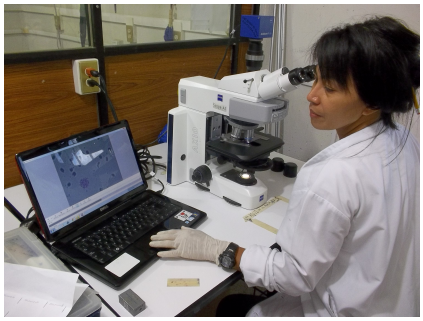
Gender Equality in the Knowledge Society: National Assessments in STI

Women in Global Science and Technology (WISAT) and Organization for Women in Science for the Developing World (OWSD)



A gender imbalance exists in science, technology and innovation worldwide. The number of women in STI falls continuously from secondary school to university, laboratories, teaching and decision making. There are consistently low levels of women in the skilled technology workforce in the private sector, with even fewer females in senior management and as leaders of large companies[i]. A gender imbalance also exists in STI education, where males outnumber females worldwide for reasons of safety and security, teaching methods that favour boys, preconceptions that S&T is a male domain, and unwillingness of families to support their daughters through all levels of education. Women have lower levels of access to ICTs such as internet and smartphones in the majority of countries in the world.

Women's contributions to sustainable socio-economic development as food producers and providers, owners of micro and small-scale enterprises, healthcare providers, household managers, educators and natural resource managers[ii], are critical to the achievement of poverty reduction and the MDGs. However, the S&T needed to support these activities is not readily available.

All of these gendered barriers to STI and technology access and use create a large gender divide in the knowledge society that will not improve automatically with economic growth.

The Gender Equality – Knowledge Society (GE&KS) indicator framework was developed to address the fact that worldwide, women's capacity to participate in science, technology and innovation is grossly under-developed and under-utilized: not only do they have less access to information and technology, they are poorly represented in educational, entrepreneurship and employment opportunities. It brings together gender-sensitive data on key areas in the knowledge society (ICT, science, technology and innovation) with gender indicators of health, economic and social status to assess the barriers and opportunities for women.

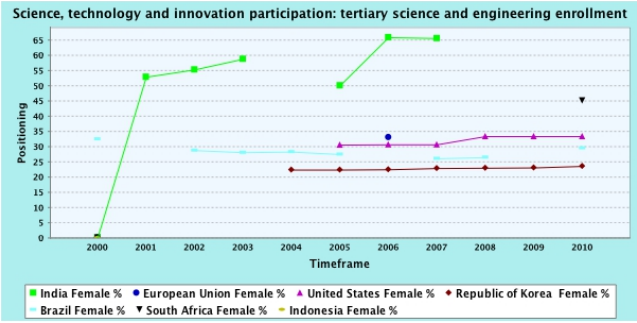
A pilot assessment of six countries and one region took place during 2012: Brazil, India, Indonesia, the Republic of Korea, South Africa, the United States, and the European Union.

Key Findings

The major finding of this study is that the knowledge gender divide continues to exist in all countries, even those which have a highly-developed knowledge society. *In all countries in this review – which represent the leading knowledge-based economies in the world – the knowledge society is failing to include women to an equal extent, and in some cases, their inclusion is negligible.*

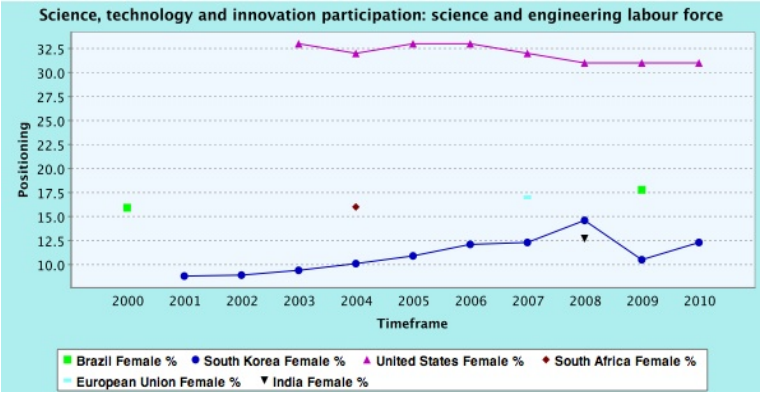
- Numbers of women in the science, technology and innovation fields are alarmingly low in the world's leading economies, and are actually on the decline in many, including the United States.
- Women remain severely under-represented in engineering, physics and computer science — less than 30% in most countries – while the numbers of women working in these fields are also declining.
- Women have lower levels of access to the productive resources necessary to support active engagement in the knowledge society and related professions – property (land); finance; technology; and education.
- Female parity in the science, technology and innovation fields is tied to multiple factors, with the most influential being higher economic status, larger roles in government and politics, access to economic, productive and technological resources, and a supportive policy environment. Findings also show that women gain ground in countries that have health and childcare, equal pay, & gender mainstreaming.
- Access to education is not a solution in and of itself and neither is economic status. It's only one part of what should be a multi-dimensional policymaking approach. There is no simple solution.

Science and engineering participation



Tertiary science and engineering enrollment: This standard statistical category includes biology, medical science, nursing and pharmacy – in all of which women are highly represented – as well as all other scientific, technological and engineering disciplines. The figures are highest (and rising) in India at 65.6% and South Africa at 45%. Others follow with percentages close to half that of the India – the US moving from 30.5% - 33.3%, Brazil at 29.5% and Korea at 23.5%. The figures for all are rising, with the exception of Brazil's, which experienced a drop from 32.4% to 29.5% over the decade. The EU average was 33% in 2006.

However, if participation in engineering is dropped from the calculation, the representation of women increases. Of the countries providing data, the vast majority of university students in bio, medical and life sciences are female, ranging from 44% in Korea to 65.6% in Indonesia, 70.1% in Brazil and 80.4% in India.



Rates of female participation drop substantially in most countries during the transition from S&E education to the S&E workforce force by about 30 points, indicating a substantial loss of females and the investment made in their education. This trend is representative of much of the world.

Gender Equality – Knowledge Society Framework

The GE&KS framework is organized into three sections – Inputs, Outcomes and Enabling Policies, each comprised of key data indicators[iii]:

Inputs

Health Status	- Healthy life expectancy - Prevalence of disease - Fertility
Social Status	- Sex ratio at birth - Violence against women - Time use
Economic Status	- Economically active population - Income - Categories of work - Poverty
Access to Resources	- Property rights - Access to capital - Access to ICT - Quality of infrastructure - Electricity consumption
Agency	- Parliamentary representation - Women in government - Contraceptive use
Opportunity and Capability	- Literacy - Access to education - Access to training

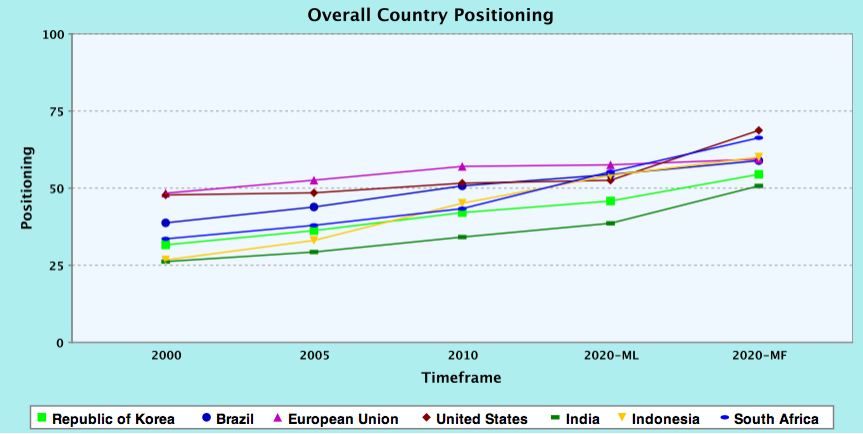
Supporting Policy

Knowledge society policy environment
Gender policy
Gender budgets
Science and engineering policy

Outcomes

Knowledge Society Decision Making	- Business and corporate decision making - Science decision making
Knowledge Economy	- Administrative and managerial positions - Information technology workers
Science, technology and innovation participation	- Science and engineering education - Scientists and engineers - Publications - Brain drain - Entrepreneurship

Country Rankings



The **European Union** as a composite ranks first overall, and first or second in every other dimension except opportunity and capability. This is a remarkable result, considering the wide variation among countries in the EU in terms of social support, GDP, and promotion of science, technology and innovation (STI). The **United States** ranks second overall, but fifth in health, agency, social status. The US ranks lowest in enabling policies. While it ranks higher in other sectors, this finding indicates that a more favourable policy environment for women in the US could be an important strategy for regenerating economic growth. **Brazil** ranks the highest of the remaining countries. It is third overall and first in women's participation in the knowledge economy and science, technology and innovation, as well as agency. Brazil is an example of a country with both a highly enabling policy environment for women and effective implementation strategies. Although **Indonesia** comes out fourth overall, its actual status is not clear as a result of a paucity of available statistics on the situation of women. **South Africa** ranks fifth overall but first in agency. It ranks highly also in knowledge society decision-making and fairly well in STI participation. This is likely a result of a strong educational system, a policy focus on STI, and a quota system to promote diversity of participation by race and gender. The high rate of HIV in the population is a negative factor. While the **Republic of Korea** ranks first in health it is last several sectors. It ranks second to last (sixth) overall. This shows the country has failed to adequately support its women to participate actively in its economic success and is proof of the lack of correlation between a country's GDP and gender equality. **India** ranks the lowest overall and in most categories. While its enabling policy environment is very positive and has been in place for many years, implementation and funding needs to increase substantially before its women can equally benefit from its innovation advantage.

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[i] UNCTAD, 2011; UNESCO, 2007. *Science, Technology, and Gender: An International Report*. Paris: UNESCO; UNESCO Institute for Statistics (UIS), 2011. *Global Education Digest 2011*. Montreal, Canada: UNESCO Institute for Statistics.
[ii] UNCTAD, 2011. *Applying a Gender Lens to Science, Technology and Innovation*. Current Studies on Science, Technology and Innovation, No. 5 ed. Geneva: United Nations.
[iii] For the reasons behind the choice of indicators, see Huyer, Sophia, Nancy Hafkin, Heidi Ertl,and Heather Dryburgh, 2005. Women in the Information Society. In Sciadis, G., ed. From the digital divide to digital opportunities: Measuring infostates for development. Montreal: Orbicom.