



CLOSING THE GENDER GAP IN SCIENCE

NEW RESEARCH SHOWS THAT IN BOTH DEVELOPED AND DEVELOPING NATIONS, WOMEN ARE NOT FULL PARTNERS IN THE KNOWLEDGE ECONOMY. AND THE ECONOMIC EFFECTS CAN BE PROFOUND.

In the realm of global science leadership, there is widespread agreement that women must be more fully integrated into the fields of science, engineering and technology. And yet, countries and cultures worldwide are struggling to achieve this goal. Women have low enrolment rates in every field of scientific study except for the life sciences, and among those who do finish their studies in science, the dropout rate after university and throughout the career trajectory is high.

This creates a cascade of negative effects: It represents a loss of the investment in women's education. If a country is not developing all of its potential skill in science-related fields, then progress in developing a knowledge economy will be slowed. And clearly, research shows that when women are more fully represented in fields related to innovation, economic bene-



fits flow not just to the women, but to a nation's entire economy.

This is an important issue for all countries. Building capacity in agriculture, engineering, health, and the social sciences is essential for achieving economic development. Science, technology and innovation (STI) can also improve food security and living conditions, ensure adequate infrastructure, promote employment and livelihoods, and increase the quality of life in developing and developed countries alike.

With a team of international researchers, we recently undertook a pilot assessment of the status of women in the knowledge society – collectively the STI and the information and communication technology (ICT) sectors – looking at the potential for and actual contributions of women in six countries and one



region: Brazil, India, Indonesia, South Africa, South Korea, the United States and the European Union.

Our overall finding is that all the countries in this study have failed to include women to an equal extent in the knowledge economy – and in many cases, their inclusion is negligible. But the assessment also highlights policies that can help put countries on the right track to women’s inclusion. Among developing nations, for example, Brazil and South Africa are among the strongest performers in science and technology, and the evidence shows that they have had considerable success in bringing women into science-related sectors.

EXTENT OF THE DIVIDE

The assessment was undertaken by Women in Global Science and Technology (WISAT) and the Organization for Women in Science for the Developing World (OWSD) from November 2011 to May 2012, with support from the Elsevier Foundation. The full study, national reports and national scorecards, are available at www.wisat.org.

The assessment identifies gender barriers in a range of areas – health, social status, the economy and access to resources. These are preventing women and girls from accessing technology, information and learning, and from participating equally in scientific research and employment, decision-making and the private sector.

Brazil punches far above its weight in articipation of women in science, technology and innovation.

It also shows that few countries are collecting consistent gender data in any of these areas, leaving an evidence vacuum that makes it difficult, and perhaps impossible, to craft effective policies to support innovation and advance development of knowledge-based economic sectors.

From the data that do exist, the gender divide is also clear. Women are represented equally with men in only health and life sciences education. In most places, including the US and EU, they remain severely under-

represented in engineering, physics and computer science, generally making up less than 30% of graduates in these subjects.

The total number of women working in these fields is even lower and, more troubling, it is declining across the board. Even in countries where the number of women

studying science and technology has increased, the rise has not produced higher numbers of women in the workplace.

POLICY AND FUNDING

So what should be done to move in the right direction? A combination of actions in education, economic status, social status and health is required.

Empowerment factors include greater participation of women in public and economic life, greater roles for women in government and politics – in the decision-making that affects their lives – and access to resources,



or the ability to freely access financing, technology, energy and productive inputs. But equally important is support to women's domestic responsibilities which will enable them to balance their work and personal lives: childcare, healthcare and maternity leave, for example. Another important issue is equal pay and recognition for work.

An enabling policy environment is a crucial first step. A cross-government approach is needed to integrate and monitor gender concerns and effects on women and men in all areas – from health and education to infrastructure, energy and banking. For example, does national policy take into account the need for

safe, affordable and efficient transport for women's personal, employment and livelihood needs? But good policies also need funding. India has an excellent policy environment for women, but insufficient funding and implementation means it has the lowest ranking among the countries we surveyed.

COUNTRIES DOING WELL

On the other hand, Brazil punches far above its weight by standard development measures. It ranks higher than would be expected based on its GDP, and first in the participation of women in both the knowledge economy and in science, technology and innovation. This result reflects Brazil's substantial national investment in science and technology, as well as serious efforts to reduce social inequality, and support for women's education at all levels. Brazil has put in place strong policies and programmes to support scientific and technological education for all that include substantive funding for research and higher education. The availability and transparency of scholarship awards, particularly at the graduate level and in science and technology, have substantially aided women's participation in the knowledge society.

South Africa scores well too, with a high number of women in science nationally. It has the highest percentage of female members of a national science academy in the study, demonstrating a supportive policy environment and evidence that women can do the work. This high ranking is the result of a number of factors, including promoting female participation in

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politics in South Africa (45% of elected and appointed officials are women) and in decision-making and management positions, as well as freedom for women to choose the timing and number of their children. The country has a national quota system that promotes diversity of participation and leadership by race and gender.

OPPORTUNITIES FOR GROWTH

Our study shows that supporting women in education and health are only the first steps. Nations need a multi-dimensional policymaking approach that includes supporting women's ability to fulfill their educational and professional aspirations, providing flexible education and training opportunities, and reinforcing their ability to make choices and decisions about their lives.

And this should be complemented by social and health support such as childcare, flexible work and access to healthcare. Our study found that where women's health and/or social status is low, countries fall behind from the very beginning, even in the presence of an enabling policy environment – India is a case in point. Similarly, South Africa's success is restricted to a minority of its female population due to low economic and health status.

Promoting women's participation in the STI sector will increase benefits for everyone. Data from the World Economic Forum and *The Economist Intelligence Unit* indicate that if women's paid employment rates were raised to the same level as men's, GDP would rise 5% in the United States, 9% in Japan, 12% in the Unit-

ed Arab Emirates and a huge 34% in Egypt. A report by the UN Economic and Social Commission of Asia Pacific (ESCAP) found that restricting job opportunities for women, where 45% of women remain outside the labour market, costs the Asia-Pacific region up to USD42–46 billion per year. In the agricultural sector, the Food and Agriculture Organization (FAO) estimates that equalizing access to productive resources for female farmers – fertilizers, extension, technology and credit – could increase agricultural output in developing countries by 2.5% to 4% and result in 100 million to 150 million fewer hungry people globally (FAO, 2011).

Countries that fail to capitalize on women are failing to develop the knowledge that drives innovation. Clearly, that inhibits development and the potential for growth. And that, in turn, hurts everyone. ■

◆◆◆ **Sophia Huyer and Nancy Hafkin**

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