

UNESCO-Bericht: USA, Europa und Japan in Forschung und Entwicklung zunehmend herausgefordert von Schwellenländern

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Der englischsprachige Artikel fasst die wichtigsten Ergebnisse des UNESCO Science Reports zusammen und zeigt die Entwicklungen der F&E-Landschaft weltweit auf. Laut dieses Berichts werden USA, Europa und Japan zunehmend von Schwellenländern, insbesondere China, herausgefordert.

While the USA, Europe and Japan may still be leading the global research and development (R&D) effort, they are increasingly being challenged by emerging countries, especially China. This is one of the findings of the 2010 UNESCO Science Report, launched at the Organization's headquarters on 10 November, World Science Day.

The UNESCO Science Report depicts a rapidly changing landscape. While investment in R&D is growing globally (in volume)*, emerging countries are clearly gaining strength in science and technology. This can be seen especially in terms of Asia's share of gross domestic expenditure on research and development (GERD).

Led mainly by China, India and the Republic of Korea, Asia's share increased from 27 to 32% between 2002 and 2007. Over the same period, the three heavyweights, the European Union, USA and Japan, have registered a decrease. In 2002, almost 83% of research and development was carried out in developed countries; by 2007 this share had dropped to 76%. This trend is even clearer when industry's contribution to GERD is considered. Between 2000 and 2007, the private sector share of R&D spending, as a proportion of GDP, saw a sharp increase in Japan, China, Singapore and especially the Republic of Korea, while it remained stable in Germany, France, and the United Kingdom and even saw a slight decrease in the Russian Federation and the USA.

"The distribution of research and development (R&D) efforts between North and South has changed with the emergence of new players in the global economy," says UNESCO Director General, Irina Bokova, in her foreword to the Report. "The bipolar world in which science and technology (S&T) were dominated by the Triad made up of the European Union, Japan and the USA is gradually giving way to a multi-polar world, with an increasing number of public and private research hubs spreading across North and South."

More researchers in developing countries

The proportion of researchers in developing countries increased from 30% in 2002 to 38% in 2007. Two-thirds of this increase is due to China alone. In 2007, China, with its 1,423,400 researchers, was on the verge of overtaking the USA and the European Union. Today, Europe, USA and China each contribute 20% of the world's researchers, followed by Japan (10%) and the Russian Federation (7%).

While still in the lead, the developed countries have also seen their share of scientific publications drop from 84% in 2002, to 75% in 2008. During this period, China's share more than doubled, increasing from 5.2% to 10.6%, even if the citation rate of its articles lags behind those in the Triad. The number of articles published by researchers in Latin America has also increased, mostly thanks to Brazil.

This transformation is being helped by the extremely rapid development of the Internet, which has become a powerful vector for disseminating knowledge. Throughout the world, the number of connections leaped noticeably from 2002 to 2007. But this advance is even more significant in emerging countries. In 2002, just over 10 out of 100 people, globally, used the Internet. There are over 23 users per 100 today. And this proportion rose from 1.2 to 8 in the same period in Africa, from 2.8 to 16 in the Arab States, and from 8.6 to 28 in Latin America. "The rapid diffusion of Internet in the South is one of the most promising new trends of the Millennium," says the report.

Indeed, while the emerging economies have been content, until now, to carry out R&D activities outsourced from the developing countries, they have now moved on to a process of autonomous technological development and applied research. China, Brazil, and India have thus initiated simultaneous catching-up processes in industry, science and technology. This has also meant the arrival on the world scene of multinational firms from emerging countries in sectors such as automobile manufacturing, consumer goods and high-tech industries like aircraft manufacturing.

The brain drain continues

There is still one area where the Triad countries have maintained their lead, and that is patents. "Of all the indicators used in the World Science report, it is the patent indicator which points most strikingly to the inequality of knowledge creation at the global level," says the Report. The US Patents and Trademark Office, European Patent Office and Japan Patent Office claim the lion's share, and patents filed with these bodies mean they are of a high quality.

Also, while developing countries are training more researchers and scientists, this does not necessarily mean that they will easily find jobs in the country of origin, feeding a South-North and North-North migration of graduates. India, Turkey, some countries in sub-Saharan Africa and Southern Asia are particularly faced with this problem. At least one-third of African researchers were estimated to be working abroad in 2009. According to OECD data cited in a British study in 2008, out of 59 million migrants living in OECD countries, 20 million were highly qualified.

Even if it is hard to quantify the effects of the 2008 financial crisis, the Report points out that the global recession could have an impact on R&D budgets, which are often vulnerable to cuts in times of crisis. American firms, which are among the most active in terms of R&D, slashed their budgets by 5 - 25% in 2009. As a result, the USA has been harder hit than Brazil, China and India, which has enabled these countries to catch up faster than they would have without the crisis. Finally the Report stresses the need to intensify scientific cooperation, particularly between countries in the South.

The development of scientific diplomacy

"I am convinced that, more than ever, regional and international scientific co-operation is crucial to addressing the interrelated, complex and growing global challenges with which we are confronted," states Ms Bokova in the foreword to the Report. Increasingly, international diplomacy will take the form of science diplomacy in the years to come. "In this respect, UNESCO must and will pursue its efforts to strengthen international partnerships and co-operation, in particular South-South co-operation. This science dimension of diplomacy was one of the original reasons for including science in UNESCO's mandate. It has fundamental significance for UNESCO nowadays, at a time when science has tremendous power to shape the future of humanity and when it no longer makes much sense to design science policy in purely national terms."

The Science Report was written by a team of international experts. It presents an overview of global trends in science and technology, based on a wide range of qualitative and quantitative indicators. It is divided into chapters devoted to the various regions, with spotlights on certain individual countries (Brazil, Canada, China, Cuba, India, Iran, Japan, republic of Korea, Russian Federation, Turkey and USA). The previous UNESCO science reports were published in 1993, 1996, 1998 and 2005.

* The share of world GDP devoted to R&D reached 1.7% in 2007, a percentage comparable to that for 2002, but the amount in US dollars rose from US\$ 790 billion to US\$ 1,146 billion, a growth of 45%. This is slightly greater than the growth in GDP for the same period (43%).

Den vollständigen Report können Sie [hier](#) herunterladen.

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