Foreword. University reform – a prerequisite for success of knowledge-based economy?

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The European Union (EU) set in Lisbon in 2000 the goal of being the leading knowledge-based economy in the world by 2010. To achieve that goal, at least 3 per cent of GDP would be invested in research and development (R&D) (European Parliament, 2000).

In an interim evaluation (Kok, 2004) the conclusions were dismal: the European economy is falling behind compared to the USA and Asia, and the 3 per cent R&D investment target is being met only in Sweden and Finland. Enlargement is making matters more difficult, since the EU-25 is performing worse than the EU-15.

Despite disappointing progress, European heads of state decided to stick to the Lisbon target but without a time limit for its attainment. Growth and jobs became the new slogan, and specific measures to resuscitate the Lisbon process were agreed upon (European Commission, 2006), including increased R&D spending, tax stimuli to promote innovation, and public procurement to open lead markets. An essential task was seen in the reform of universities. Their funding should be improved, bureaucratic meddling in their activities abandoned, and their relations with industry fostered. The Commission was mandated to draft plans for modernization of European universities (Commission of the European Communities, 2006).

Great expectations are thus placed upon universities by the EU and national governments. Why this sudden attention? Are European universities really underperforming and if so, why? Are they to be blamed for the sluggish economy of most European countries? If they are, what should be done about it?

PERFORMANCE OF UNIVERSITIES

The three main functions of universities are research, education and innovation, that is economic exploitation of research. None of the three yields clearly definable 'products', and thus transnational comparison of the performance of universities is difficult.

Success in research can be assessed on the basis of quantity and quality of scientific publications, which are recorded in databases. These do not include most of humanities and social sciences research. In terms of numbers alone, Europe has surpassed the productivity of the USA, and if expressed per million of population (Figure 1) or per amount of funding spent, many European countries compare favourably with the USA. However, if the quality or impact of the publications is assessed on the basis of citations, the USA is still clearly in the lead. Of the most important articles, those belonging to the 1 per cent receiving the largest number of citations, nearly two thirds originate in the USA (Table 1).

Research in different countries is carried out mainly in universities or in dedicated research institutes (May, 1997). Therefore, the scientific success of nations cannot be directly ascribed to universities. Although missions and national characteristics are different, attempts to rank all the world's universities have been made by Shanghai Jiao Tong University in China, and the *Times Higher Education Supplement* in the UK. In both of these ranking lists (Table 2), American universities dominate, with only Oxford and Cambridge consistently among the top 10. These rankings reflect superior research achievement in biomedical and natural sciences.

The educational mission of universities is more difficult to evaluate, and direct comparisons have not been attempted.

CAUSES OF ILLNESS

The basic problem with European universities is a mismatch between funding and aspirations. OECD statistics (OECD, 2005) show that in 2003 the expenditure in tertiary (higher) education averaged 1.3 per cent of GDP in EU countries but 2.9 per cent in the USA. Annual expenditure per student in higher education, in equivalent US \$ converted using PPPs for GDP, was \$9872 in EU countries but \$24 074 in the USA. Part of the programme to reform European higher education is the Commission proposal of investment of at least 2.0 per cent of GDP, which today is not met by any EU country.

A similar gap in funding also exists in R&D investment, where the Lisbon target of 3.0 per cent of GDP is far above the EU average (1.8 per cent).

Source: European Union, DG Research, Key Figures 2005

Figure 1 Number of scientific publications per million population, 2003

Table I.1 Share (%) of the most highly cited 1 per cent of publications 1997–2001 (Thomson ISI Database)

USA	62.8	Australia	2.8
UK	12.8	Sweden	2.5
Germany	10.4	Spain	2.1
Japan	6.9	Belgium	1.7
France	6.9	Denmark	1.5
Canada	5.8	Israel	1.5
Italy	4.3	Russia	1.3
Switzerland	4.1	Finland	1.1
Netherlands	3.8	Austria	1.0

Table I.2 Top 10 universities in the Shanghai Jiao Tong University (2006) and the Times Higher Education Supplement (2006) rankings

Shanghai	Times
Harvard	Harvard
Cambridge	Cambridge
Stanford	Oxford
UC Berkeley	MIT
MIT	Yale
Caltech	Stanford
Columbia	Caltech
Princeton	UC Berkeley
U Chicago	Imperial College London
Oxford	Princeton

To make matters worse, meagre funding is spread thinly to many institutions all professing to do research at a high international level. A survey by the Commission found 980 such universities in Europe, whereas in the USA only 261 universities award doctoral degrees and even fewer consider themselves research-intensive. Failure to specialize and differentiate leads to a homogeneously mediocre system.

Another problem in many European universities is an atmosphere of state bureaucracy, rather than the vibrant, dynamic, competitive but also rewarding culture in American universities.

SURVIVAL STRATEGIES

To enable European universities to fulfil the expectations placed upon them, increased funding is necessary but not sufficient. The role of the EU is small in research funding and even smaller in direct support of higher education. National governments are in a key position to improve the finances of universities, but most of them are struggling with economic problems. Reaching the GDP targets of 3 per cent for research and development and 2 per cent for higher education thus requires a long time or a suddenly booming economy, which is unlikely.

Particularly under economic scarcity, taxpayers' money should be well spent. National interests are better served by a versatile and differentiated university system, each unit concentrating on its strengths, instead of each pretending to be a globally important research university. Competitive funding is the best way to promote evolution and specialization of universities. The private sector should be involved through incentives to both sides to promote mutual interests.

Increased autonomy, to respond proactively to a changing environment and increased competition, has been regarded as essential by both EU Commission and OECD experts. Simultaneously, the accountability of universities to their numerous stakeholders must be emphasized and reflected in the composition of their governing bodies.

INDUSTRY–ACADEMIA COLLABORATION

When knowledge becomes the most important driver of economies, both the educational and the research functions of universities must be brought more strongly to bear on the private sector. Industry is increasingly outsourcing its research and development as well as continuing education of its workforce, and these activities provide fruitful areas of collaboration. Multinational companies are not a problem, since they are aware of their needs and find optimal sources of know-how globally. On the other hand, small and medium-sized enterprises (SMEs) have a regional base and an important economic role, but their contacts with higher education are poor. OECD statistics indicate that even in Finland, which is the leading country in this respect, only 20 per cent of SMEs interact with universities, whereas the EU-25 average is 7 per cent. In-house research and development is carried out in less than a third of SMEs in the EU-25, and only a few governments provide funding to business R&D in SMEs. These should be more knowledge-intensive to compete in the globalized world.

To promote industry–academia relationships three areas should be stimulated (LERU, 2006). Firstly, on the supply side of innovation, universities should have more autonomy to adjust research and education to changing opportunities and needs of their partners, increased competitive funding to develop their strengths and to diversify, and better leadership and governance to make and implement strategic decisions. Secondly, to increase business demand for innovative activity, public procurement should be exploited as a market for new products and services, and tax incentives should be used to promote R&D in SMEs. Thirdly, mutual awareness of joint potential for innovation should be promoted by meetings, conferences, exchange of personnel, and joint R&D as well as continuing education projects. Governments should support such activities as appropriate and remove the administrative obstacles that discourage fruitful collaboration.

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