

Should we pay for science and technology?

Aidan Kane *

Sunday Business Post 16th August 1998

At the end of last month, the EU reported that Ireland had topped the league for growth in patent applications. It is a pity that this indicator of Ireland's economic renaissance did not receive more attention.

Over the period 1989–1996, patent applications in Ireland grew at 15 per cent per year on average, ahead of nearest rivals Finland and Spain, which grew at about 11 per cent per year. The EU average growth in patents was 2.1 per cent per year.

One has to be careful interpreting these numbers. Some patent activity in the period covered undoubtedly owed more to creative tax accountants than to innovative industrialists.

This was recognised by ministers for finance who tightened the tax reliefs on patents to curb abuses in 1992 and 1994. Innovative activity is generally difficult to measure, but counting patent applications is a standard starting point in comparing countries' technological creativity over time.

Apart from the artificial nature of some patent activity, one might add that while Ireland has grown fast, we started from a tiny base.

Even at the end of the period, we had a share of under 0.5 per cent of the total 35,000 EU patent applications. In contrast, if growth in patents in Germany seems low at 1.4 per cent, that country nevertheless alone accounted for an extraordinary 41 per cent of EU patents filed in 1996.

Patent data should prompt a wide debate, simply because the innovation they signal is the only reliable source of long-run increases in living standards.

*Department of Economics, NUI Galway.

An economy can only accumulate so much capital, employ so much labour, and extend educational opportunities so far, before diminishing returns set in. But increases in the efficiency of those inputs, i.e., technological progress, can be self-sustaining and continuous, drawing on the seemingly limitless possibilities of science.

Knowing this, some economists were highly sceptical of Cold War claims that the Soviets would ‘bury the West’ economically; they could drag millions into the labour force, and direct investment on a colossal scale, but a society that failed to innovate would eventually stagnate, and the Eastern Bloc duly did.

The MIT economist Paul Krugman drew an analogy in 1994 between that debate and exaggerated fears of Asian economic dominance, arguing that much of Asia’s rapid growth was based on the mobilisation of previously idle resources, rather than on improvements in efficiency, and foresaw that it would eventually peter out.

This, of course, does not capture the complexity of all Asia’s current woes, about which Krugman has more to say, but other tiger economies take note: innovate or die.

But what are policymakers to do about this? They have had little help from conventional economic models until recently: too many economists were transfixed by the hope of understanding and controlling short-run economic events.

They had little to say about the sources of long-run economic growth—the wealth of nations, to borrow a phrase. But now the policy and research agenda has turned decisively towards the deeper forces of economic progress, with technological change as one of the key issues.

In Ireland, this process was kick-started by the Tierney Report of the Science, Technology and Innovation Advisory Council (STIAC) in 1995. Pat Rabbitte built on this foundation with a White Paper on Science, Technology and Innovation in 1996, and the baton has been taken up by his successors.

One result is the Irish Council for Science, Technology and Innovation (ICSTI) chaired by former University of Limerick president, Dr Edward Walsh. It brings together scientists, industry and policymakers.

Technology Foresight Ireland is an ICSTI project which has put together panels of experts to envisage future scenarios in science and technology and

to see how Ireland can benefit from them by acting now. (Those undertaking such exercises see them as useful explorations, not as forecasts, a distinction which economists wish was more widely understood.)

Despite taskforces, advisory committees and reports—the flotsam and jetsam of modern Irish government—many Irish scientists are sceptical. They’re asking: “where’s the money” But should the state spend to promote science and technology?

After all, 38 per cent of Irish exports are high-tech (in large part due to foreign direct investment), compared to an EU average of 7 per cent, while state support for basic research is paltry.

Should the taxpayer fund basic scientific research, or concentrate on applied research, directly linked with the marketplace?

For some, these questions are irrelevant. ‘We all know’ that innovation, based on technology, depends crucially on fundamental knowledge, generated through basic research.

Moreover, basic research looks like a classic ‘public good’ of textbook economics fame. Commercial incentives to do basic research are weak because it is difficult to exclude others from the benefits of new knowledge and capture them for oneself. Are not scientists in academia driven to ‘publish or perish’, and to establish priority for their discoveries by publicising them quickly? If markets face poor incentives to engage in this socially useful activity, can we please have a few state millions for our laboratories and machines that go ‘beep’?

Yet scientists know that applied questions have often generated pure science, rather than vice versa. Firms need to go beyond the technology they know will work, and find out why it works. They need to understand the principles behind the technology in order to advance it, and so have every incentive to perform some basic science, which in corporate labs, they do.

Nor is basic science, as an information good, freely available, even if widely published. Firms need the capacity to understand the research results of others, a capacity they get by employing experts in the underlying scientific disciplines. The case for funding basic science is probably stronger here; if there’s a market failure, it’s probably in training, rather than in research.

Firms may not invest in training for general scientific ‘problem solving’, when

human capital can freely relocate to other firms.

So the state could have a role in providing an environment in which such expertise is grown, i.e., basic research programmes. Beyond that debate, which is sometimes overdrawn, the real concern might be that the institutions of state support for innovation in Ireland, in an attempt to be coherent, have become too centralised.

Science thrives on diversity. The real breakthroughs often occur at the margins, rather than where the establishment sees fit to work, and in the overlaps between previously distinct disciplines.

The EU recognises this in its latest science funding programme, which has an open-ended element, in an attempt to avoid planning the process of discovery too much. Irish science policy documents understandably stress the need to ‘coordinate, integrate, and prioritise’ state funding efforts.

But, given the effective nationalisation of the third-level sector in the last Universities Act, it may all add up to a centralist, Faustian bargain for Irish innovators.

http://www.aidankane.net/writingsetc/1998_kane_science.html