UNESCO Science Report
Towards 2030

Latin America’s place in the world
Key messages

Globally, a gradual South-North convergence in science, technology and innovation. *On the one hand,* many emerging and lower income countries are showing a growing interest in science. *On the other hand,* there is a declining public commitment to science in high-income countries struggling with economic crises.

Latin America still boxes below its weight in research:

- 8.0% of global population
- 8.3% of global GDP **but:**
- 5.1% of global scientific publications (Thomson Reuters Web of Science)
- 3.6% of global researchers
- 3.4% of global spending on research
- 0.3% of global patents (US Patent and Trademark Office)

Globally, a trend towards open science, open innovation and open education, with the emergence of a global labour market for researchers and a growing labour market for university students. Internet has facilitated international scientific collaboration and online university courses (MOOCs).

Globally, a growing focus on business-driven science to accelerate economic growth and productivity **but** a risk that public good science and basic science could suffer. Basic science nurtures the commercial ideas of tomorrow and all stakeholders in science will need to be mobilized to reach the Sustainable Development Goals (Agenda 2030). Hence, the subtitle of the report ‘Towards 2030’ refers to the need for science to satisfy both today’s and tomorrow’s needs.
Global trends

Most Latin American countries are middle-income economies. Between 2007 and 2013, the research gap between high-income and middle-income countries narrowed.

China made the most spectacular progress, overtaking the USA for the number of researchers and almost doubling its global share of research spending (from 10.2% to 19.6%).

RESEARCH EXPENDITURE

Global research expenditure grew faster (+30.5%) than the global economy (+20.1%) between 2007 and 2013.

The share of middle-income economies rose from 20% to 30% of the total.

Latin America’s global share of spending rose from 3.1% to 3.4%.

RESEARCHERS

The global numbers of researchers rose by 21% between 2007 and 2013.

The share of middle-income economies rose from 29% to 34%.

Latin America’s global share of researchers rose from 3.5% to 3.6%. Latin America has one of the highest share of women researchers.

PUBLICATIONS

Global numbers of scientific articles grew by 23% (Thomson Reuters’ Web of Science – Science Citation Index) between 2008 and 2014.

The share of middle-income economies climbed from 26% to 39%.

Latin America’s global share of publications rose only slightly, from 4.9% to 5.1%.
Latin American researchers on the cusp of gender parity (45–55%)

44% of Latin American researchers are women, compared to 28% worldwide.

Although women have by and large reached parity in higher education, their share falls as one moves from education to research and plummets as one approaches the commanding heights of STI governance.
Convergence is most evident in the strong growth in scientific articles in low and middle-income countries

Growth rate of scientific publications between 2008 and 2014 (%)

The growth rate for Mexico was 30.2%, close to the Latin American average

HI: High-income; UMI: Upper middle-income; LMI: Lower middle-income; LI: Low-income

Based on Table 1.4 in UNESCO Science Report: towards 2030
Four Latin American countries have more scientific publications per million inhabitants than the world average (176)

Chile produces more scientific publications per million population (350) than the G20 average (256), equivalent to half the OECD average (707)

Source of data: Thomson Reuters' Web of Science, Science Citation Index Expanded
A growing convergence in government research spending, a persistent divergence in business research spending

A *de facto* convergence, due to declining or stagnant government investment in R&D in some advanced economies (Canada, Italy, UK, USA, etc) and strong growth in government investment in a few “emerging” and developing ones: Argentina, Kenya, Mali, Malawi, Republic of Korea, Mexico, Thailand, etc.

Latin American countries have adopted a series of sophisticated funding mechanisms to foster public and private research. Government commitment to research is now of a similar level to that of some high-income countries. However, there is still a divergence with high-income countries and China when it comes to business research spending (N.B. *the following data are shown graphically in the next two slides*).

Argentina now has the same government level of research funding (0.44% of GDP) as China (0.44% of GDP) and the UK (0.44% of GDP) but Argentina’s business sector contributes 0.12% of GDP, compared to 1.05% for the UK and 1.60% for China.

Mexico now has almost the same level of government funding of research (0.38% of GDP) as Poland (0.41% of GDP) but the Mexican business sector contributes 0.17% of GDP, compared to 0.38% for Poland.

Brazil has a higher share of government research spending (0.63% of GDP) than Canada (0.57% of GDP), Italy (0.54% of GDP) or Japan (0.60% of GDP) but a lower level of research expenditure performed by the business enterprise sector (0.52% of GDP) than Canada (0.83% of GDP), Italy (0.68% of GDP) or, above all, Japan (2.64%).
Greater convergence: note how close Argentina and Mexico have come to Japan, Canada, the UK, China and Italy for government spending on research

Research financed by government as a share of GDP, 2005–2013 (%)
Persistent divergence: Argentina and Mexico still trail the same countries for business expenditure on research

Research expenditure performed by business enterprises as a share of GDP, 2005–2013 (%)
Latin America, the Middle East and Africa together account for just 4% of global business expenditure on research and development, China and India for one-fifth of the total.
Much of the current convergence is confined to large emerging economies

World shares of GDP, GERD, researchers and publications for the G20, 2009 and 2013 (%)

The G20 still accounts for 87-94% of research spending, researchers and publications, yet just 64% of the global population. The greater North-South convergence results primarily from China’s rise and the stagnation or decline of some developed countries: Canada, France, Italy, Japan, Russian Fed, UK, USA... Latin America has remained stable.
Good governance is good for science

Science powers commerce – but not only: commerce and government need to power modern science in tandem. Both will be necessary to meet the Sustainable Development Goals to 2030.

With public budgets under pressure in advanced economies since the 2008 financial crisis, there is a temptation to divert public research budgets towards the commercialization end of the innovation cycle.

Latin American economies, on the other hand, do not seem to have been seeking technology-based competitiveness up to now. They have not used the commodities boom over the past decade to adapt their economies to the type of manufacturing that lends itself to science-based innovation, even if sectorial funds and other funding mechanisms have given a strategic boost to economic sectors requiring innovation, such as agriculture, energy and ICTs. The planned city of Yachay in Ecuador will be Latin America’s first knowledge hub.

Countries that combine a high government investment and a critical mass of human resources invariably achieve a high level of business investment in R&D. Some governments have been raising their financial and human investment (e.g. Mexico). However, a national innovation system does not develop overnight; Latin American countries will need to design long-term public policies that extend beyond a single term of government.

Private knowledge creation remains dominated by a minority of countries.

Taken together, the European Union, China, Japan, Republic of Korea and USA hold nine out of ten triadic patents in the world. Latin America accounted for just 1.5% of global business expenditure on R&D in 2011.

Latin America should use existing regional integration mechanisms (UNASUR, MERCOSUR, Andean Community...) to foster regional scientific integration and address the region’s sustainability agenda.