
Third European Report on Science & Technology Indicators 2003: Towards a Knowledge-based Economy. European Commission. EUR 20025. Office of Official Publications of the European Communities, Luxembourg. 2003. 451 pp. Price: Euro 77.

There are three major players in research and innovation today, viz. USA, Europe and Japan, and each of them is constantly trying to outsmart the others. All the rest of us, including China and India, are mere also-rans, whichever way we look at it. Of course, the situation can be altered. It requires tremendous amount of will power, planning and concerted action. The US has done it. At the turn of the 20th century, USA was not a force to reckon with in science; indeed bright young American students were sent to Great Britain and continental Europe for higher studies. During the interval between the First and the Second World Wars, the Americans started establishing their leadership in scientific research and innovation: Japan did it a little later. Despite the defeat and humiliation suffered in the war, Japan rose like a phoenix from the ashes, to export cameras to Germany, watches to Switzerland, computers to USA, and automobiles and machinery to everywhere. Will Europe's turn be the next? At least that is what the European Community would want to happen.

Europe was in the forefront of the Industrial Revolution at the turn of the 19th century. Will it once again be the leader in the knowledge revolution of the 21st century? What should Europe do to be able to assume the leadership position say by 2010? Says Philippe Busquin, Europe's Commissioner for Research, in his preface to this volume: 'Clearly, Europe needs to invest more in research (say 3% of GDP by the end of the decade), decide where and how to invest this increased funding (nanotechnology, biotechnology, sophisticated scientific instruments?), raise private investments in R&D, especially in commercially promising research and innovation activities, invest in people (produce more high-quality researchers per capita), and effectively coordinate a range of public policies (taxation, employment, enterprise,

competition and education policies, as well as research and innovation policies)'. He continues: 'There must be greater coordination of national research policies and European policy, and there must be strengthening of research actors across Europe. Mobility of scientists between countries and between university and industry must be encouraged.' The European Union is now the largest producer of scientific papers, outstripping even the US. However, its main challenge remains the exploitation and commercialization of science in order to boost growth and employment and improve social conditions. To be able to do all these, it is essential that policy makers have a common information base about European research trends and performances. The European Report on Science and Technology Indicators provides such a shared information source and presents policy-relevant S&T indicators and analyses.

This is the third in the series; the first and second appeared in 1997 and 2000, respectively. And it is different from the earlier editions in both content and structure, although its mission remains the same, viz. to provide those involved in S&T policy with reliable indicators and comparative analyses of S&T trends. It is far more than a classical compendium of statistics. It reflects Europe's strength in the science indicators movement and focuses on Europe's investment and performance in the knowledge-based economy. With a view to developing new and better indicators, the authors of the report have introduced some new composite indicators.

The report begins with a chapter on 'Facing the challenges of the 21st century' and is divided into two parts. The first is on input indicators and deals with investment in knowledge production, dissemination and absorption. This part has three chapters: Investment in science, technology and new knowledge, Private sector investment in scientific and technological knowledge, and Human resources in science and technology. The second part is on output indicators and deals with performance in knowledge production, exploitation and commercialization. This part has two chapters: Scientific output and impact, and Europe's technological competitiveness. Each chapter is

divided into several sections. Besides, there are dossiers on stagnation in R&D budget, research-based spin-offs leading to commercialization of technology, women in science, importance of Nobel Prizes as S&T indicators, patenting in the service sector, and linkage between science and technology. There are several box items, annexes and a moderately extensive bibliography. Data have been collected from diverse sources, notably Eurostat, the OECD and the UN, and experts from different organizations [including CWTS (Leiden University), Maastricht Economic Research Institute on Innovation and Technology, PREST (Manchester University), and Observatoire des Sciences et des Techniques, Paris] have been commissioned to analyse the data and write the different chapters. The report is well laid out and well produced. The tables and figures – many of them comparing Europe with not only USA and Japan, the main competitors, but also with other countries performing science and technology above a threshold – enable one to get a quick overview of the strengths and weaknesses of Europe's research system.

While the report is relatively free from errors, this reviewer feels that the average number of citations won by basic life sciences papers from India during the five-year period 1995–99 cannot be 7.5 as given in Figure 5.3.6, whereas the world average is less than 5.0. According to the Institute for Scientific Information, Philadelphia, the average number of citations to life sciences papers from India is less than 30% of the world average. But one such rare error does not diminish the value of this report.

The report deserves appreciation not only for the wealth of data it provides, but also for the way the data are presented and analysed in depth. Although the publication came out months later than planned, the Directorate General for Research (DG XII) deserves to be congratulated for a job well done.

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