Technology, particularly the information and communication technology, is viewed as a potent force in transforming social, economic and political life across the globe. In many instances, the continuous development and application of technology has created vast new economic and employment opportunities. Most developing countries are harnessing the use of technology to accelerate their development processes.

With an estimated 500 million people entering the global workforce over the next decade, coming to grips with the technological challenge is crucial. Without being “plugged in”, millions of women and men risk being left behind. Since women represent a significant majority of those who do not have access, there is a clear gender dimension to the technological divide. Therefore the technology divide is multifold. It refers to a gap between countries that have or do not have easy access to technological advances. Within countries, the divide is between the socio-economic strata of societies that have access to technology and those that do not (particularly in rural areas). In addition, there is a gender gap across and within most countries: almost everywhere women lag behind men either in access to training or in the application of technology.

In order to meet the technological challenge, there is a need for development strategies that combine new technological capacity with investments in a broad variety of traditional and non-traditional economic sectors. These strategies need to be supported by improvements in education, skills development and vocational training and research. Training in the use of technology is essential and a key step in taking advantage of emerging economic opportunities. Both are critical to the ILO goal of creating greater opportunities for women and men to obtain decent and productive work.

**Technology and its challenges**

At its core, technology is knowledge made up of two dimensions: technological knowledge – knowledge about what works and how things could be done – and techniques - or the application of this knowledge in processes and tools for daily living. From ancient forms, technology has evolved into such devices as the computer or the mobile phone. Technology is so predominant in many of our modern societies and so widespread that its implementation is not limited to any particular field, or linked to any specific sector. Technological knowledge and techniques are moreover constantly evolving and bridging geographical distances (for example with e-learning and e-commerce). Practical advances often lead to broad usage, which in turn lowers the costs of products for the end-users and makes technologies more accessible. Innovation and certain technologies may also have unwanted effects such as pollution and environmental degredation.

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In developed countries, access to technology has greatly helped improve productivity. In less-developed countries, even low-tech innovations have spawned high-impact reductions in work burdens. The “Mabati movement” in Kenya during the 1960s for example turned simple tin roofs into rain water collectors, saving countless hours of water hauling and providing a commodity that could help raise livestock, improve garden yields or be sold to others.

**Technology and Gender**

In many countries, there are more men than women acquiring technological knowledge and skills needed to apply new techniques and start innovative economic activities. Women face many barriers preventing them from taking full advantage of emerging economic opportunities, increasing productivity in their enterprises and accessing more productive and higher value added jobs and higher income generating employment opportunities.

More and more girls and boys are enrolling in primary and secondary school in many regions of the world; at the tertiary level enrolment of women has increased steadily and women are now approaching the 50 per cent mark of the total number of students worldwide. Even so, women are unevenly under-represented in science and technology (SET) studies at all levels of education in and the workforce in different regions.

A recent OECD report found that in most OECD countries, less than a third of all students in advanced chemistry, physics or biology classes in secondary schools were women. In the United States, women represent only 16 per cent of students enrolled in advanced computer science. But according to the United Nations, in Latin America and the Caribbean, 43 per cent of science and technology researchers are women, exceeding the world average of 28 per cent. In most Central Asian countries reporting data, the figure is about 50 per cent; in the Commonwealth of Independent States, 43 per cent and in Africa, about 31 per cent.

Why is there a wide gap in some parts of the world and not in others? It is more a question of encouragement, pervasive gender roles and attitudes rather than aptitudes, according to the OECD. Girls are far less likely than boys to study engineering or computer or physical sciences. Though women earn more than half of the university degrees in the OECD countries, they receive only 30 per cent of degrees in science and technology. The percentage of female graduates advancing to research is even smaller, representing less than 30 per cent of science and technology researchers in most OECD countries and only 12 per cent in countries such as Japan and the Republic of Korea.

Another element to look at is the degree of access women and men around the world have to information and communication technologies. Even though women hold more than 60 per cent of Information and Communication Technology (ICT)-related jobs in OECD countries, only 10 to 20 per cent are computer programmers, engineers, systems analysts or designers. The large majority of women are in secretarial, word processing or data-entry positions, requiring rather routine, low-level skills or limited technical training.

The internet use gap between developed and developing countries in 2006 remains vast, despite the fast development pace in some regions. What is more, the gender divide in internet use is widely variable. While women represent 34 per cent to 50 per cent of internet users in developed countries, the figure can be as low as 4 per cent in some developing countries. On the whole, Internet users are largely male, college-educated and earn higher-than-average incomes. But there is a positive evolution to note as the gender gap is much smaller and even inexistent among younger people in different parts of the world, thanks to higher literacy rates among younger people and the increased presence of computers in schools and further education facilities.

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5 Ibid, p. 23.
7 Ibid, p. 2.
At the 2005 World Summit for Information Societies (WSIS)\textsuperscript{(12)}, convened by the UN, world leaders recognized the key role of science and technology, including ICT, in the wider discussions on development. The World Summit contributed substantially towards setting the goals for establishing a more balanced, harmonious and solidarity-based information society. The Tunis Agenda of the WSIS provides, among other things, specific steps to bridge the “digital divide” between the developed and developing countries as well as focus on women’s access to ICT\textsuperscript{(13)}.

In order to bridge this gap, educational incentives for women are needed. These may include female science teachers functioning as role models; making technical subjects such as math and science more attractive to women and girls; improving gender-awareness among school staff – male and female\textsuperscript{(14)}; and encouraging communities and families to give up the resistance to girls studying technical subjects. These means can help promote science and technology education among women and girls as an entry point to higher end information technology (IT) jobs. Without them, occupational segregation along gender lines may perpetuate a digital or technological gap\textsuperscript{(15)}.

\begin{table}
\centering
\begin{tabular}{|l|c|}
\hline
Country & Male 15-24 \\
\hline
Bermuda & 65.0 \\
El Salvador & 50.0 \\
Iceland & 45.0 \\
Japan & 30.0 \\
New Zealand & 25.0 \\
Norway & 20.0 \\
Australia & 15.0 \\
Serbia & 10.0 \\
Brazil & 5.0 \\
Cyprus & 0.0 \\
Hong Kong (China) & 0.0 \\
Mado (China) & 0.0 \\
Namibia & 0.0 \\
Monaco & 0.0 \\
Ox. Pakistan \\
R. Korea & 0.0 \\
\hline
\end{tabular}
\caption{Table on Internet use by gender, total percentage of population}
\end{table}

\textbf{HOW TECHNOLOGY CAN HELP BREAKING OCCUPATIONAL SEGREGATION}

Trucking can be hard work—and typically a man’s job. New technologies such as power steering, automatic transmissions and power brakes open up many employment opportunities. Combined with training women can take up these opportunities. In Scotland and some other countries, for example, trucking firms faced with a shortage of qualified male drivers are training women to pilot the huge vehicles on long-haul routes. The logistics industry, backed by transport businesses and trade unions, have worked together to launch pilot programmes that will be helping more women to enter this traditionally male field\textsuperscript{(16)}.

\textbf{SKILLS FOR RAPID TECHNOLOGICAL CHANGE AND EMPLOYABILITY}

To address many of these challenges, developing vocational skills and entrepreneurship is overall regarded as the way forward. In 2004 the Report of the World Commission on the Social Dimension of Globalization stated “Today women and men need broad-based skills which can be adapted to rapidly changing economic requirements as well as appropriate basic skills which enable them to benefit from information technology, increasing their ability to overcome barriers of distance and budgetary limitations... Sound education policy also provides an important instrument to offset the negative impacts of globalization, such as increasing income inequalities, with effects which may ultimately be stronger than labour market policies”\textsuperscript{(17)}.

This statement was further developed during the 97th session of the International Labour Conference (ILC) in 2008, in its Committee on Skills for improved productivity, employment growth and development. “Training policies and programmes that aim to improve productivity and employability therefore need to ensure equality of opportunity, be free from discrimination and take into account family and household obligations... A life-cycle approach has to be adopted to overcome the challenges...”\textsuperscript{(18)}

\begin{itemize}
\item \textsuperscript{12} Website of the World Summit on the Information Societies http://www.itu.int/wsis/index.html
\item \textsuperscript{13} See ITU's webpages on gender http://www.itu.int/ITU-D/gender/ and UNESCO’s webpages on gender and ICT http://portal.unesco.org/ev.php-URL_ID=4096&URL_DO=DO_TOPIC&URL_SECTION=201.html
\item \textsuperscript{14} Education Development Centre, Inc.. Building a gender friendly school environment: A Toolkit for Educators and their Unions. (Education International, Brussels, 2007).
\end{itemize}
Gender equality at the heart of decent work

that confront women in gaining access to education and training and in utilizing this training to secure better employment. This includes: improving the access of girls to basic education; overcoming logistical, economic and cultural barriers to apprenticeships and to secondary and vocational training for young women – especially in non-traditional occupations; taking into account women’s home and care responsibilities when scheduling workplace-based learning and entrepreneurship training; and meeting the training needs of women re-entering the labour market and of older women who have not had equal access to opportunities for lifelong learning

Indeed, education and skills training increase the ability of women and men to apply new techniques, thus enhancing their employability as well as the productivity and competitiveness of enterprises. Effective skills development systems – connecting education to technical training, technical training to labour market entry and labour market entry to workplace and lifelong learning – can help women and men benefit from existing and emerging opportunities.

FORMUJER: A REGIONAL PROGRAMME TO STRENGTHEN THE VOCATIONAL AND TECHNICAL TRAINING OF LOW-INCOME WOMEN IN LATIN AMERICA

The Inter-American centre for Knowledge Development in Vocational Training – CINTERFOR/ ILO – developed FORMUJER, a specific programme to increase productivity and employment opportunities of low-income women as well as to support women’s participation in development and in contributing to the reduction of poverty in the region. The programme was launched in three pilot countries: Argentina together with the Ministry of Labour, Employment and Social Protection, Bolivia together with the National Institute for Labour Training (INFICAL) and in Costa Rica with the National Training Institute (INA). Some 248 courses were executed, in 57 occupational areas and in 13 locations throughout the continent, and 3,400 individuals were trained directly, surpassing all goals. Moreover, remarkably, 25 per cent of the participating women were trained in new or non-traditional areas. The theoretical framework, methodologies and materials produced and validated by the local and national Vocational Training Institutions (VTIs) became the joint achievements that enabled FORMUJER to be recognised as a technical reference point in training and gender policies.

Technology also has an important contribution to make in creating decent work for people with disabilities and their integration into the workplace. Most disabled people live in developing countries – of the estimated 650 million people with disabilities in the world, 80 per cent live in developing countries, the majority below the poverty line. The participation rate of disabled women in the workforce is significantly lower than that of disabled men - 16.6 per cent compared with 52.6 per cent. Young women are disproportionately disadvantaged when it comes to employment; they may be discriminated against for being young, female and having a disability. Environmental aspects such as physical access may be overcome with technological advances. Equipment and tools such as hearing aids, Braille devices, or motorized wheelchairs assist disabled persons to bridge their specific disabilities and gain access to work. Internet and computer access can provide opportunities for teleworking and inclusion into many aspects of political, social, economic and cultural life. Efforts need to be made at policy and implementation levels to remove obstacles making these working tools both available and affordable.

Entrepreneurship development

Technological “catching up” is also supporting the transition from the informal to the formal economy. In some countries, the growth in women-owned businesses is greater than for private firms as a whole. Women entrepreneurs are increasingly becoming the driving forces of many economies particularly in Africa. Studies show that they account for 50 per cent of all businesses. These businesses are often micro- and small-scale enterprises, in the informal economy and may not offer the same job security, social protection, access to training and career development as the formal economy. In fact, formal employment, with all its inherent advantages in terms of job quality and quantity, remains an illusive goal for many women.

Supporting women entrepreneurs to introduce new technologies in their enterprises enhances the potential to increase productivity, create employment, reduce poverty, and promote local development. Women go into business in a variety of forms, including self-employment, SMEs, social entrepreneurship, cooperatives and many more. For women to recognize their entrepreneurial potential, it is important to promote role models that coincide with their realities and aspirations.
Women also need to overcome other barriers when deciding whether to start a business, such as limited access to credits or traditional patterns preventing women from taking part in income-generating activities or controlling financial resources. To address these barriers, the ILO has adopted a twin-track approach of mainstreaming gender equality in entrepreneurship development and approaches, while at the same time providing targeted approaches to women's starting, formalizing and growing their enterprises. This has been formulated into a comprehensive Strategy on Promoting Women's Entrepreneurship Development.

Skilled development paves the way by enabling women to create and sustain productive employment. In order to increase productivity, and diversify into higher value added activities, women entrepreneurs need to be empowered to access and adopt new technologies and apply them in different sectors in the economy. Promoting women entrepreneurship to help close the technology gap thus contributes to more decent and productive work. Yet education and training are not enough. To be fully effective, these need to be part of integrated national economic and employment development policies and strategies. Other key factors include the creation of an enabling environment for sustainable enterprise development, social dialogue and fundamental investments in basic education, health and physical infrastructure.

**ILO RESPONSES AND PARTNERSHIPS**

Skills development policies constitute a core element of the ILO’s *Global Employment Agenda* (GEA), the ILO’s policy framework for the employment promotion objective of the Decent Work Agenda. The Human Resources Development Recommendation, 2004 (No. 195) also provides valuable guidance for effective skills and employment policies that assist governments, employers and workers to put into effect education, training and lifelong learning policies and programmes for the 21st century, including the use of new information and communication technology in learning and training.

At the 2008 ILC, the ILO’s tripartite constituents adopted conclusions squarely focused on the challenge of skills development. The conclusions seek to engender a *virtuous circle* in which improving the quality and availability of education and training for women and men fuels innovation, investment, technological change, enterprise development, economic diversification and competitiveness. Economies need to accelerate the creation of more but also better jobs and thereby improve social cohesion.

Within the broad policy context, Decent Work Country Programmes (DWCP) provide an important vehicle for countries to integrate skills development into broader national development frameworks. Many DWCPs identify skills development, productivity and employment as national priorities for improving competitiveness, enhancing the employability of young women and men and increasing decent work opportunities for disadvantaged groups.

The ILO’s Skills and Employability Department supports governments and social partners in using skills development to improve employability of women and men, and to improve the sustainability of enterprises and encourage inclusive growth. Education and training are crucial to improve and sustain workers’ productivity and income-earning opportunities at work. It serves to enhance their mobility at work in the labour market and offer the potential for increased career choices.

The ILO’s Training for Rural Economic Empowerment project (TREE) in Pakistan and the Philippines developed an alternative methodology for income generation for the most marginalized groups, including the rural poor (specifically women), disenfranchised young men and persons with disabilities. In Pakistan 56 per cent of those participating were women, an impressive figure in Pakistan given the social, cultural and mobility constraints. The project also developed new ways of encouraging women to take part in skills training programmes. Training gave women the skills to generate income in areas such as tailoring, household appliance repair, welding, auto mechanics, building electrician, electronics and plumbing.

**UPGRADING INFORMAL APPRENTICESHIPS**

Apprenticeship in the informal economy is the major route for most young people in developing countries to acquire the technical skills of a craft or trade and the entrepreneurial competences to start their own business. The ILO, in the framework of the One UN project in Tanzania, is implementing a pilot project in the region of Mtwar and Lind, to upgrade the informal training system. Important objectives are to improve access of girls to apprenticeship training in trades with growth potential, including the traditionally male-dominated ones; and to train master craftspeople, as well as women and male apprentices in the business and technical skills required to apply more advanced technologies. This approach enhances employability and productivity, and helps to bridge the technology and gender divide in the informal economy.
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The Postal and Telecommunications services team of the ILO Sectoral Activities Branch (SECTOR) implemented from 2006-2007 an ILO Action Programme to promote social dialogue on skills, employability and equal opportunities in telecommunications services, focused on sub-Saharan African countries. It enabled participants to share experiences, discuss specific challenges facing the telecommunications industry and identify activities for the Action Programme in 2007. The seminar adopted a set of conclusions, one of which stated that the social partners will work towards greater gender equity in access to training.

Employers' and Workers Organizations also have an important role to play in levelling the gender divide in skills and entrepreneurship development. The International Organisation of Employers (IOE) designed an employers’ toolkit to increase the representation of women in employers’ organizations and business associations in their respective countries. The ILO Small Enterprise Development (SEED) programme and the ILO Bureau for Workers’ Activities (ACTRAV) did research on the representational gap of women workers in small enterprises. ACTRAV and the ILO’s Cooperative Branch (COOP) undertook the gender sensitive SYNDICOOP programme to support organizing of unprotected workers in the informal economy through cooperative–trade union collaboration in Rwanda, the United Republic of Tanzania and Uganda.

The ILO’s Women’s Entrepreneurship Development and Gender Equality Programme (WEDGE) has worked effectively to enhance economic opportunities for women entrepreneurs—including women living with HIV/AIDS or disabilities—through business knowledge and skills training; promoting and facilitating access to micro-finance institutions and markets; strengthening women entrepreneurs’ voice and representation; and increasing constituents’ ability to remove barriers that may impede women’s entrepreneurship development.

ENTREPRENEUR IN TANZANIA: INFORMATION TECHNOLOGY

Operating out of the family home, Jane provides computer training to nearly 50 students a day. From three computers in 1998, the business has grown to 10 computers and five employees. They train young women and men how to use computers, software and provide maintenance. As a result of increased demand for IT services in Mbeya Municipality, Jane hopes to start giving certificates and diploma courses. For this, she will need assistance and more skills training in technology. All will benefit her, as well as her community. Jane participated in WEDGE training activities to increase her business management skills, to organize her work effectively and grow her business26.

WEDGE is part of the broader Small Enterprise Development unit (SEED). This unit’s mission is to strengthen the understanding of how the development of sustainable enterprises can better serve employment goals, with a special emphasis on women and youth entrepreneurs. In particular the ILO’s Know About Business (KAB) works to develop an entrepreneurial society and positive attitudes towards entrepreneurship among young women and men by providing guidance for governments, social partners and educational institutions that want to integrate youth entrepreneurship education into their curricula. It also provides career guidance on entrepreneurship as an employment option directly to young men and women in schools. The ILO-initiated Small Enterprise Media in Africa (SEMA) project in Uganda that taps into the country’s growing radio industry and establish a radio programme for small enterprises that reaches the poorest strata of society.

Cooperatives can empower women and raise not only their own standards of living, but also of the communities in which they live. The ILO Cooperatives branch (COOP) has mainstreamed gender in all its activities and focuses specifically on access to productive resources, income generation, employment creation, and access to credit and quality, low cost services. It also provides specific training programmes for women. Together with the International Cooperative Alliance, the ILO published a Leadership Training Manual for Women Leaders of Cooperatives.

The ILO Bureau for Gender Equality (GENDER) plays a leading role in supporting the implementation of gender equality in the ILO’s Decent Work Agenda by promoting gender mainstreaming in all ILO policies, strategic objectives, programmes and activities. The Bureau gives advice to governments, employers’ and workers organisations and units alike on specific issues, in addition to conducting technical cooperation programmes and gender audits.

A number of steps can be taken to promote education, skills training and entrepreneurship development to equip women and men to overcome the technology gap and benefit from emerging opportunities.

Education, training and skills development can be encouraged by:

- Ratifying and implementing the Human Resources Development Convention, 1975 (No. 142) and applying the guidance provided in the Human Resources Development Recommendation, 2004 (No. 195).
- Ratifying and implementing the Vocational Rehabilitation and Employment (Disabled Persons) Convention, 1983 (No. 159) and applying the Recommendation concerning Vocational Rehabilitation and Employment (Disabled Persons), 1983 (No. 168).
- Increasing the training and employment opportunities for disadvantaged persons, including women, young people and people with disabilities.
- Empowering women to study technology-related subjects and be trained in new and higher skills, providing career guidance to widen the interest of girls and women in existing and emerging opportunities related to technological developments.
- Creating awareness on the need to overcome cultural and social barriers preventing girls from studying technology-related subjects. This also includes upgrading the informal apprenticeship systems in developing countries by enhancing relevance and quality of training, ensuring formal recognition of skills and providing women with access to apprenticeship training.
- Addressing low productivity and persistent poverty in the informal economy through the improved access of women and men to quality skills development outside high-growth urban areas, combining remedial education and employment services with technical training, implementing systems for the recognition of prior learning so as to open up jobs for them in the formal economy and providing entrepreneurship training that encourages and enables the formalization of small enterprises.
- Developing effective means for women and men in urban and rural communities to learn about new technologies, production techniques, products and markets to improve agricultural and non-farming productivity.

Entrepreneurship can be promoted through:

- Mainstreaming gender in ICT policies and strategies to help promote women’s access to, and participation and leadership in IT.
- Supporting media campaigns, workshops, trade fairs, exhibitions and other promotional events— involving governments, employers’ and workers’ organizations and local communities—to provide women entrepreneurs with a platform to promote voices for change and be inspirational for other women.
- Improving ways for women to access micro-credits allowing them to buy and make full advantage of new technologies, thus enhancing their productivity and access to new markets.
- Promoting policies that assist women in establishing small- and micro-businesses, including providing business skills training, access to communication technology and credits to enhance the productivity.

SELECTED ILO PUBLICATIONS ON SKILLS, ENTREPRENEURSHIP AND BRIDGING THE TECHNOLOGY AND GENDER DIVIDE


Gilbert, M. 2008. *Link and learn: progress assessment of the approach adopted to promoting the inclusion of women entrepreneurs with disabilities into the WEDGE programme in four African countries* (Geneva, ILO).


- 2008c. *Membership directory of five women entrepreneurs associations (WEAs) in Ethiopia* (Geneva, ILO).


This background brochure has been prepared as part of the ILO public awareness raising campaign on “Gender equality at the heart of decent work”.
Please contact us on gendercampaign@ilo.org for information on additional ILO themes addressed by this gender equality campaign.