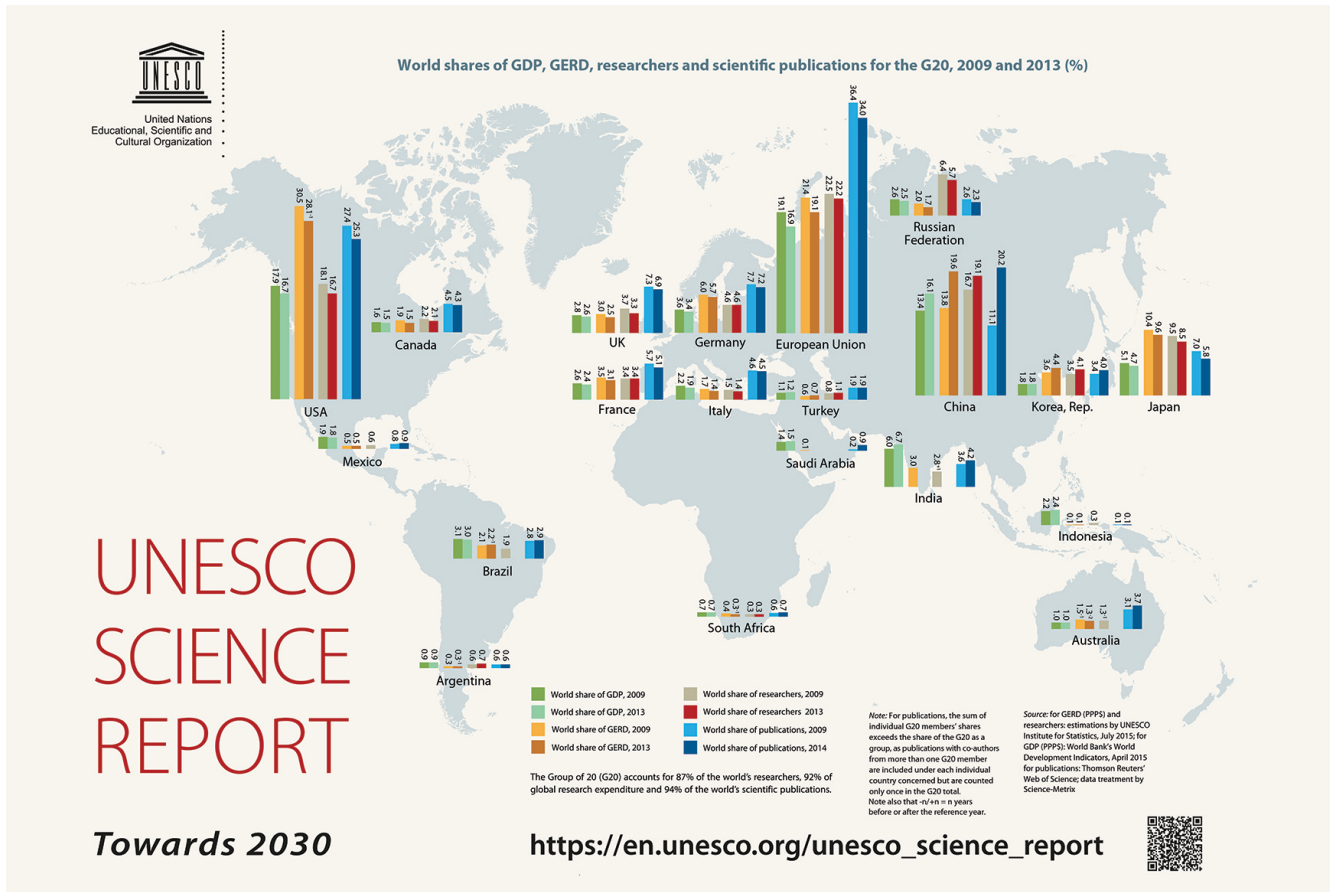


Global trend

Research at forefront of global race for sustainable development



Most countries, regardless of their level of income, now see research and innovation as key to fostering sustainable economic growth and furthering their development. This is one of the conclusions of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) *Science Report: towards 2030*, launched on World Science Day, on 10 November. The report is published every five years.

“In the wake of the adoption of the Sustainable Development Goals to 2030 by the UN General Assembly, the UNESCO *Science Report* clearly shows that research is both a motor

for economic development and a cornerstone in the construction of societies that are more sustainable and more respectful of the planet,” said UNESCO Director-General, Irina Bokova.

The report’s first lesson is that, despite the economic crisis that hit industrialised countries in 2008, gross domestic expenditure on research and development (GERD) increased globally by 31% between 2007 and 2013, rising from US\$1,132 billion in 2007 to US\$1 478 billion in 2013. This increase was more rapid than that of global gross domestic product (GDP) during the same period (20%).

Cuts in public investment

The increase in research and development (R&D) spending owes a great deal to the private sector, which has compensated for frozen or reduced public spending in a number of industrialised countries, such as Italy, the UK and France. This trend is particularly apparent in Canada (whose world share of R&D spending dropped from 2.1% in 2007 to 1.5% in 2013), and Australia, where significant cuts were made to research funding and applied sciences were prioritised to the detriment of basic research.

If global spending on R&D has increased despite the economic crisis, it is largely because it has been identified as a key factor in promoting economic growth and development. As a result, a great many countries, regardless of the size of their income, now see research and innovation as a way to keep up in a highly competitive world or find their place in it.

This is the case in Africa, where there is a growing recognition that the development of modern infrastructure, such as hospitals, roads, railways, etc. and a more diversified economy require investment in science and technology, as well as the constitution of a skilled workforce. Kenya, for example, devoted 0.79% of its GDP to R&D in 2010 compared to just 0.36% in 2007. R&D spending is also increasing in Ethiopia, Ghana, Malawi, Mali, Mozambique and Uganda.

More scientists, greater mobility

The investment in research also translates into an increase in the number of scientists, estimated at 7.8 million worldwide, which is up by more than 20% since 2007. The European Union as the most (22% of the world share), followed by China (19%) and the USA (16.7%).

There has also been a parallel explosion in the number of scientific publications, which have increased by 23% since 2008. In 2014, there were around 1.27 million per month. Europe also leads in this field (34% of world share), followed by the USA (25%), although their respective shares have seen a slight decrease.

As well as being more numerous, scientists are also more mobile. Despite the development of the Internet and the multiplication of online networks, doctoral-level researchers still feel the need to travel. The increasing mobility of PhD students, in turn, influences the mobility of researchers. "This is perhaps one of the most important trends of recent times," say the authors of the report.

Students from the Arab States, Central Asia, sub-Saharan Africa and Western Europe are the most likely to study abroad. Europe and North America are still the preferred destinations for students. The USA alone receives almost half (49%) of international students enrolled in doctoral science or engineering courses. The UK comes second (9%), followed by France (7%), and Australia (4.6%).

Research is still a male world

While, globally, women have achieved parity at Masters level, their share diminishes at PhD level to 43% of all doctoral graduates. The gap continues to widen after this, as women only represent 28.4% of the world's researchers. They also have more limited access to funding than men, and are less well represented in prestigious universities. They remain a minority in senior positions, whether on faculty boards or at the higher levels of decision-making in universities.

The regions with the greatest number of women researchers are Southeast Europe (49%), the Caribbean, Central Asia and Latin America (44%). Interestingly, in the Arab States, 37% of researchers are women, which is a higher proportion than in the European Union.

Investing in R&D – some difficult choices

"Formulating a successful national science and innovation policy remains a very difficult task," conclude the authors of the report. This will require simultaneous action on several fronts, whether it is education, basic research, technological development or indeed private investment in R&D. The 2008 economic crisis, which made many industrialised countries tighten their budgets, has rendered this task more difficult.

While most R&D takes place in high-income countries, innovation is now occurring in a large number of countries, whatever their income level. Some

innovation is occurring without any R&D activity at all. The authors of the report therefore encourage policy-makers not to focus exclusively on designing corporate incentives for R&D, but also to target innovation, in the form of technology transfer and the acquisition of machinery, equipment and software, which are all key elements in the innovation process.

While most science policies advocate stronger links between the private sector, universities and public research institutions, these commitments often come to nothing, the report observes, quoting a 2013 survey carried out by the UNESCO Institute for Statistics in 65 countries. The report encourages policy-makers to draft strategies to try and reverse this trend.

The UNESCO Science Report also emphasises the importance of good governance for innovation-driven development. Corruption in the university system is an obstacle to the education of qualified graduates. It is also a disincentive for the private sector. Companies will have little interest to invest in R&D if they cannot rely on the justice system to defend their intellectual property.

To access the full report, Visit: https://en.unesco.org/unesco_science_report

