

A Bright Future in ICTs OPPORTUNITIES FOR A NEW GENERATION OF WOMEN

Executive Summary



A bright future in ICT opportunities for a new generation of women

Executive Summary



Lead Author: Nidhi Tandon, Networked Intelligence for Development.
Research team members: Shannon Pritchard, Victoria Savelieva, Racquel G. Smith, Erich Vogt.



Please consider the environment before printing this report.

© ITU 2012

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

Executive Summary

The future of the ICT sector is exciting. These are uncharted waters open to creativity, innovation and entirely new ways of working, interacting and learning that should appeal to women and men alike. The Institute for the Future¹ identifies six drivers most likely to shape the future workforce: longer life spans; a rise in smart devices and systems; advances in computational systems such as sensors and processing power; new multimedia technology; the continuing evolution of social media; and a globally connected world. The ICT sector clearly underpins this future.

This summary report surveys the global trends in women's professional development and employment in the information and communication technology (ICT) sector, and offers a sample of the range of national policies, training programmes and initiatives targeting girls and women as potential students and professionals.

Key findings – status report

The ICT sector remains a buoyant and growing sector for employment, and a key economic factor underpinning both national and international development. This growth in employment, however, has not yet led to a parallel increase in jobs for women in the ICT labour market, with the female to male ratio being particularly pronounced at senior levels. In fact, with the general growth of job opportunities in the sector, women's employment figures in advanced economies are in decline, which suggests that the issue is not just an entry level problem but may also be one of demotivation, of retention and/or lack of promotion of women within the sector at many levels.

It wasn't always so. For example, women were the original programmers of ENIAC, the US government's first ever computer and in the US in the 1980s, young women were earning 37 per cent of computer science degrees; today, that

¹ www.iftf.org/

number has fallen to below 20 per cent. But while teenage girls now use computers and the Internet at rates similar to boys, they are five times less likely to consider a technology-related career.

The lack of trained female professionals means that in OECD countries, women now account for less than 20 per cent of ICT specialists. It also means that most developed countries are forecasting an alarming shortfall in the number of skilled staff to fill upcoming ICT jobs. The European Union calculates that in ten years' time there will be 700 000 more ICT jobs than there are professionals to fill them; globally, that shortfall is estimated to be closer to two million.

One of the reasons why the ICT sector continues to be generally perceived as a male-dominated industry is because most high-value and high-income jobs in this sector are occupied by men. Research conducted for this study in both developed and developing countries found classic cases of vertical gender segregation, with women strongly represented in lower level ICT occupations. Although women are making inroads into technical and senior professions, the study indicated a 'feminization' of lower level jobs. On average, this research found that women accounted for 30 per cent of operations technicians, only 15 per cent of managers and a mere 11 per cent of strategy and planning professionals.

There is also room for significant improvement in the number of women holding leadership positions at board and senior management levels.

Why we need to engage more women

Human talent with the right skill sets is the keystone of a vibrant and diversified ICT sector. That talent pool will need to be enriched through the nurturing and training of non-discriminatory human capital, primarily in universities, research and development centres and trade or 'applied' schools, in order to respond to the ever-evolving needs of the ICT industry.

This suggests that ICT qualifications need to be extended to include a much broader spectrum that might attract the attention and interest of girls and women. Dr Hamadoun Touré, ITU Secretary-General, noted in launching the ITU Girls in ICT Portal, that "research consistently shows that girls tend to choose careers where they feel they can make a difference – healthcare, education, medicine. With this new portal, we're trying to show them that there's much more to ICTs than writing computer code ... As we move towards an ICT-based knowledge society, the rise of apps and the explosion in telemedicine, remote

learning systems and research and development make the ICT industry the most exciting choice any young person can make. We are entering uncharted waters of creativity, innovation and entirely new ways of working, interacting and learning. I hope our new portal will serve as a showcase to attract the many talented girls and young women in countries worldwide to this booming sector.”

It is evident that the ICT sector needs to invest more resources in human capital development and to create an enabling environment for women and girls, and there are compelling economic reasons for engaging women more prominently. Improving the female to male employment ratio is good for economic growth.

Research indicates that the narrowing in the male-female employment gap has been an important driver of Europe’s economic growth in the last decade. In the Asia and Pacific region, for example, restricting job opportunities for women is costing the region between USD 42 and USD 46 billion a year. World Bank findings demonstrate that similar restrictions have imposed massive costs throughout the Arab States region, where the gender gap in economic opportunity remains the widest in the world. The World Economic Forum maintains that countries which divide resources equitably between women and men, regardless of their level of resources, fare better than those that do not.

Engaging women and girls in ICT sector work is not only the right thing to do from the point of social justice. It is also smart economics.

Gender balance in high value ICT jobs in both management and on company boards has been proven to improve business performance. Studies exploring the link between women in leadership positions and business performance have shown a direct positive correlation between gender balance on top leadership teams and a company’s financial results. More balanced teams make better informed decisions, leading to less risk-taking and more successful outcomes for companies. Over time, therefore, a nation’s ICT competitiveness depends significantly on whether and how it educates and utilizes its non-discriminatory human capital.

Expanding horizons with government support

A combination of approaches to ensure benefits from pro-women policies and to prepare for future workforce needs, includes the need for training and career support at three distinct levels:

1. for entrance levels by way of education, training, recruitment, internship and career incentives, which require a national reassessment of educational infrastructure and delivery systems;
2. for mid-career levels through career promotion and training; and
3. for management and senior levels through mentorship, skill improvement and sponsorship programmes.

At the same time, parents, teachers, career guidance counsellors and recruiters need to be made aware of and acknowledge that ICT careers are an important and viable opportunity for girls. In order to secure initial gains made, women already active in the ICT sector need to take the time to engage with community initiatives to mentor girls and women and participate in virtual and face to face communities of practice.

Governments need to place a premium on promoting ICT skills in primary, secondary and higher education. The curricula need to reinforce each other at different levels, from computer camps for pre-high school or secondary school students, to ICT classes for high school students, right through to mentoring and sponsoring. This needs to be complemented by investment in vocational training.

Governments need also to invest in on-the-job and industry-based training initiatives with a focus on promoting advanced ICT skills in and with the private sector.

The changing scope of ICT occupations has intensified the need to ensure that graduates emerge with skills that match employer demand. These demands are expanding from traditional ICT occupations (such as computer programmers) and towards business/ICT specialists, highly specialized ICT areas (such as micro-computing or quantum-computing) and multidisciplinary ICT occupations (such as bioinformatics and industrial design). This, however, is putting increased pressure on educators and the education sector to guide interested students into relevant ICT education and career paths.

In order to bring about a significant increase in girls' and women's engagement and employment across the board in the ICT sector, the core of current education systems and infrastructure needs to be restructured in four fundamental ways:

1. Instruction needs to be made more relevant – combining industry, science and the arts in curricula that focus not only on preparing for college education but also on vocational courses. A more technologically

astute avenue for students that cater to their interests in engineering needs to be established. ICT courses need to be “hybrid” into all curricula offered by community colleges and technical schools.

2. Schools need to improve the quality of their execution, moving away from rote individualistic learning to hands-on, team-work and problem-solving teaching methods.
3. Schools need to ensure that students know about the continually evolving nature of the knowledge economy and that they need to carry on improving their skill base once basic schooling is completed. This also means that companies need to offer a more collaborative workplace experience engaging workers and giving them opportunities to continuously improve and seek productivity gains.
4. More funds or subsidies need to be placed for technical training and incubation programmes.

The future of the ICT job market

Since the dot-com bust at the beginning of the millennium, the demand for technology jobs has steadily increased. There are now more IT jobs in the United States than there were at the height of the dot-com boom. With an estimated 700 000 jobs in Europe, 800 000 in the US and 200 000 in Brazil alone, the ICT sector will be looking to hire at least 1.7 million people in the coming years.

The ICT sector has changed radically since the early days of computing – and the ‘knowledge economy’ is now taking on hitherto unseen dimensions where communication technologies have become forces of social change. Social media and its participatory formats are as much about the technologies as they are about their applications – bringing the virtual and physical worlds closer together in dynamic ways across several platforms.

The development of new goods and services is expected to drive demand from businesses, households and governments, with replacement ICT investments further boosting continuing demand. Much of the growth of the highly globalized ICT sector comes from the efficiencies gained from the global re-organization of research, development and production to provide new and improved ICT products and services to new and expanding markets. This includes the expanding use of software and extensive application of outsourcing. Additional ICT growth is

expected to come from “green growth” through “smart” applications in buildings, transport, energy, and production which will translate into demand for customized applications.

As ICTs merge with sector-specific technologies across the economy, they produce “hybrid jobs”. The expectation is that young women will show more interest in opportunities that use their creativity and intuition in for example software application design. Their future is particularly promising in bioengineering, power grid informatics, digital media, and social and mobile applications; these are interesting, fun and creative jobs that combine ICT with business of every imaginable field.

ICT employment opportunities for women in the post 2008 global economic era include high-speed internet, cloud computing, green ICT goods and services and their “smart” applications as these are presently heavily promoted by governments as a strategic response to the economic crisis.

The full report provides evidence to prove that a range of initiatives are already underway to support girls and women in the ICT sector as more governments recognize the importance and necessity of taking these deliberate steps. The most important determinant of a country’s competitiveness is its human capital and talent – the skills, education and productivity of its workforce. Women account for one-half of the potential talent base throughout the world. Closing gender gaps is therefore not only a matter of human rights and equality; it is also one of efficiency and economic productivity. To maximize competitiveness and development potential, skills need to be seen as a key part of an economy’s infrastructure, and the stronger infrastructure becomes the more robust and resilient the economy will be in response to opportunities and challenges.

The choices made by policymakers, enterprises and individuals on investment in education and training must strive for gender equality-that is, to give women the same rights, responsibilities and opportunities as men. Business leaders and policy-makers need to work together towards removing barriers to women’s entry to the ICT workforce and putting in place practices and policies that will provide equal opportunities for rising to positions of leadership within the ICT sector. Such practices will ensure that all existing resources are used in the most efficient manner and that the right signals are sent regarding the future flow of talent.

Recommendations

National governments, private sector, donors, civil society and education actors need to acknowledge and support the central role professional women can play in further developing and servicing a dynamic and competitive ICT sector. The growing demand for a range of ICT skills around the globe present a unique window of opportunity to properly position girls and women in the industry and provide them with the tools necessary to succeed. The following recommendations apply to all ITU member groups (government, industry and academic institutions) and can be customized and adapted to suit national and regional priorities and the different gender contexts outlined in the report.

I. Recommendations to the governments including ministries responsible for communications, broadcasting, education, science and technology, employment, women and youth affairs, and national regulatory authorities for ICTs and broadcasting

1. Develop and implement national policies to restructure current education systems and infrastructure with the objective/aim/goal of integrating science and ICT-related subjects with mainstream curricula, to better respond to both present industry needs and standards as well as future ICT workforce requirements;
2. Establish and support policies and programmes that place a premium on promoting ICTs skills among girl students in primary, secondary and higher education with complementary investment in vocational training;
3. Relevant government ministries and agencies should prioritise the implementation of policies that develop human talent and the right skill sets for the building of a vibrant and diversified ICT sector, engaging women and girls at all levels in order to fully utilize and promote the full spectrum of talent in the country. This could include the following:
 - a. Ensuring closer collaborative links on ICT policies and initiatives among Ministries of Information and Communication Technologies, Communications, Science and Technology, and Ministries of Education and Youth/Women's Affairs;

- b. Launching awareness raising campaigns, including posters, videos, broadcasts and the staging of public events to encourage girls into taking up ICT studies and careers;
 - c. Targeting more funds and providing scholarships and subsidies towards technical training and incubation programmes;
 - d. Participation in and support of Girls in ICT Days events every year on the fourth Thursday of April where girls and university students, along with their teachers, are invited to spend the day at the office of ICT companies and government agencies so they better understand the opportunities the ICT sector holds for their future.
4. Work with all stakeholders to change the dominant public (mis)conceptions about the industry and the employment and career opportunities it holds for both girls and women.

II. Recommendations to schools, colleges and academic institutions

5. The core education system and infrastructure needs to ensure that:
- a. Courses offered are constantly upgraded to ensure relevance to industry needs – this includes integrating science with other subjects;
 - b. Teaching pedagogies shift away from rote individualistic and ‘silo’-learning to holistic and hands-on team-work and problem-solving teaching methods;
 - c. Concepts of life-long learning beyond basic schooling are promoted;
 - d. Theoretical and practical modes of learning are brought closer together through internships, mentoring and social networking.
 - e. Feedback loops are put in place enabling the private sector and government to advise schools, colleges and academic institutions on the skills and courses required to better meet industry/government needs.
6. Put in place learning opportunities for middle and high school girls about the ICT sector in the form of potential careers and courses through:
- a. Participation in and support of Girls in ICT Days every year through hosting of local events (guidelines provided in on-line kit at www.witnet.org);

- b. Using the ITU Girls in ICT Portal www.girlsinict.org on a regular basis to advertise programmes and events including scholarships, awards, internships and courses;
 - c. Advertising the Girls in ICT Portal www.girlsinict.org in career guidance counsellor offices;
 - d. Other awareness programmes involving local champions, private sector and students.
- 7. Provide training, awareness raising and materials, including online videos and brochures, for parents, teachers, career guidance counsellors and recruiters to shift their own mindsets, attitudes and preconceived notions about ICT careers for girls;
 - 8. Host school-based events that target students, parents, teachers and career counsellors.

III. Recommendations to ICT enterprises, industry, private sector interests and investors

- 1. Develop and nurture partnerships with both governments and educational bodies with the objective to invest in advanced on-the-job ICT skills and industry-based training initiatives and to provide feedback to educational bodies related to the type of skills and training required on the job;
- 2. Engage in career development in Science Technology, Engineering and Math (STEM) through learning-by-doing training, mentorship, internship, creating online networks of girls and women in ICT, and other sponsorship programmes for girls and women;
- 3. Involve women in research and innovation processes to increase the potential for creativity, new research content and user-centred design and application;
- 4. Create positive images through role models, awareness campaigns, use of all media platforms, including, movies, television shows, online videos, comics and video games;

5. Companies of all sizes should be encouraged to refer to the McKinsey 2010 “Most effective measures promoting gender diversity” report² that enable and support women to establish a healthy and effective balance between work and other responsibilities;
6. Participate in ITU’s Girls in ICT Day events every year through invitations to local schools and vocational/technical colleges, small and medium ICT enterprises as well as regulatory bodies, the larger information and communication industry, including broadcasters, and related professional organizations.

² www.mckinsey.com/locations/swiss/news_publications/pdf/women_matter_2010_4.pdf



International Telecommunication Union
Telecommunication Development Bureau
Place des Nations
CH-1211 Geneva 20
Switzerland
www.itu.int