from this investment," he continues, "But where we do need particular attention is to this area of the financial bridging gap and that's timely now. This second National Development Plan is when we really have to provide that. And it doesn't have to be public money. Public money leverages that." he concludes. ●