

## UNESCO SCIENCE REPORT Towards 2030 UNESCO 2015

### Introduction:

In 2015, the United Nations General Assembly took a historic and visionary step with the adoption of the *2030 Agenda for Sustainable Development*. For the first time at this level, the role of science, technology and innovation has been explicitly recognized as a vital driver of sustainability. For two decades now, the UNESCO Science Report series has been mapping science, technology and innovation (STI) around the world on a regular basis.

### Key influences on STI policy and governance:

- Geopolitical events have reshaped science in many regions.
  - Some are The Arab Spring in 2011; the nuclear deal with Iran in 2015; and the creation of the Association of Southeast Asian Nations (ASEAN) Economic Community in 2015.
- Environmental crises raising expectations of science.
  - Cambodia, for instance, has adopted a Climate Change Strategy (2014–2023) with the assistance of European development partners to protect its agriculture.
  - In 2013, ministers from the (Southern African Development Community) SADC approved the development of a Regional Climate Change programme.
- Energy has become a major preoccupation
  - The EU, USA, China, Japan, the Republic of Korea and others have all toughened national legislation in recent years to reduce their own carbon emissions, develop alternative energy sources and promote greater energy efficiency.
  - The Australian government, for instance, has shelved the country's carbon tax and announced plans to abolish institutions instigated by the previous government<sup>3</sup> to stimulate technological development in the renewable energy sector
- The quest for a growth strategy that works.
  - In the USA, the investment was made in climate change research, energy and health a priority.
  - In 2010, the EU adopted its own growth strategy, Europe 2020, to help the region emerge from the crisis by embracing smart, sustainable and inclusive growth.
  - Horizon 2020, the EU's current seven-year framework programme for research and innovation, has received the biggest budget ever in order to drive this agenda between 2014 and 2020.
  - The Indian government elected in 2014 has argued for a new economic model based on export oriented manufacturing to foster job creation. India is already becoming a hub for frugal innovation, owing mainly to the large domestic market for pro-poor products and services such as low-cost medical devices and cheap cars.

### Global trends in R&D expenditure:

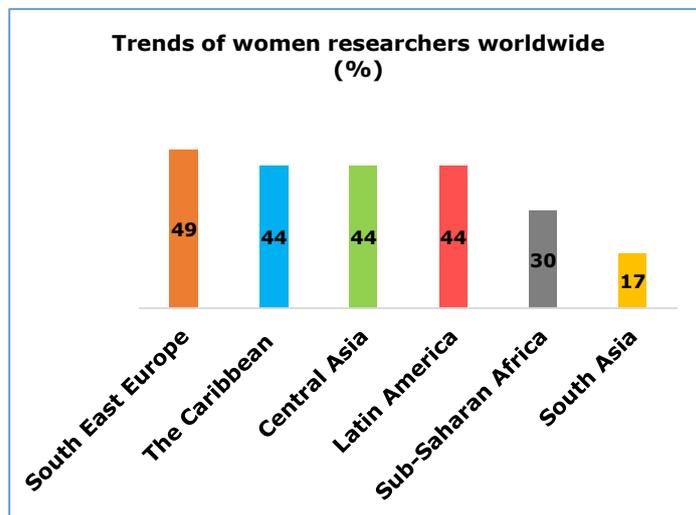
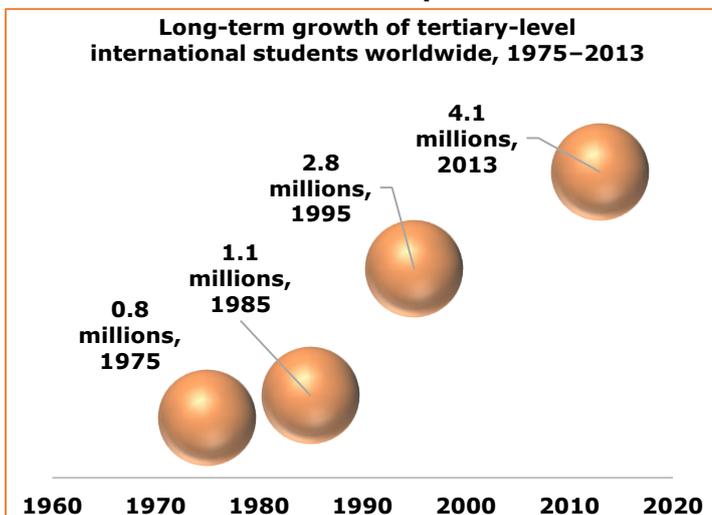
- The crisis affected R&D investment
  - In 2013, world Gross Domestic Expenditure on Research and Development (GERD) amounted to PPP\$ 1 478 billion, compared to only PPP\$ 1 132 billion in 2007.
  - As GERD progressed much faster than global GDP, this caused global R&D intensity to climb from 1.57% (2007) to 1.70% (2013) of GDP.
  - Asia, in general, and China, in particular, were the first to recover from the crisis, pulling global R&D investment relatively quickly to higher levels. In other emerging economies such as Brazil and India, the rise in R&D intensity took longer to kick in.
  - The Triad (EU, Japan and USA) have all seen GERD rise over the past five years to levels well above those of 2007, unlike Canada
- Public research budgets
  - The past five years have seen a converging trend: disengagement in R&D by the public sector in many high income countries (Australia, Canada, USA, etc.) and a growing investment in R&D on the part of lower income countries.
  - Among the BRICS countries, India, business R&D has progressed faster than government commitment to R&D.
- In search of an optimal balance between basic and applied science
  - In India, universities perform just 4% of GERD. Although India has created an impressive number of universities in recent years, industry has complained about the 'employability' of science and engineering graduates.

## Highlight

➤ The gap in R&D expenditure is narrowing

- Geographically, the distribution of investment in knowledge remains unequal. The USA still dominates, with 28% of global investment in R&D.
- The R&D or human capital intensities of Brazil, China, India and Turkey might still be low but their contribution to the global stock of knowledge is rapidly rising, due to the sheer size of their financial investment in R&D.

### Global trends in human capital:



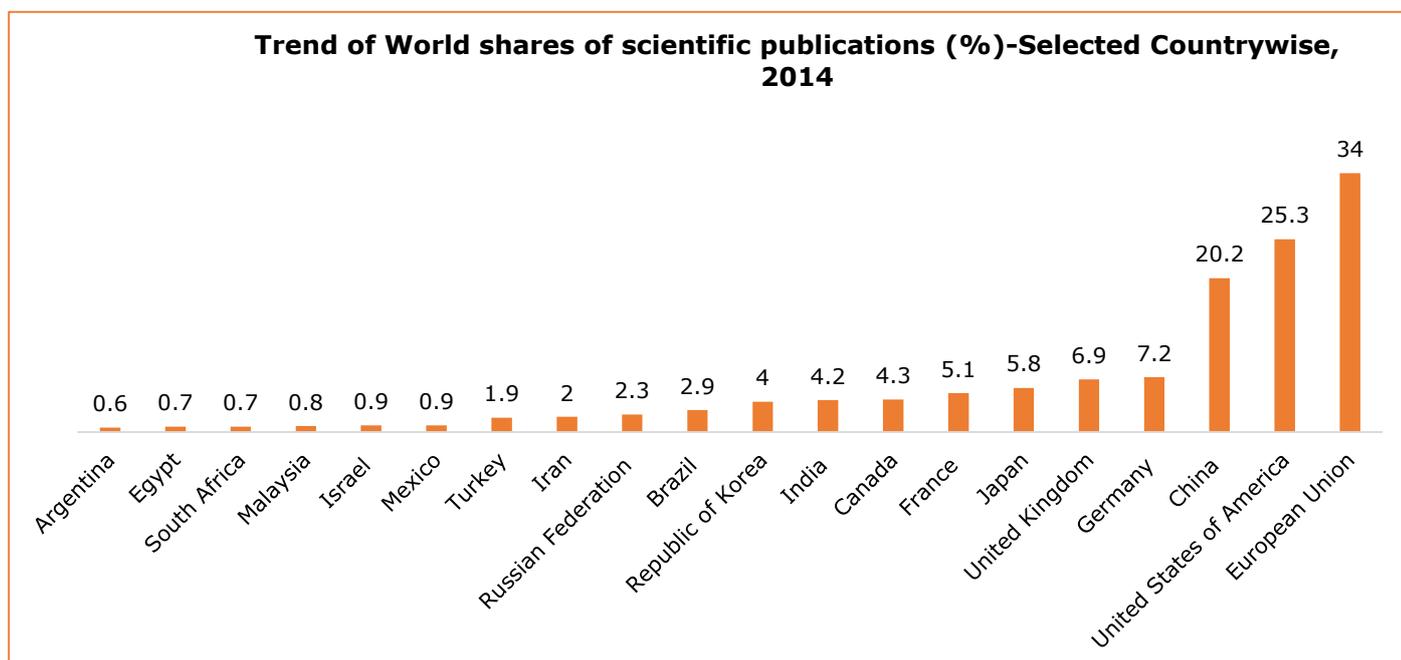
➤ Widespread growth in researchers, little change in the global balance

- Since 2007, the number of researchers has risen by 21%.
- The EU remains the world leader for the number of researchers, with a 22.2% share.
- The number of international students is growing rapidly, increasing mobility at doctoral level, which, in turn, is driving the mobility of scientists.
- A study conducted recently by the UNESCO Institute for Statistics found that students from the Arab States, Central Asia, sub-Saharan African and Western Europe were more likely to study abroad than their peers from other regions. Central Asia has even overtaken Africa for the share of tertiary students studying abroad.

➤ The other half of human capital still a minority.

- On the whole, women constitute a minority in the research world.
- They tend to have more limited access to funding than men and to be less represented in prestigious universities and among senior faculty, which puts them at a further disadvantage in high-impact publishing.

### Trends in knowledge generation:

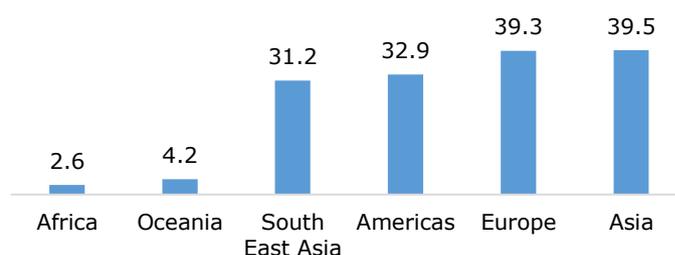


## Highlight

### Trends in scientific publications worldwide, 2008 and 2014:

- Growth in publications with authors from Europe- 13.8 %
- Growth in publications with authors from Africa- 60.1 %
- Growth in publications with authors from Arab states- 109.6 %

### Trend of World shares of scientific publications (%)—Regionwise, 2014



### A closer look at India:

- In India, economic growth has slowed to about 5% per year since the 2008 crisis; there is concern that this respectable growth rate is not creating sufficient jobs.
- The Indian government elected in 2014 has argued for a new economic model based on export oriented manufacturing to foster job creation. India is already becoming a hub for frugal innovation, owing mainly to the large domestic market for pro-poor products and services such as low-cost medical devices and cheap cars.
- The business enterprise sector has become increasingly dynamic: it performed nearly 36% of all R&D in 2011, compared to 29% in 2005.
- The only key indicator which has stagnated is the measure of India's R&D effort: 0.82% of GDP in 2011.
- The government had planned to raise GERD to 2% of GDP by 2007 but has since had to set back the target date to 2018.
- Innovation is concentrated in nine industrial sectors, with more than half of business R&D expenditure concerning just three industries: pharmaceuticals, automotive and computer software.
- Innovative firms are also largely circumscribed to just six of India's 29 states.
- There has been strong growth in patents, six out of ten of which were in IT and one out of ten in pharmaceuticals in 2012.

### Conclusion:

- The report reflects the growing acceptance worldwide and, in particular, in the non-OECD world, of STI as a driver of development.
- Another striking trend observed in the UNESCO Science Report is the decline in public commitment to R&D observed in many developed countries.
- There is a growing belief in the importance of public investment in R&D for knowledge creation and technology adoption in emerging and lower income countries.
- Innovation spreading but policy hard to get right.
- There is a steep rise in the number of researchers, who now number 7.8 million worldwide. This represents an increase of 21% since 2007.
- The focus of scientific discovery has shifted towards problem-solving, in order to tackle pressing developmental challenges.

Read the full report at the official website: <http://uis.unesco.org/sites/default/files/documents/unesco-science-report-towards-2030-part1.pdf>

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