

COMMENTARY



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Europe pays the price for spending less

Europe's contribution to the global advancement of science and the promotion of learning is in decline. Better funding of universities and research institutions is needed to reverse this trend, argues **Christopher Patten**.

The British Surgeon General in the Crimean War, responding to complaints about the quality of the medical services for which he was responsible, argued that they would have been perfectly adequate had it not been for the war's casualties. I am reminded of that insouciance when Europe's political leaders bemoan the European Union's growing problem of international competitiveness. The difficulty they have in relating cause to effect is, I suppose, an example of their difficulty in grasping the scientific method.

Cost of knowledge

I had a fairly orthodox career in national politics, including one year as the education minister. I spent five years in Asia, presiding over a colony in which the provision of higher education grew exponentially — underpinning the transition from a low- to a high-value-added economy and providing a rite of social passage for the offspring of the mainly immigrant community. I spent a further five years as a European commissioner, considering, sometimes morosely, the gap between Europe's global aspirations and its ability to live up to them. I am now a chancellor of two fine universities, one of which is among the greatest in the world, with an unrivalled brand and image. Finally, I chaired a steering committee for the European Research Council, suggesting ways

in which that body should operate, free of bureaucratic or political interference.

All that gives me what others might call prejudices, but which I would naturally argue are informed opinions. I am not myself an academic, nor an administrator of educational or research programmes. Nevertheless, I believe my views reflect a growing opinion in Europe, that much of its higher-education system is in severe difficulties; the research base is threatened; many of the best researchers are being lost; and there is more competition in the knowledge business. There are serious consequences for Europe's future as an economy and a civilization.

All this may surprise those who believe what is said by heads of state and finance ministers at European councils. Since 2000, the European Union (EU) has been committed to a strategy to become the most competitive knowledge-based economy in the world by 2010. To accomplish this heroic objective, reforms to higher education and research and development (R&D) have been proposed, and a number have even been implemented, with some countries doing much better than others (http://ec.europa.eu/invest-in-research/national/national_reform_en.htm). But overall, the picture is not looking good, and some of the reasons are perhaps understandable. Opening up the market in public utilities,

reforming labour markets, facing down protectionist pressures at a time of low-ish economic growth — all could be said to pose political difficulties. But what is the problem with investing more in knowledge? The biggest problem by far is simply a lack of money from governments (or other sources), together with inadequate corporate investment in R&D.

Lower education

The consequences of the present situation can be described in both conventionally utilitarian and liberal terms. The utilitarian argument is that we live in a knowledge-based economy — a cliché that is true, up to a point. I do not seek to argue that there is a direct correlation between spending on higher education and economic growth, nor between investment in R&D and successful innovation. Nevertheless, it is surely unarguable that science is a principal determinant of the wealth, creativity and well-being of society. Yesterday's good science — answering the 'whys' — added to today's technology — working out the 'hows' — has provided much of the quality and standard of our lives today. We are now living off what has been achieved in the past by researchers, technologists and entrepreneurs. What will Europe hand to the next generation?

Turning from concept to statistics, spending

on tertiary education per student (including R&D) in US\$ is just over 9,000 for France, just under 11,000 for Germany and just under 12,000 for the United Kingdom (OECD 2005 indicators). Austria, Belgium, Denmark, the Netherlands and Sweden do better, yet by comparison, the figure for the United States is heading towards 26,000. The percentage of gross domestic product (GDP) spent on tertiary education (2002 figures) is 1.1% in France, Germany and the United Kingdom, and 2.6% for the United States (1.2% from public funds and 1.4% from private). In other words, the public sector in the United States is more generous than the public and private sectors combined in Europe's three largest economies. Universities are the principal incubators of research. If universities are undervalued, what are the prospects for research?

What else do the figures tell us? The international league table of university performance of London's *Times Higher Education Supplement* does not reflect perfect methodology (how could it?), but uses various weighted factors covering peer review, recruiter review, percentage of international faculty, percentage of international students, faculty-to-student ratio and research impact measured by citations per faculty member. It concentrates on large general universities and excludes institutions that do not teach undergraduates and those with fewer than 5,000 papers in the citation index.

In the *Times* 2005 rankings, there are three European institutions — Oxford, Cambridge and École Polytechnique — in the top ten; the rest are all from the United States (see Table). In the next ten are the London School of Economics and Imperial College, London, the rest being US institutions plus Beijing, Tokyo and Melbourne. The next European university is the École Normale Supérieure at 24, and the first German university is Heidelberg at 45. Altogether in the top 50 there are 13 European institutions. A similar list drawn up by Shanghai Jiao Tong University, China, in 2005 is more depressing for Europe: there are two European universities in the top ten, and nine in the top 50, of which one is Swiss and none is German.

What does this tell us? Not long ago, Europe came way ahead in such lists of academic attainment. After all, it pretty well invented universities, such that the traditional liberal arts universities in the United States drew their inspiration from the British university system, and the great US research universities were founded on the Humboldt (German) model. Is it not a paradox that during a period in Europe of unparalleled prosperity and stability, the priority given to universities in, for example, the allocation of public resources, has sagged so pitifully?

Public controversy focuses on health and on welfare entitlement spending. Are universities victims of competitive populist politics? Europe spends very little on its own security in comparison to the United States. Is it not far

more culpable that it spends so much less on knowledge and learning? After all, there are political objections, right or wrong, to more spending on defence, but what is the argument against spending more on universities? How can Europe be so condescending about US culture when that country spends twice as much on knowledge, its transmission to students, and its acquisition, as Europe? Europe is allowing its culture to wither on the vine.

Brain drain

Two other statistics have made an impression on me. In the first three decades of the twentieth century, nationals of France, Germany and Britain each won more Nobel prizes in science and economics than the United States, which collected just 3% of the total. Since 1970, the United States has picked up almost 60%, more than the whole of Europe combined. The

TOP 20 UNIVERSITIES IN 2005

Rank	Name	Country
1	Harvard University	US
2	Massachusetts Institute of Technology	US
3	Cambridge University	UK
4	Oxford University	UK
5	Stanford University	US
6	University of California, Berkeley	US
7	Yale University	US
8	California Institute of Technology	US
9	Princeton University	US
10	École Polytechnique	France
11=	Duke University	US
11=	London School of Economics	UK
13	Imperial College London	UK
14	Cornell University	US
15	Beijing University	China
16	Tokyo University	Japan
17=	University of California, San Francisco	US
17=	University of Chicago	US
19	Melbourne University	Aus.
20	Columbia University	US

European tally has looked more respectable in the past five years if measured by the winners' countries of birth, as the United States has greatly benefited from a brain drain — and still does.

What will the figures look like in future? Winners of Nobel prizes are usually rewarded for work done after the completion of their doctorates. A decade ago, half the young Europeans who had completed doctorates in the United States came home afterwards; yet now, only a quarter do so. None of us should want to put up barriers against the movement of academics; scholarship should know no boundaries. European academic institutions need to be able to attract the best to return.

The other statistic commonly used to measure academic achievement is citations used in academic papers. Today, the United States accounts for half of these. Yet many of these papers are written by foreign researchers — mainly Asians and Europeans — based in US academic institutions.

Although I am wholly in favour of expanding educational opportunity, it should not be at the expense of lessening the quality of what is being offered. An increase in quantity is to

increase social inclusiveness and to broaden the skills of the workforce. In Britain, at least, university study is now seen by those undertaking it as a necessary step to getting better-paid employment. A university degree is the best indicator of future income (unless you decide to become an academic!).

Because governments have been unwilling to raise spending in line with the expansion of the number of students, they have concentrated on the sort of objectives that would make more sense in running profit-making enterprises. Per capita costs become the issue, not the quality of the learning experience, and those who are taught protest less than they should because the system has become more a matter of credentialing — as the economist and moralist, Jane Jacobs, has argued (J. Jacobs, *Dark Age Ahead*, Random House, New York; 2004) — rather than learning. This contributes to high drop-out rates in some countries, and absurdly long periods taken to graduate in others.

Governments marvel at how, in comparison with, say, the expansion of healthcare, they have managed to open up opportunities in higher education exponentially without a concomitant expansion of spending. They find the answer in allegedly increased productivity. But what that means is a downward pressure on academic salaries, degraded facilities and a devalued learning experience. The well-intentioned expansion of education is threatening its quality.

Research standstill

How much does all this matter to performance in research, development and innovation? First, it would be more than surprising if the condition of the principal agents for promoting both advanced learning and pioneering research did not have an impact on the broader research scene. Second, underinvestment in research in universities is matched by underinvestment in business. Corporate Europe does much less than corporate America and Japan. As a percentage of GDP, R&D in Europe has stagnated for ten years at round about 2%, while it has been growing in the United States. There, spending as a proportion of GDP is almost half as much again as the European figure. There is a bigger gap when Europe is compared with Japan. Much of the gaps are accounted for by higher funding by the business sector: in the United States about a third of government R&D funding goes to support business R&D, twice the European figure.

Europe's corporate sector's performance is increasingly lacklustre: last year's UK government figures showed a 7% increase in R&D spending in the United States and Asia, and 2% in Europe. Greater R&D spending does not necessarily mean more innovation, as other factors are clearly involved, not least the quality of the investment in research and perhaps, above all, market competition. But surely in



The European Commission is attempting to increase investment in research and development, with mixed results.

some of the frontier industries — pharmaceuticals, biotechnology, IT hardware and software, for example — R&D spending is vital to innovation. Walmart or Tesco may not have to spend much on research in order to innovate. Glaxo and Nokia are in a different category. Moreover, it may be that the simplest way of showing the corporate benefits of R&D is the share portfolio of R&D-intensive companies.

The competition is hotting up elsewhere. The number of scientific papers being produced in Asia is rising fast, for example in nanotechnology journals. India's institutes of technology grow in quality, while the country already produces 260,000 engineers a year. China's spending on R&D has trebled in seven years and is predicted to hit 2% of GDP by 2010.

So what can Europe do? It is important both to recognize the scale of the problem, and to understand that it should be easier to solve than some others. Europe starts with a huge advantage in terms of standard of living and quality of life in comparison with much of the rest of the world. Europe is not only prosperous, but has great universities and research institutes, with long histories, civilized traditions and dedicated staff. All that they lack, on the whole, is more generous support. Similarly, Europe has many world-class companies.

Some things require action at the national level; some at the European level. EU member states should be encouraged to give a greater priority to higher education and R&D, with a scoreboard of their performance across the EU. To the extent that governments do not require students to pay for tuition, the gap can only be made up by the taxpayer, the corporation or the philanthropic giver. If governments spent more, that might well encourage greater corporate investment both in universities and in their own laboratories. More philanthropic support of universities should be encouraged: only two universities in Europe would get into

a list of the top 150 in the United States for the size of their private endowments.

The primary responsibility for improvement lies with national governments, but there is also plenty that can be done at the European level. The coverage of the Bologna process — a scheme launched in 1999 to align and harmonize degree standards and the quality of courses and university departments in Europe — is patchy and needs to be broadened. The lack of a European patent continues to load additional costs on to European inventors in comparison with US competitors. This is a subject that has been debated for three decades. Each time the negotiations founder on the language issue: if Europe is serious about competitiveness, this can easily be resolved.

Action underway

At least the European Commission seems to understand the nature and worrying scale of the problem. It has tried to do three things — one unsuccessfully, one with every possibility of success, and one that I cannot quite fathom.

First, it has tried (as recommended in 2003 by the Sapir report) to reorient the European budget towards what should be its priorities — competitiveness, growth and R&D — and away from agricultural-led priorities set in the 1950s. It has not had much success.

On the second issue, the Commission has been much more successful. A group, chaired by myself, proposed among other things the establishment of the European Research Centre — an equivalent to the US National Science Foundation — which is turning from a caterpillar into a butterfly. It will seek to fund frontier research in top-class departments and institutions, and will be run by scientists, academics and researchers, not bureaucrats or politicians. It will be driven by peer review so that grants will go to the best, not distributed on the basis of *juste retour*. Political interfer-

ence should be minimal — here Europe has the priceless advantage over the United States that scientific research has not been assaulted by the anti-enlightenment forces of unreason except in the case of animal research.

High-quality, curiosity-driven research can be even more commercially significant than proprietary science — think of lasers and DNA. Knowledge is not simply another commodity in the market place. Yet while encouraging greater cooperation between industry and universities, research must not be skewed almost exclusively to subjects that interest industry rather than the public. The European Research Council is on its way, with the only major matter still to be resolved being the size of its budget.

That is where the third Commission proposal jars. It has suggested the establishment of a European Institute of Technology (EIT), presumably to try to replicate the Massachusetts Institute of Technology and its impact on its regional economy in the north-east United States. But is the EIT a real institution or is it a virtual body, promoting yet more networking? Is it meant to create more technology and innovation clusters such as those that already exist in European countries? I believe we do not require one new institution, but much better funding of some of the existing universities and research institutions. Finally, what guarantee is there that the money for the EIT will not come from what would otherwise be spent through the European Research Centre on research of peer-reviewed excellence? I cannot see how the EIT — however skeletal its structure — will do other than take money from the funds that would otherwise go to existing institutions. ■ Lord Patten is Chancellor of the Universities of Oxford and of Newcastle, UK. This text is an edited version of a speech by the author to the Academy of Technologies in Paris, France, on 28 February 2006.