

FINAL DRAFT

Engendering ICT:

Ensuring Gender Equality
In ICT for Development

September 5, 2003

Global Information and Communication Technologies Department
Gender and Development Group

Acknowledgments

The study “Engendering ICT” was conducted by Knowledge Management International Co., Ltd. (KMI) and its associated professional group, with Nancy J. Hafkin as study coordinator, Deepti Bhatnagar, Subhash Bhatnagar, Sophia Huyer, and Nidhi Tandon. Funding for this study was provided by the Government of Japan. World Bank task managers for this study were Kayoko Shibata, Knowledge Management Analyst, Gender and Development Group, Poverty Reduction and Economic Management Network, and Robert Schware, Lead Informatics Specialist, Policy Division, Global Information and Communication Technologies Department. Thanks are due to Michael Bamberger, external reviewer, for his poignant critique that helped focus the study, Shampa Banerjee, for her painstaking and perceptive editorial work, and Ben Huffman, who prepared the CD-ROM training materials derived from the study for Bank task managers. Their contributions are gratefully acknowledged, along with those of dozens of others, particularly from the staff of the World Bank, who helped by giving time, information, and views. The views reflected in this study are those of the contributors and not necessarily those of the World Bank or its members.

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Engendering ICT: Ensuring Gender Equality in ICT for Development

Executive Summary

Men and women often experience different realities. Compared to men, women generally enjoy fewer rights and resources. These gender-based inequalities reduce women's ability to benefit equally from the opportunities offered by information and communication technologies (ICT), and to contribute toward the shaping of the developing global knowledge economy. ICT has tremendous potential for promoting and achieving gender-equal sustainable development — a potential that is yet to be realized. The purpose of this study is to identify selected areas, describe innovative projects and activities, and set forth suggestions on how the World Bank and other agencies working for global change can contribute to realizing this potential.

Gender and development

Awareness of the disparities between men and women that affect women's access to the benefits of development has increased worldwide since the 1970s. There is also a growing consciousness

of the centrality of gender equality issues in poverty alleviation and sustainable development. The World Bank gender policy (OP 4.20)* has been in existence since 1994. In 2002 the Bank's Operations Evaluation Department (OED) called for better integration of gender considerations in Bank-supported projects so that both men and women can access the benefits of development equally. This study responds directly to this call. As many Bank-supported projects have ICT components, taking the gender dimension into account is imperative.

ICT covers a wide range of technologies, from radio, television, and telephones to the Internet. This paper will examine the entire range.

Decisions about which ICT is appropriate to use have gender implications. The study has chosen a number of areas on which to concentrate because of their importance for both social and economic development. They are:

- Employment, both in the formal information

* OP/BP 4.20 Gender and Development <http://wbIn0018.worldbank.org/institutional/manuals/opmanual.nsf/TextTOC1?OpenNavigator&Start=1&Count=30&Collapse=1.2.3>

technology (IT)** sector, and in the informal micro and small enterprises (MSE) sector

- Education, which provides the prerequisites for effective use of ICT as well as new models of delivery
- ICT-enabled delivery of social services
- Use of ICT for political empowerment
- National policies for ICT development.

The study also examines a sample of World Bank financed projects that cuts across many sectors to examine whether gender issues were considered in their efforts to employ ICT as transformative development tools.

Most of the research was based on desk study, although the authors of both the chapter on MSE and the chapter on women in the IT labor force conducted primary research in the course of preparing their work. While the full potential of ICT for advancing gender equality has not yet been realized, some very interesting and challenging steps have already been taken. The case studies chosen illustrate these steps.

ICT as a tool for social and economic transformation

Along with globalization, ICT provides the tools that can transform the way production is organized and information shared around the world. These technologies offer flexibility of time and space, a way out of isolation, and access to knowledge and productive resources. They are enabling tools for economic development and social change. Arguably, ICT can be most valuable to those who suffer most from limited time availability, social isolation, and lack of access to knowledge and productive resources: women in developing countries.

Removing gender disparities in ICT

In recent years, gender advocates have given an additional meaning to engender — that of “integrating gender into development work”.

“Engendering ICT” is the process of identifying and removing gender disparities in the access to and use of ICT. It is also the process of adapting ICT to the special needs, constraints, and opportunities of women, by taking advantage of women’s special knowledge and of their strong informal networks and support systems in order to better combine electronic communication with traditional communication systems.

When the underlying concern is gender, we frequently find ourselves talking about the situation of women because existing gender inequalities in access to vital rights and resources generally affect women and girls more negatively than men and boys. In the case of ICT, access to and use of ICT for girls and women are directly affected by gender-based inequalities.

Women need ICT for the same reasons as men. They need ICT to get more information to carry out their productive, reproductive, and community roles; they need ICT as tools to conduct their businesses and to work in the IT industry. They need ICT to find resources for themselves, their families, their work, and their communities. They need ICT to have a voice in their lives, their community, their government, and the larger world that shares their issues and problems. They need ICT to compete in a digital world. Additionally, they bring knowledge and perspective that can enrich the world of information technology. These advantages need to be captured and included.

Gender issues in ICT

Some of the major gender issues that affect the impact of ICT on men and women include:

- Lack of reliable sex-disaggregated statistics, which constrain our knowledge of gender issues in ICT
- Concentration of ICT infrastructure in urban areas, while many women in developing

** Although the terms ICT and IT are frequently used interchangeably, in this study IT will be used to primarily refer to the information technology industry.

countries live in rural areas, with limited access to new technologies

- Social and cultural issues that frequently prevent women from accessing ICT facilities
- Women's lower educational levels, especially in scientific and technological education
- Negative attitudes about girls and technology
- Technophobia or disinterest in ICT on the part of many women
- Women's lack of disposable income to purchase ICT services
- Lack of Internet content of interest to many women in developing countries.

ICT-specific gender issues

Other gender issues in ICT projects are specific to the technology. For example, when choosing a particular kind of telephone technology, was the number of female-headed households unable to afford it taken into consideration? Would established pricing encourage widespread adoption (and increased use) of the technology by women as well as men? Do the databases created for health management information systems include full information about women's health problems and possible use of alternative, indigenous treatments?

Gender-based differences in ICT employment

Some major points about gender and the ICT labor market emerging from the study were:

- In general, across countries, women constitute about 30 percent of those working in the IT industry.
- Throughout the IT industry in developing countries, women are concentrated in routine jobs at lower levels and lower salaries than men.
- Low enrollment rates of girls and women in science and technology hinder their advancement in IT employment.
- Women constitute a disproportionately high number of employees in call center services, data entry, and programming, but their numbers are very small at the project manager level.

- Upward mobility in organizations tends to follow along gender lines, with women taking more time than men to move from entry to middle levels and from middle to managerial levels.
- Upward mobility in IT employment for women in developing countries tends to be higher in the public sector than in the private sector.
- Countries with higher Gender Equality Index and a large ICT sector offer the greatest opportunities for IT employment of women.
- Although one of the characteristics of the IT industry is its flexibility of workplace and hours, developing countries show no evidence to date of applying this flexibility to women's employment in the ICT sector.

Women's access to and use of ICT in micro and small enterprises

Women increasingly dominate the MSE sector in many developing countries. Women in business need ICT for connectivity, communication, computing, and commerce. Women find it harder than men to use ICT to support their businesses, as it is more difficult for them to generate capital to invest in ICT. They also face higher barriers to computer literacy. Women often find it harder than men to get training in the use of computers or engage in ICT-related employment. Many women entrepreneurs are also losing out on the information and networking that come from ICT. This is a serious deficit, particularly in the context of globalization where businesses require more information and communication capabilities to be competitive.

Many women-owned microbusinesses are beginning to use ICT. Mobile phones are particularly vital for those who do not have fixed work locations. A matrix of the types of ICT that women-owned businesses look for showed that:

- Microbusinesses want cell phones and e-mail accounts (public access).
- Small enterprises want cell phones, e-mail accounts, and the use of ICT applications for

accounting and conducting e-commerce.

- Medium enterprises want cell phones, personal computers (PC), dial-up connections, computerization of basic business processes, as well as their own web sites.

New ICT-enabled businesses and businesses servicing the ICT sector are particularly fruitful areas for women entrepreneurs. A number of e-business ventures, including examples from Cambodia, India, and Peru, illustrate how self-employed women working in the informal sector can exploit economic opportunities offered by e-commerce. Chambers of commerce and other business service providers too can be very helpful in delivering ICT-related services to women entrepreneurs.

Many women entrepreneurs recognize the difference that ICT can make in their business activities and are ready to adopt the new technologies, but can only do so effectively with adequate support.

Gender, ICT, and education

Education is arguably the single most important factor in improving the ability of women in developing countries to take full advantage of the opportunities offered by IT at all levels. Currently, because of their low educational levels and limited access to scientific and technical education, women tend to be poorly placed to participate in and benefit from the knowledge economy. They also tend to have less access to skills training and development, which would enable them to gain IT employment. The participation of women in IT design and development is particularly low. These gaps are closing in some countries, but not in most.

This study, therefore, is also concerned with women's education and its relationship to ICT: education allows women to have equal access with men to ICT, and the use of ICT helps women overcome gender-based differentials in education. Education can enable women to work in or with

IT at increasingly high levels, and ICT can help women acquire education where they were previously unable to do so.

Education for equal access to ICT

Support and encouragement are needed for the increased participation of women and girls at every level of scientific and technical education. Initiatives to achieve this include:

- Encouragement of girls and women to continue their education past the primary level
- National programs, especially at the tertiary level, to increase the recruitment and retention of girls and women in science and technology
- Curricula and program requirements to encourage female participation, which could consist of:
 - Bridging programs that allow updating and reentry for women who are already qualified in technological subjects
 - Conversion programs that provide first entry to technological education for mature women, early school dropouts, and learners who wish to change direction
 - Community-based programs geared to local and environmental issues of direct relevance to the lives and responsibilities of women.

Despite their substantial participation in the IT labor force women continue to be an overlooked target group for IT skills development. ICT can provide innovative ways for women to obtain and update skills for equal participation in the knowledge economy. The experience of the Cisco Networking Academies and other initiatives indicate that, when opportunities are available, women successfully take advantage of them to obtain high-level technical education. Some measures supporting such efforts include reserving places for women in skills-training programs and training aimed at women.

Using ICT to overcome gender differentials in education

ICT can provide new possibilities for women at all levels and for all types of education through distance learning. Flexibility of access and study times and the potential to reach women in rural areas make distance learning via ICT a promising educational approach for women. Much more research and gender analysis, however, are needed on the efficacy and benefits of distance learning programs, including the use of computers and Internet strategies.

Women in several countries have enthusiastically taken advantage of e-learning, or the teaching and learning that take place through the Internet. Challenges to e-learning include the high cost of on-line access in much of the world. Increased costs of higher education, in general, also tend to restrict access to higher education (whether on-line or off-line) mainly to groups in higher socioeconomic brackets. In order to reach women and groups at other socioeconomic levels, alternative access strategies need to be investigated.

ICT and political empowerment

ICT can play a significant role in increasing women's voice and overcoming inequities and barriers in political participation. A small number of women have already been utilizing ICT for awareness generation, networking, advocacy, and their own political empowerment.

Some of the cases studied illustrate the use of ICT to generate collective support for women's causes. ICT has helped women find a voice and exert pressure on policymakers to incorporate women's perspectives and concerns, particularly in developing countries where they are often isolated, invisible, and powerless in a male-dominated sociopolitical milieu. The political empowerment of women can lead to more women-friendly policies and practices in social service delivery.

Using ICT to deliver social services

ICT offers the possibility of greater transparency, accountability, and accessibility in the delivery of social services, which frequently come under the rubric of e-government. Travel time can be saved by delivering services at convenient locations; the number of visits to delivery points can be minimized; and the time taken to deliver services can be shortened. With ICT-enabled service delivery, corruption can be controlled and transparency enhanced, and poor women in developing countries can be among the first to benefit.

The basic gender issue is whether men and women benefit equally from ICT-enhanced services. Are services designed and implemented keeping in mind the special requirements, convenience, and preferences (time and location) of women?

Some examples of women benefiting from ICT-enabled social service delivery include:

- The *Virtual Delivery Room* in Slovenia, where the imaginative convergence of medical and Internet technologies brought positive results for mothers and their infants
- The *Association of Uganda Women Medical Doctors* in Uganda, which combined the Internet with traditional methods of information diffusion to help extend the benefits of the latest breakthroughs in health to rural women despite severe limitations in infrastructure and skills.
- *Rural Extended Services and Care for Ultimate Emergency Relief* in rural Uganda, which used VHF radios to ensure quick communication and reduce maternal mortality rates
- *TARAhaat* in India which has ushered in social change — the idea of girls receiving computer education and becoming wage earners is becoming increasingly accepted in an otherwise conservative social environment
- *Gyandoot*, also in India, where rural women have learned to use the Internet and e-mail to redress some of their problems.

As the use of ICT for any type of service delivery

by government or nongovernment organizations (NGO) is still in its infancy, it is too early to pass judgment on the effects of such efforts on gender equality. Much work remains to be done in engendering ICT services, especially in e-government, which can bring enormous benefits to women.

Gender focus in national ICT policies

Another purpose of the study was to assess the extent to which existing national ICT policies have taken gender into account, and to what extent these policies have impacted employment, entrepreneurial opportunities, and political participation by women. The study found hardly any mention of gender concerns in ICT policies formulated by most countries, with Korea being a notable exception. A number of national ICT policies refer to the situation in rural areas and among the poor, but say nothing about gender. A likely result of this invisibility at the policy level is that gender issues will not appear in the implementation of ICT policies. Gender needs to be taken into account not only in the content of ICT policies but in the process of policy elaboration, implementation, and evaluation.

- Engendered national ICT policies can fulfill the following objectives for women: greater access to and use of ICT; more employment in IT and related industries; more opportunities to set up MSE utilizing e-commerce; more access to social services in health, education, and communication; and higher political participation and economic empowerment.
- ICT policies need to consider the gender dimensions of legal issues and attitudes of labor unions, as well as constraints on women's mobility, control over productive resources, and access to credit.

The gender focus of policies relating to ICT is difficult to review and evaluate because the policy pronouncements on these varied technologies frequently fall under the purview of more than one ministry or sector. Many governments are now grappling with institutional restructuring to take

a holistic view of these media as the technology moves increasingly toward convergence. Policies in areas other than ICT may affect women and ICT. For example, national industrial and labor policies would affect the promotion of women's employment in the IT industry. Education policies may encourage women's scientific and technological education and have a significant impact on their preparedness to enter the labor market.

The effort to engender national ICT policies needs to proceed on at least two fronts: sensitizing policymakers to gender issues, and sensitizing gender advocates to ICT issues. Very few policymakers are trained to think from a gender perspective and unless this is done at all steps of the process, gender concerns are rarely integrated into policy. Likewise, gender advocates are unlikely to understand ICT issues. To become effective advocates of women's interests in this area, they need to understand the technical issues that are the standard content of ICT policy.

The study elaborates the gender dimensions of the following ICT policy issues: infrastructure, regulatory frameworks, labor policies, education policy, licensing, and e-government.

Gender issues in World Bank ICT projects

The study examines a broad sample of World Bank projects from the ICT sector, as well as those with ICT components from other sectors to determine the extent to which they incorporated gender issues.

The half-full glass

Nearly half the projects consider gender as an element in the overall rationale for the project, but often this is limited to a simple mention of gender, or to a description of the varying social roles of men and women.

The other half of the glass...

At the same time, more than half the projects in the sample pay no attention to gender issues.

Only a third of the projects include any action that target women or strengthen institutions that are likely to target women. Again, about a third of the projects aim to undertake actions that promote gender-equal access to resources.

These results apply to the projects overall and not necessarily to the ICT components of these projects. As far as the ICT components of the projects are concerned, fewer than 10 percent consider gender issues. The tendency is to treat the ICT component as a technical part of the project, without consideration of its social impact. In those projects that do consider gender issues in ICT, the critical factors seem to be the degree of gender awareness of both the World Bank and the country teams.

Despite the low number of projects in the sample that consider the gender dimensions of ICT, there are some outstanding examples of successful incorporation of gender issues in World Bank projects. Among these are:

- An education project in Argentina teaching IT in secondary schools and analyzing results by sex and class
- A land registration information system in Bulgaria that recognized the gender issue in women's access to land registration information
- An agricultural services ICT project in Ghana that targeted women farmers for the diffusion of information and established a sex-disaggregated database of food and agricultural statistics
- An IT technician training project in India that through the provision of hostels and scholarships supported women students studying in their own states
- ICT training for youth in Macedonia aiming to improve the situation of girls from minority ethnic groups who are underrepresented in education
- A project to deliver ICT services to microenterprises in Mexico that allocated funds to train women

- A mineral resources information management project in Mozambique that addressed gender issues in artisanal mining
- A higher education project in Mozambique that increased Internet access for institutions of higher education with a focus on gender equality
- An agricultural extension project in Peru that selected IT service providers among other things on the basis of their capability to work with rural women
- Agricultural extension information and communication centers in Tanzania that reserved 30 percent of places for women and included women's issues in training.

Missed opportunities

A number of project areas that seemed suitable for gender analysis did not have a gender dimension. Although distance learning, as outlined above, has many features attractive to women, given their multiple roles and time constraints, some distance learning projects did not incorporate social awareness or gender analysis. While many of the projects in telecommunications policy and regulatory reform showed a high level of awareness of their potential for social reform, few mentioned gender issues. The study details many potential gender issues in these areas.

Some typical problems encountered were:

- While a large number of projects paid some attention to gender, in most cases this was not done in a meaningful way.
- Assurances of gender consideration or mentions of gender were not matched by project actions.
- The overall norm was to ignore gender issues in all projects studied.
- Despite a mandate to include social analysis in all project preparation documents, there were many cases where social analysis was relevant but not applied.
- Fewer than 10 percent of ICT projects or ICT components of projects considered gender issues.

- Stand-alone ICT projects had poor overall results on the integration of gender issues.

These findings indicate that there is need to enhance consciousness of gender and ICT issues.

Conclusions

It is clear that the potential of ICT to help achieve equitable and sustainable development will not be realized without special efforts and increased attention to gender issues. In the ICT domain, as in other development areas, the key to altering the distribution of resources is through the application of gender analysis and gender-aware project design, implementation, and evaluation. Development interventions must work with both men and women stakeholders to ensure that opportunities to utilize technologies are not inhibited by restrictions on mobility, the gendered division of labor, or traditional customs.

ICT projects wanting to involve women as well as men should see that:

- Women are involved in the design and implementation of projects
- Projects target men and women equally (establishing separate access and training strategies if necessary)
- Account is taken of the social division of labor, by which most domestic responsibilities fall upon women
- Content is locally appropriate and of value to women as well as men.

ICT: beyond the technology focus

ICT is not about technology alone. It is used by both men and women to satisfy their need for information, communication, and entertainment. Just as every good or resource has its gender aspect, so does ICT. Some of the questions to ask are:

- Are there factors that impact men and women differently?

- Do men and women have equal access?
- Do the media transmit both men's and women's knowledge?
- Do men and women have the same needs and requirements for the media?

It should not be assumed that technology impacts men and women equally. In seemingly exclusively technical ICT areas such as network architecture, radio spectrum allocation, and regulatory frameworks, there are gender issues outlined in the study that task managers can use as guidelines in engendering ICT projects and project components.

Virtually every ICT project has gender issues: A common misconception in ICT projects is that by using ICT to accelerate development, all will benefit equally, without the need to take any specific measures to include disadvantaged groups.

Gender issues should be considered from the earlier stages of project design. They should not be added in hindsight or as a midterm correction. A fully participatory process will most likely include gender experts and input from organizations that work on gender issues.

Successful ICT projects do not need to use high-end technology when addressing gender issues. Judicious application of available and affordable ICT, including intermediate technology, can have much greater impact than a preoccupation with using the latest technology for its own sake.

Recommendations

In order to better achieve development objectives, there is a need to sensitize World Bank Task Team leaders in the ICT sector and those from other sectors who have ICT components in their projects to the gender issues in these projects. Since the vast majority of Bank projects have ICT components, this implies a need for increased gender awareness on behalf of the leaders and their teams. In order to incorporate

gender issues into ICT projects and ICT components, it is recommended that:

1. Task Team leaders should use tools and good practice examples, such as those illustrated in this study and the accompanying toolkit, to ensure that gender and ICT are taken into account in the initial stages of project preparation.
2. Both stand-alone ICT sector projects and projects with ICT components should routinely be reviewed for consideration of gender issues in ICT. This advisory should help to bring an awareness of gender issues in ICT to Task Team leaders who might otherwise be unaware of them.
3. Resources should be assigned to provide training on gender issues for World Bank staff involved in ICT project design and formulation or in formulating ICT components in projects in other sectors.

1

Introduction

Men and women live in separate realities. The world over, most women are poorer than men and often not as well educated. Women have a higher level of illiteracy. They tend to earn less and hold fewer positions of power and decisionmaking in the family, in businesses, and in political and public life. These gender-based inequalities impact women's ability to benefit equally from the opportunities offered by information technology and to contribute fully to shaping the developing global knowledge economy and society. This study highlights several areas of high potential for gender equality within ICT, while noting the constraints to women's full participation with men in this area, and outlines some steps for making the ICT sector gender-aware and responsive.

Why this study?

Since the 1970s awareness has increased of the disparities in rights and resources between men and women that affect women's equal access to the benefits of development. This realization took on a global dimension at the five world conferences of women held from 1975 to 2000, and

achieved its culmination at the United Nations Millennium Summit in 2000 where both developed and developing countries adopted the Millennium Development Goals. One of the main goals is the promotion of gender equality and the empowerment of women. Specifically in the area of ICT, the 16th Plenipotentiary Conference of the International Telecommunication Union (ITU) in Marrakesh (2002) gave a strong mandate to ensure the inclusion of a gender perspective in all ITU contributions to the World Summit on the Information Society to be held in Geneva in 2003 and Tunis in 2005.

The World Bank's commitment to gender in development

The World Bank has been working steadily to promote gender equality in both staffing and operations since 1994 when its gender policy came into operation. The Bank's Poverty Reduction and Economic Management (PREM) network has a Gender and Development Board whose main task is to establish an official approach to promoting gender concerns. In 2001 the Bank issued its most

comprehensive treatment of gender to date in the policy research report *Engendering Development: through gender equality in rights, resources, and voice* (World Bank, 2001), bringing together pro-poor economic growth strategies with a rights-based approach to human development. In 2002 the World Bank's Operations Evaluation Department called for better integration of gender considerations into the design of projects supported by the Bank so that both men and women receive the benefits equally. The Operational Policy on Gender and Development issued in March 2003 provided an operational strategy for gender mainstreaming in World Bank projects.

While part of the overall growing awareness of the centrality of gender issues to sustainable development and the achievement of human equality, this study responds directly to the call for better integration of gender considerations in the design of Bank-supported projects. It describes gender issues in key sectors in developing countries and suggests ways in which they can be addressed. In the last chapter, it specifically addresses the record of the Bank in incorporating gender in its ICT projects and project components, and makes recommendations on how this may be improved. As ICT has become a Bank sector and as many Bank-supported projects have an ICT component, increasing the gender dimension in this sector is a central concern in achieving the Bank's goals, specifically for gender equality and the alleviation of poverty. This message was included in the Sector Strategy Paper (SSP), "Integrating Gender into the World Bank's Work: A Strategy for Action." (World Bank, 2002a). The Bank's SSP on ICT (World Bank, 2002b) recognized gender issues, although in the context of ICT use in other sectors, and not as central to ICT itself.

What is ICT?

Information and communication technologies are the hardware, software, networks, and media for collection, storage, processing, transmission, and presentation of information in the form of voice,

data, text, and images. They range from telephone, radio, and television to the Internet. Given the focus of using ICT to reach women and men equally in developing countries, particularly those in peri-urban and rural areas, this paper will look at the full range of ICT and not only at the more advanced technologies. As we will see later, decisions about which ICT is appropriate to use have gender implications.

ICT has high potential for promoting and achieving equitable and sustainable growth and development. These tools can help women participate in economic and social development on an equal basis with men. However, the tremendous potential of the sector for promoting gender-equal development has not been realized. The purpose of this study is to describe that potential in selected areas, underline innovative projects and activities, and set forth suggestions on how the potential can be realized by the World Bank and others.

If there is one message that emerges from all the chapters, it is this: the potential that ICT has for helping to achieve equitable and sustainable development will not be realized without special effort and attention to gender issues. Consideration of gender issues is not automatic. It does not happen by pronouncing an activity gender-neutral. In fact, this study calls into question whether there are any ICT projects or project components that are without gender issues. Without specific focus and attention on gender issues, gender-neutral results — those with equal impact on men and women — cannot be achieved. Any special action is time-consuming and arduous, but the results are often worth the doing. As Goetz says, "despite the rhetoric, outcomes of many programs [involving gender and development] have failed to alter asymmetrical distribution of resources and social values which contribute to the social construction of gender inequality and differences" (Goetz, 1997). In the ICT domain, as in other development areas, the key to altering

the distribution of resources and social values is through the application of gender analysis and gender-aware project design, implementation, and evaluation.

The purpose of this study is to help World Bank task managers incorporate gender issues into ICT

that such interventions will lead to improved efficiency in ICT policies and programs of client countries by responding to the needs of both men and women equally. The study should be of interest to other development practitioners, as well as researchers working on gender-equal development in any specific area, and in the long run make a difference in the lives of women, men, and their families in many developing countries.

The study is not exhaustive; rather it has chosen a number of areas on which to concentrate because of their importance for both social and economic empowerment. They are:

- Employment both in the formal IT sector as well as in the informal and semiformal area of MSE
- ICT-enabled delivery of social services
- Use of ICT in political empowerment
- Education, which provides the prerequisites for effective use of ICT as well as new models of delivery
- Policies that provide an enabling framework for ICT development at the national level.

It also examines a sample of World Bank projects that use ICT cutting across many sectors, to ask whether they have considered gender issues in their effort to employ ICT as transformative development tools.

The topics chosen address the following issues:

- The impact of ICT on women's work where it differs from that of men, in the ICT industry and labor market as well as in self-employment, especially in MSE where women predominate
- How ICT can help to economically empower

women with their chronic lack of access to resources, through creative and proactive approaches to adapt ICT to their needs

- How women can use new technologies today in diverse spheres of activity to improve their lives
- How education, both through and in ICT, can improve women's opportunities to be part of the information society and knowledge economy
- How ICT can help women politically, and provide them with a voice that will be heard globally
- Women's access to ICT-delivered services in health, education, and government
- The need for Internet content relevant to both men and women in developing countries, in a form that is accessible to them
- Whether national policies in ICT and related areas take into account gender inequalities in access to and use of resources in ICT
- The extent to which World Bank projects in either ICT alone or in projects with ICT components, take account of gender-based differences.

The corrective measures suggested stem from the principle that gender-based differences can be exploited to advantage, while disadvantages in access to and use of ICT need response in the form of adequate policies, programs, and strategies. Above all, development interventions must work equally with men and women stakeholders to ensure that opportunities to utilize technologies are not inhibited by cultural dictates on seclusion, restrictions on mobility, or the gendered division of labor.

Methodology

Most of the research was based on desk study, although the authors of both the chapter on women in the IT labor force and the MSE chapter conducted primary research in the course of preparing their work. The case studies were chosen primarily for the possibilities of innovation that they demonstrate. While the full potential of ICT for advancing gender equality has not been real-

ized, some very interesting and challenging steps have been taken along that path. The case studies chosen are illustrative of these steps.

The reader will notice that a disproportionate number of examples are taken from India. This is because India has become a world leader in looking at and trying out ways to use ICT to address the relationship between poverty and development, frequently with an awareness of gender issues. These applications also present some of the more innovative approaches.

Before proceeding to an in-depth consideration of the areas outlined above, this introduction will address some general issues on gender and ICT.

What is gender?

Gender is used in this paper to refer to the socially constructed roles and socially learned behaviors and expectations between women and men in a particular society. These relations and the roles that women and men assume are culturally defined and institutionally embedded. Whereas biological sex (being male or female) is not easily altered, gender as a social identity changes over time (historically) and space (geographically). Gender roles of men or women in one society may differ from another. In many cultural contexts it will be difficult to convince men to allow or encourage their daughters or wives to receive training or to invest in ICT, unless men can see that they and the whole family will benefit from such action. Gender needs to consider both men and women and the relations between them.

Why is gender a development issue?

Research has established the business case for consideration of gender issues: development projects that take gender relations into account are more likely to achieve their objectives than those that do not (Murphy, 1997). The achievement of gender equality is directly correlated with the alleviation of global poverty. Social considerations, however, are not easily incorporated into policies, laws,

markets, and organizations. It is particularly difficult to incorporate them into technical projects. The process of incorporating gender considerations into development institutions, projects, and programs is often referred to as the “mainstreaming” of gender. Studies confirm that without direct intervention, gender mainstreaming will not occur (Kimani, 2000; IFPRI, 2000).

Why a concern for gender equality in ICT projects?

Along with globalization, ICT provides tools that transform the way production is organized and information shared around the world. They offer flexibility of time and space, a way out of isolation, and access to knowledge and productive resources. They are enabling tools for economic development and social change. Arguably, because of these attributes, they are most valuable to those who, as a result of gender inequality, suffer most from limited time availability, social isolation, and lack of access to knowledge and productive resources: *women in developing countries*. Unfortunately, many women have numerous constraints that do not allow them to take advantage of the opportunities of the new technologies. If the dissemination of information technology proceeds without taking note of women’s particular needs in accessing and utilizing it, they will continue to be removed from its benefits.

What is engendering ICT?

The standard meaning of “engender” is “give rise to”. In recent years, gender advocates have adopted the word and given it an additional meaning — that of “integrating gender into development work”. Although not explicitly defined, this new connotation of the word was used for the first time in the World Bank report *Engendering Development* (2001). The report reiterated the Bank’s commitment to a world free from poverty. The close association of poverty with gender meant that the alleviation of poverty entailed the elimination of gender inequalities. The present study sees ICT as a tool that can help alleviate poverty as well as gender inequality. In order to do so, existing

gender disparities that are part of the digital divide need to be identified and removed, and the potential of the media for empowerment of both men and women exploited in full. This study, therefore, understands “engendering ICT” as the process of identifying and removing gender disparities in the access to and use of ICT, as well as that of adapting ICT to the special needs, constraints, and opportunities of women. Any such adaptation should take advantage of women’s special knowledge and their strong informal networks and support systems that may make it possible to combine electronic communication with traditional communication systems.

Why concentrate on women if we are talking about gender?

When the underlying concern is gender, we frequently find ourselves talking about the situation of women because the existing gender inequalities in access to vital rights and resources generally affect women and girls negatively more than men and boys. These inequalities include disparities in basic human rights, in political participation, and in access to resources such as schooling, credit, and jobs. As globally women generally face more situations of gender-based inequality, the concern for correcting those inequalities shifts the focus on women. In the case of ICT, areas in which girls and women suffer such inequalities directly affect their access to and use of ICT.

A caveat needs to be inserted whenever the term “women” is used. All women in the developing world do not belong to a single homogeneous group. There are highly variable political, socio-economic, and cultural differences that affect the lives of both men and women across different regions of the world, in addition to factors such as age and health. We do not want to lose sight of this complex reality. Not all women are disadvantaged (for example middle-class women will usually have much greater access to ICT than most poor men). There are also major differences based on age and ethnicity, and substantial re-

gional variations in the relations between gender and ICT. While in North America, for instance, girls shy away from computer science, it is often regarded as a women’s field in some countries of south and west Asia.

At the same time, however, it should be noted that gender inequality is more pervasive across societies than other forms of inequality. It is a feature of social relations in most societies, although it takes different forms in different societies. Gender inequality also cuts across other forms of inequality so that it is a feature of the rich as well as the poor, the racially dominant as well as the racially subordinate. All the same, it is usually, but not always, more marked among the poor.

It is necessary to emphasize that gender analysis is not achieved by a narrow focus on women. Strategies should be discussed for maximizing the welfare of the household rather than just focusing on women as an isolated group.

Why do women need ICT?

Women need ICT for the same reasons as men do. They need ICT to get more information to carry out their productive, reproductive, and community roles; they need ICT as tools to conduct their businesses and to work in the ICT industry. They need ICT to find resources for themselves, their families, their work, and their communities. They need ICT to have a voice in their lives, their community, their government, and the larger world that shares their issues and problems. They need ICT to compete in a digital world. But existing gender inequalities hinder both their access to and their use of ICT. Additionally, they bring knowledge and perspective that can enrich the world of information technology. These advantages must be captured and included.

There are gender issues in virtually every area of development activity. Development does not take place in a vacuum, but rather in a social context in which gender is a fact of life. As long as devel-

opment efforts consider the “human factor”, gender is a necessary part of the equation. Every domain has its particular gender issues. Here are some that are central to an understanding of the application of IT to society.

Statistics and indicators

The lack of reliable statistics is a major constraint on our knowledge of gender issues in ICT. The main collector and disseminator of statistics on ICT is the International Telecommunication Union (ITU). The ITU, however, does not disaggregate any of its ICT indicators by sex. As a result there are few, if any, reliable statistics on women’s use of ICT in developing countries. In the absence of reliable statistics, those looking for data have to fall back on sources of dubious reliability. Many of the country studies that show large numbers of women Internet users are marketing studies, conducted by or for firms that want to market products to women consumers. It would not be remarkable to find that they identify and project large numbers of women users for their clients. In other cases, the studies are limited country surveys, generally based on the subscriber lists of a few, small Internet service providers (ISP) or e-mail services. In many countries, where public access is the dominant mode, subscriber lists may identify only a third or less of users. Few studies provide statistics on the users of public access facilities by sex. In almost all that do, the number of women users is much smaller than that of men.

Gender issues in accessing ICT

The most basic gender issue in ICT is access, which is inextricably linked to the availability of the necessary infrastructure. In virtually all developing countries, communications infrastructure is weaker and less available in rural and poor urban areas, where the majority of women tend to live. Internet connectivity is frequently available only within capital and major secondary cities in many developing countries, especially in Africa, while the majority of poor women live outside these cities. The urban bias in the provi-

sion of information technologies and the fact that most poor women in developing countries live in rural areas make infrastructure a gender issue. Simply by being the majority of the population in rural areas, women have a smaller chance than men to access the new technologies. It is likely that phone lines are fewer, that there are no relay stations for mobile phones, and no earth stations for satellites. As the United Nations Development Fund for Women (UNIFEM) and the Institute for New Technologies of the United Nations University (UNU/INTECH) have noted, “Women, with their special responsibilities for children and the elderly, find it less easy than men to migrate to towns and cities. The urban bias in connectivity thus deprives women, more than men, of the universal right to communicate.” (UNIFEM and UNU/INTECH, 2000).

Social and cultural issues

Women often do not have equal access to those ICT facilities that do exist. Frequently, information centers or cybercafes are located in places that women may not feel comfortable about visiting, or that are culturally inappropriate for them to visit. Since most communication facilities in developing countries are in offices or shared public access, women also have problems of time. Given gender-defined multiple roles and heavy domestic responsibilities, their leisure hours are few, and the public centers may not be open when women can visit them. Or they may be open evenings, when it is problematic for women to visit them and then return safely to their homes in the dark. Their mobility (both in the sense of access to transport and ability to leave the home) is also more limited than that of men. Some accommodations that may be needed to ensure gender equality in access and use of ICT for women are schedules to suit women’s hours and availability of women support staff and trainers.

Another cultural aspect of gender and ICT is gender bias in attitudes toward women studying or using ICT. Throughout the world, attracting young women to science and technology studies

can be a problem as we will see in the section on education. The problem is worse in Africa than in any other region, with the lowest percentage of women studying science and technology at all levels. Many (predominantly male) math and science teachers in Africa hold outmoded views that girls do not possess the scientific temper and that science is too mechanical and technical for them, thus discouraging female students (Hafkin and Taggart, 2001). In many countries traditional cultural attitudes discriminate against women having access to education in technology. Girls are encouraged to take any job or get married rather than seek higher education. The presumption that ICT is not for women is not limited to formal education. In a project for rural farmers in Peru, when women undertook ICT training with men, the men mocked them, saying that computers were for men, not women.

Sometimes gender-based cultural attitudes, and not the immediate gender identification of technology use, prevent young girls and women from accessing and using ICT. In Uganda, girls did not get equal access to the limited number of computers installed in school (under a World Links program) because of the sociocultural norm that “girls do not run”. Boys ran and got to the computers first and refused to give them up to the girls. Additionally, the earlier curfew hours for girls at boarding schools further constrained their access. In India, in the well-known “hole in the wall” experiment, the aggressiveness of boys who pushed the girls away prevented the girls from using the computers.

Technophobia and disinterest in technology

A generalization that is often true is that women are disinterested in new technologies, until by some fortunate accident they actually experience how useful ICT can be for them. Low female participation in ICT is not always a result of women’s inability to participate, but of their lack of interest — the project may not be within a natural sphere of interest for women. In addition,

women themselves sometimes subscribe to the same social attitudes that restrict them. They may see technology as something “male” in use and utility, and suffer from lack of self-confidence and technophobia. At the same time, in regions where people have no preconceptions about information technology, both women and men can be completely unafraid and equally inclined to experiment with it.

Education and skills

With two-thirds of the world’s 876 million illiterates being women, it is fair to say that women in developing countries are less likely than men to have the requisite education and knowledge to use ICT. Technologies that do not require literacy are being developed, such as the International Development Research Centre (IDRC) sound and graphics CD-ROM on rural women in Uganda, but to date these are available in only widely scattered pilot projects. Compared to men, fewer women know the international languages that dominate the Web. Given their limited access to schooling, women, especially those in rural areas, are hardly likely to acquire computer skills. Information literacy essentially involves using information contextually, a skill that women, often isolated and neglected, do not have the opportunity to learn.

Financial resources

Almost all communication facilities cost money. Women are less likely than men to own radios and televisions, or to access them when they want to, even when the household possesses the technology. When it involves paying for information access, such as at a rural information center or a cybercafe, women may not have the disposable income to do so (or may hesitate to use family food, education, and clothing resources for information).

Limitations of content

The Internet has hardly any content that meets the information needs of women in developing countries in a form they can use. The amount of content in local languages, which women tend to

use exclusively more than men, is minuscule. If information technology is to be useful to women in developing countries, it must meet the test of relevance. Without it ICT will remain of little interest and value to many women in developing countries, particularly those living in rural areas.

Use of ICT

There are gender differences in the way ICT is used in developing countries. To date, most women's use of ICT has been confined to e-mail and sometimes to e-mail discussion lists, generally in connection with advocacy and networking activities. The main reasons for this are the cost of access and limitations of time, bandwidth, and technical skills. Relatively few women have used it for business, for entertainment (the predominant use in the developed world), or for education, including education in matters related to livelihood and well being of themselves and their families (for example, health and nutrition education). Promoting women's use of new technologies for business (including improved agriculture and agricultural products) and for education is an important undertaking.

Industry and labor

As we will see in the chapter on work in the ICT sector, the patterns of work in the IT industry are highly gendered. Women are found in disproportionately high numbers in the lowest paid and least secure jobs. Few are found at higher levels, particularly in hardware and software engineering or management levels. Many women have been displaced due to increasing automation and computerization of workplaces. Men continue to crowd out women in training required for high-skill work.

Power and decisionmaking

Women are underrepresented in virtually all ICT decisionmaking structures, including policy and regulatory institutions, ministries responsible for ICT, and boards and senior management of ICT companies. ICT decisionmaking is generally treated as a purely technical area, where civil society viewpoints are given little or no space.

Privacy and security

One of the negative aspects of ICT is the use of the Internet for sexual exploitation and harassment. The pernicious elements include trafficking of women through the Internet, pornography, sexual harassment, and use of the Internet to perpetuate violence against women. Regrettably, increasingly graphic pornography is easily available to all who seek it and even to those who do not. A number of cases have appeared recently where men use web sites to harass women and violate their privacy. Legislation is needed that prevents ICT from threatening human rights.

Engendering ICT

This study draws a number of lessons, observations, and conclusions from its survey of gender issues in ICT in the areas of employment, education, social services, political participation, policies, and in the design and implementation of Bank projects. Some of these are:

GENDER ISSUES CAN BE ICT-SPECIFIC

Gender issues in ICT projects are both generic (the normal gender issues encountered in other kinds of projects) and specific to ICT. They are generic in the sense that most often unequal gender results emerge because the needs and interests of both men and women are not taken into account at the design stage. This is a standard caveat of gender training that has not yet penetrated most ICT projects or project components. For example, ICT training projects may not have women trainees because no specific effort was made to recruit women or take into account that they might need special accommodations in the hours of training to make it safe for them to attend, or make it flexible enough to carry out their domestic responsibilities. These are issues that can be found in virtually any project. The ICT-specific issues emerge in the analysis of the gender impact of projects. For example, when choosing a particular kind of telephone technology for rural areas, were the demographics of the region considered? Does the region contain many female-headed households that would be unable to afford it?

ENGENDERING ICT

INCLUDING A GENDER FOCUS BRINGS EXTRA BENEFITS

ICT projects and project components can reap many benefits by including a gender focus. These include:

- A greater likelihood that the project will achieve its objectives through the inclusion of a larger percentage of the target clientele
- A clearer perspective on the issues under consideration through the inclusion of a wider, more diverse group of stakeholders
- A crucial step toward the achievement of gender equality.

INTERVENTIONS MUST BE CHOSEN WITH CARE

Awareness of the sociocultural context is of overriding importance in ensuring the participation by, and the distribution of benefits to, both men and women. In some cases, this happens best by ensuring that men and women work together. In other cases, it may mean separation of the sexes in training and meetings.

TECHNICAL PROJECTS NEED TO BE PROACTIVE

Technical projects must ensure the participation of women as well as men. Where the pool of eligible women in technical areas is small, corrective measures may be needed to include them. For instance, in technical training, women may have lower skill levels than men and some remediation may be necessary.

GENDER AWARENESS WORKS BETTER

Gender-neutral interventions, in general, do not work. Gender-aware interventions have a much better chance of producing gender-equal outcomes. ICT projects wanting to involve women as well as men should see that:

- Women are involved in the design and implementation of projects
- Projects target men and women equally (establishing separate access and training strategies if necessary)
- Content should be locally appropriate and of value to women as well as men
- Account is taken of the social division of labor, by which most domestic responsibilities fall upon women.

VIRTUALLY EVERY PROJECT HAS GENDER ISSUES

The most common misconception about technology is that it is gender-neutral. Project designers often assume that everyone will benefit equally when ICT is used to accelerate development. The gender-neutral intervention says, "this is about technology; it will naturally impact men and women equally." The assumption, that ICT will benefit an entire population regardless of gender, disregards the impact of gender relations on technology and the social constraints faced by women in accessing and using such technology.

GENDER ANALYSIS REMOVES BLIND SPOTS

Technology does not operate in a vacuum. ICT projects, like any other, need to be grounded in local reality. In itself, IT cannot combat constraining sociocultural forces (such as gender discrimination, negative male attitudes, and stereotypes about women), but needs to be complemented by gender analysis and corrective measures. Technology alone cannot correct gender bias in employment. Lack of gender awareness on the part of project designers means that the economic roles that women play and the ways in which they can benefit from the new technology are often overlooked. The absence of gender analysis can lead to blind spots about the different ways that a proposed reform may impact men and women. Without gender analysis, a project manager may not realize that women are underrepresented in the project activities, and therefore may not take proactive measures to recruit them.

Awareness of the social context of technology is the first step towards gender awareness and gender sensitivity in projects with ICT components. Does the technology impact all sectors of society equally? Do both men and women have equal chances to access it? Is the technology designed so that men and women can use it with equal ease? Are there aspects of the social milieu that make the technology more suitable for and more accessible to men rather than women? These are just a few of the questions that can make a difference in a project's effectiveness.

GENDER NEEDS TO BE INTEGRATED IN PROJECT DESIGN

It should not be added in hindsight or as a mid-term correction. How a project may impact local gender perceptions and to what extent it can bring benefit equally to both men and women should be concerns that are taken into account during the design stage. The number of women involved in project design and implementation, or as participants, is no guarantee of gender awareness. There are many cases where women feature prominently in design and implementation teams, but are themselves not aware of the gender issues associated with the projects goals. A fully participatory process will most likely need to include gender experts or input from local organizations that work with women and on gender issues.

SUCCESSFUL ICT PROJECTS DO NOT NEED HIGH-END TECHNOLOGY TO ADDRESS GENDER ISSUES

Judicious application of available and affordable ICT, including intermediate technology, can have a greater impact than a preoccupation with the latest technology for its own sake. The relevance, usefulness, and practicality of the application are the most important considerations. In order to be successful, the ICT interventions need to be primarily needs driven and not simply technology driven. This approach affirms the importance of using radio, television, and telephones to accelerate gender-focused development. The RESCUER project in Uganda uses radio and walkie-talkies to reduce maternal mortality. The Commonwealth of Learning has a project for women in Ghana that employs radio to develop functional literacy as well as provide information in local languages on a wide range of topics, including AIDS, teenage pregnancy, nutrition, community empowerment, income generating activities, food preservation, animal husbandry, child labor, and energy saving. Development Through Radio has become an interactive means of putting women in contact with government officials in southern and western Africa. The GrameenPhone in Bangladesh is the classic model of an ICT-enabled project that has brought employment, income,

self-esteem, and increased status to largely uneducated women.

ENSURING WOMEN'S OPPORTUNITY TO BENEFIT EQUALLY FROM THE NEW TECHNOLOGIES

Unless special interventions are undertaken, it is unlikely that the majority of women will have access to new technologies. In addition, outreach efforts are essential to ensure that women are aware of the project services and opportunities. These must consider appropriate channels in communicating with women (which, for example, may not be an advertisement based on the Internet or on e-mails, but rather a poster in schools or women's support organizations), and must try to provide women with the necessary conditions to participate in project activities (such as daycare assistance or schedules that consider women's multiple work responsibilities). Above all, the content needs to reflect women's needs and interests.

Gender equality concerns should be part of every ICT effort. The process needs to begin with its rationale and project design, continue through participatory consultations with stakeholders, project implementation, and monitoring, to the evaluation of outcomes with statistics that differentiate impact by sex.

To this end, the study will first look at gender-based differences in ICT between men and women in the world of work — in the labor market and in self-employment. Next, it will examine the relationship between gender, ICT, and education, followed by political empowerment, social service delivery, and the identification of gender concerns in national ICT policies. Lastly, it will present an in-depth perception of how gender is incorporated in World Bank ICT projects and ICT components.

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2

Women in the ICT Labor Market



Women in developing countries already bear a double burden: they are at the wrong end of both the economic and the gender divide. To this has been added a third divide — the digital divide — and once again women in developing countries are at a special disadvantage. Historically women’s presence has been marginal at best in any profession. It is feared that if they do not have a significant presence in the ICT sector, they will be left behind once again. The purpose of this chapter is to examine the extent and level of women’s participation in the ICT labor market in the developing world.

The ICT labor market is not a homogeneous entity. It covers a wide area and a large number of activities, occupations, and professions. It is also new and relatively undocumented, especially in the developing world. This study, therefore, draws upon data from different subsectors.

Here are some important questions to consider in this context:

- How many women in developing countries

work with ICT?

- Are they mostly in operating or entry-level jobs?
- How many of them occupy management positions?
- How many participate in decisionmaking that will influence future policies?
- What factors facilitate the presence of women in the ICT labor market?
- What kind of career path can they follow in this area of work?
- Do organizations provide special facilities for women?
- Does the ICT labor market make special demands on women employees?

Current status of women in the ICT labor market

For the purposes of this study the ICT labor market stretches beyond the IT industry to include IT-enabled services. Software and electronic goods manufacturing industries are part of the ICT sector, as are a range of outsourced or remote processing services, such as medical transcription, legal database

processing, digital component development, remote data maintenance, back office operations in accounts and financial services, data processing, call centers, insurance claims processing, revenue accounting, geographic information services, human resource services, and web site services. The extent of preparedness of women for each of these services is different, and dependent on the length of time the particular service has been available. For example, software development has been outsourced to developing countries for twenty-five years, whereas outsourcing of call center activities is of recent origin. The nature and size of these activities are different in each developing country.

Like any labor market, the ICT labor market too is governed by professional and business networks, market forces of demand and supply, systems of work organization, pay determination structures, and the overall labor legislation of a country. There are industry associations which monitor major developments in the market and project future trends. At the same time from a gender perspective, issues such as female participation rate, male-female pay differentials, female crowding at lower skill levels, and gender-based employment segregation continue to be some of the major concerns.

Since the consolidation and growth of the ICT labor market are directly linked to the forces of globalization across the world, compared to many other markets, labor mobility is relatively high here. As the ICT sector deals with new and emerging technologies, the workforce is educated, well-informed, and often very young, which adds to mobility and turnover. Unlike many other well-established markets, however, being relatively new, the ICT labor market has very little available data, particularly sex-disaggregated data, from developing countries. It is hoped that as the industry matures, more research, analysis, and documentation will accumulate and form a body of significant information. But for the present, sex-disaggregated data are

almost nonexistent in developing countries, and even when pooled from diverse sources, the difference in years, measures, and methodologies across countries makes any generalization almost impossible.

ICT, nature of work, and workplace

As they have to deal with new and emerging technologies, organizations in the ICT sector offer to employees workplaces which have modern infrastructure including equipment and peripherals, continuous power supply, and a clean work environment. The population of young workers and managers often have a liberal outlook. These factors make organizations in the ICT sector desirable workplaces for everyone, especially women. In some industries within the sector, for example call centers, there seems to be a preference for employing women. The stereotypical image of women offers a natural advantage. Women are perceived to be naturally adaptive, quick to acquire a foreign accent, and able to deal with problems patiently. These reasons are conjectures at this stage, and they need to be investigated through empirical research.

Work in the ICT sector poses challenges to women. Many organizations, particularly in fields such as software programming, medical transcription, and call centers work with clients in distant countries. Because of time differences between the countries, at times employees have to work late hours, which can pose problems of safety for women. Working for a client often involves travel to the work site, or travel abroad. Because of strict deadlines, software projects often require unconventionally long hours of work. These can adversely affect the work-family balance that women must maintain, especially because women usually carry a much heavier load of domestic responsibilities than their male colleagues.

Data on women's participation in the IT labor market

There were no comparable data available for

developing countries. It was difficult to find information on total employment in the ICT sector as compared with the overall labor market. Data on components within the ICT sector were rarer still. Gender-disaggregated data were simply nonexistent in most cases. Often ICT was grouped with broader categories such as in the services sector, and in science and technology.

As a result, primary data were collected from some Indian companies and organizations to determine women's employment in whichever ICT subsector the company was involved in. Even so, there were some successes: for example, the questionnaire did help in collecting the latest sex-disaggregated data for the medical transcription industry in India.

Case studies and country profiles

In order to supplement findings from the labor market data and empirical studies, and to increase the understanding of organizational realities experienced by women in areas of recruitment, training, promotion, project assignment practices, and so on, it was thought useful to draw lessons from case studies. Case studies provide rich insights for action as they capture and present realities at the workplace. Appendix 1 contains selected case studies that provide pointers for new policy initiatives to promote women's employment in the ICT sector. Care was taken to include cases which represented different regions from the developing world. Appendix 2 provides country studies developed from secondary sources, which include employment opportunities for women in the ICT sector in relation to the overall economy.

Women's presence in the IT labor market is dependent on factors such as adult female literacy, women's enrollment in natural sciences courses which lead to careers in the ICT sector, Internet use by women, government policies on ICT and gender, and other cultural factors like social bias against working women. These issues are covered in other chapters of this publication.

Crowding of women at the lowest levels

Table 1 provides data on women's share of employment in the ICT sector for eighteen developing and emerging market countries. Table 2 presents data on factors contributing to preparedness of women for employment in the ICT sector for some of the same countries. The data were derived from a variety of sources, many of which are specific to the country or region. A comparison across countries is therefore difficult to make.

The tables show that the ICT sector is indeed important for women. In Israel, as indicated in Table 1, employment of women in the ICT sector is 51 percent, while women's share in total employment is 44 percent. In India women form 30 percent of those employed in the ICT sector, while their share in the industry and service sectors is only 15 percent. The data also indicate that employment potential in the ICT sector is not uniform across countries. In some countries the ICT share in employment is as low as 0.2 percent (Romania), while in some others it is as high as 10.7 percent (Korea). Clearly, policies intended to increase employment of women in the ICT sector will bear fruit in countries where the ICT sector is a significant employer.

Table 1 also presents the potential scope for women in the ICT sector in some of the countries. For example, Malaysia may be able to increase women's employment by 0.25 percent if, through proactive policies, women's employment in this sector is pushed up to 50 percent. In a country like Ireland where the ICT share in total employment is as high as 7 percent, proactive women's employment policies in ICT can raise the overall share of women's employment by 1 percent.

To see whether there exists any relationship between women as percent of Internet users (column 1) and the GDI rank (last column), a correlation was computed. For the fourteen countries where data were available for both the

Table 1. Employment in the ICT sector

Country	Year	ICT share in total employment	ICT employment	Average annual growth	Female share in ICT employment	Female share of paid employment in industry and services	Remarks
Barbados	1997	2 %	3,000			47 %	
Brazil	1999		38,400	-4.82 %	27.7 % *	44 %	* Among fifty largest manufacturers of IT goods in Brazil
China	1999	0.8 %	1,604,000	4.3 %		39 %	
Costa Rica	2001	1 %	13,500			38 %	
Czech Rep.	1997	3.1 %	152,000			46 %	
El Salvador						32 %	
Hungary	1998				63.3 % *	51 %	* Technical workers
India	2001	1.85%	522,250	21.42 %	30 % *	15 %	* Estimated figure from ILO website, 2001
Ireland	1999	7.1 %	97,000	18 %	34.5 %	45 %	
Israel	1999	3.2 %	65,000	3.5 %	51 % *	47 %	* 1997 figures from 194 firms (ILO World Employment Report, 2001), of a total of over 14,300 employees in Israeli electronic component sector.
Jordan	2000				27.4 %	23 %	
Korea	1998	10.7 %				39 %	
Malaysia	2001	1.35 %	128,861 *	1.93 %	30 % **	36 %*	* Estimated figure ** Share among IT professionals
Philippines	2001				65.1 % *	40 %	* Professional and technical workers
Romania	1996	0.2 %			56 % *	43 %	* Professional and technical workers
Russia	1998				70.5 % *		* Technical workers
South Africa	1999	1 %	54,000		27.18 %		
Turkey	1997	0.5 %	100,000			10 %	

Sources: <http://www.statistics.gov.my/English/framesetKeystats.htm>; Malaysia's country paper on HRD in response to Advancement of ICT; ILO World Employment Report 2001; www.utoronto.ca/onris/newsletterlink26.htm; Dirk Pilat and Frank C. Lee, *Productivity Growth in ICT-Producing and ICT-Using Industries: A Source of Growth Differentials in the OECD?* Organization for Economic Cooperation and Development (June, 2001); DSTI/DOC (2001); NASSCOM Strategic Review 2002, "The information technology revolution: Widening or bridging gender gaps?" <http://www.ilo.org/public/english/bureau/inf/pkits/wer2001/wer01ch4.htm>; Department of Labor Statistics Jordan, 2000 Labor Survey; SAITIS Jobs and Skills Scan, 1999, Saitis 2000, http://www.saitis.co.za/studies/jobs_skills/index.html, www.aed.org, UN/ECE database based on national sources; Yearbook of Labor Statistics 1999, ILO; Miller & Mitter, Background Paper for the World Employment Report 2001; Gender profile – South Africa, http://www.acdi-cida.gc.ca/cida_ind.nsf/8949395286e4d3a58525641300568be1/0eae7ab371afd86885256b57007112d4?OpenDocument.

Table 2. Women's Internet use and other enabling factors

Country	Women as % of Internet users, 2000	Total women Internet users in '000s	Total Internet users in '000s	Internet users as % of total population	Population in '000s	Female prof. & tech workers % of total	Female literacy rate	Female GDP per capita (US\$)	GDI Rank 1/174
Brazil	43.0	1,075	2,500	2.1	169,807	63.3	83.9	3813	67
China	30.4	6,840	22,500	0.7	1,265,530	45.1	74.5	2485	79
Colombia (3)	N/A	N/A	350.0	0.0	38,581	45.6	90.8	4725	51
Czech Rep.	12.0	48.0	400.0	6.8	10,286	54.1	99.0	7952	34
Estonia	38.0	57.0	150.0	14.1	1,421	66.8	99.0	4236	49
Ethiopia	13.9	0.83	6.0	0.1	58,390	N/A	29.2	349	172
India	23.0	115.0	500.0	0.2	983,377	20.5	39.4	902	112
Indonesia	N/A	N/A	300.0	0.2	212,942	40.8	79.5	2359	88
Jordan	6.0	3.7	60.8	1.8	4,435	N/A	81.8	1429	N/A
Lebanon *	6	N/A	200	N/A	N/A	N/A	80.4	N/A	N/A
Mexico	42.0	567.0	1,350	2.5	98,553	45.2	87.9	4594	48
Pakistan	N/A	N/A	61.9	0.1	135,135	21.0	25.4	701	116
Peru	N/A	N/A	200.0	1.5	26,111	39.4	83.7	2335	71
Philippines	51.0	76.5	150.0	0.6	77,726	65.1	94.3	2510	65
Poland	18.7	295.6	1,581	5.4	38,607	61.2	99.0	5061	40
Romania *	N/A	N/A	600	N/A	N/A	56	96	N/A	N/A
Russian Fed.	38.0	4,560	12,000	1.8	146,861	N/A	98.8	3503	61
South Africa	51.0	645.6	1,266	4.2	42,835	46.7	83.2	4637	84
Senegal	12.0	0.9	7.5	0.3	9,723	N/A	24.8	1253	127
Thailand	N/A	N/A	200.0	1.3	60,037	54.5	92.8	5000	58
Turkey	N/A	N/A	450.0	2.3	64,567	33	73.9	4681	73
UAE *	6	N/A	735	N/A	N/A	N/A	76.8	N/A	N/A
Uganda	31.5	4.73	15.0	0.1	22,167	N/A	35.0	944	131
Vietnam	N/A	N/A	10.0	0.1	76,236	27.6	89.0	1385	91
Zambia	37.5	1.13	3.0	0.2	9,461	31.9	67.5	753	125

Sources: Hafkin and Taggart (2001), 2000 World Employment Report, UNESCO Statistical Yearbook 1999.

The Human Development Index (HDI) was developed by the United Nations Development Programme (UNDP) to evaluate the achievements of a country by three basic measures of human development – longevity (measured by life expectancy), knowledge (measured by adult literacy and primary, secondary, and tertiary enrolment), and income (measured by per capita GDP in PPP\$). An HDI closer to 1 indicates a reasonably good level of human development in any country. The Gender-Related Development Index or GDI is essentially the same as the HDI but adjusted for gender disparities in achievements. The greater the gender disparity in human development, the lower a country's GDI compared with its HDI. Countries with highest GDI ranking are those with least gender disparities and an HDI closer to 1.2

variables, the correlation was 0.29, which was statistically not significant. At the same time, in countries like India, although the software sector is a large employer of professionals, only 20 percent of those employed are women. There is potential to enhance women's employment in this sector. This can be exploited by addressing the current bottlenecks such as low registration of women in engineering and technical courses.

Countries with a high female literacy rate such as Estonia, the Philippines, Brazil, and Poland have a high percentage of women among professional and technical workers. Countries where women's literacy levels are low like Senegal, Ethiopia, and Uganda seem to have a negligible share of women among professional and technical workers. These examples suggest that education can increase the share of women in ICT employment.

Jordan displays a distinct situation: there are more women employed in the public sector than in the private sector for most categories of employees. In fact, it is significant that the public sector seems to provide greater employment to women for higher skilled jobs, while the private sector tends to hire women in jobs involving the lowest level of skills. Again, in the case of Jordan, the lower proportion of women in the ICT sector seems to be a result of lower enrollment of women in technical and natural sciences.

The United Arab Emirates, on the other hand, is a striking example of high preparedness of women to take on ICT jobs, but it also illustrates the negative influence of cultural factors which inhibit the employment of women in ICT or other sectors. Sixty percent of students enrolled in engineering courses are women, but the proportion of women employed in the ICT sector is insignificant. In the Philippines and South Africa, the proactive policies and social environment have played a vital role in encouraging women's participation in ICT economy. This suggests that besides education, proactive policies

and women-friendly social environment too play an important role to encourage women's participation in the ICT employment.

Identifying strategies by analyzing comparative data

In countries where there is little ICT activity, gender awareness in the sector is not going to produce a significant impact on women's employment. Therefore, countries where there is enough potential to increase the number of women employed in ICT were identified. These are countries where the ICT sector's current employment is significant (10 percent or more), and the sector is expected to grow over the next four to five years. Next, the factors that would enable employment of women in the ICT sector were documented (referred to as "enabling factors" throughout this chapter). These are the literacy level of women, percentage of women in technical education programs, cultural factors influencing the role of women in broader economic activity, and the presence of affirmative policies at national and organizational levels.

Countries were classified in a 2x2 matrix according to the following four categories.

Quadrant 1 represents a large ICT market and a high level of enabling factors. These countries are doing well in terms of women's participation in the labor market. They provide a benchmark for what can be achieved. Understanding their policies, strategies, and programs at government and organizational levels can help define engendering strategies for other countries. There are only a few countries under this classification, such as Israel, with 50 percent participation of women in the electronic component sector. For such countries, more detailed information across different components and the current participation levels of women in these components can help identify sectors where further growth of women's employment is possible. Affirmative action and policies can then be proposed for such components.

Table 3. Market size and enabling factors

Enabling factors Size of the ICT market	High	Low
Large	1	3
Small	2	4

Quadrant 2 represents a small ICT market and a high level of enabling factors, where action on engendering ICT cannot make a significant difference. Should policies be designed to encourage the growth of this sector, however, it is obvious that more women can get employment because of the existence of the enabling factors.

Quadrant 3 represents a large ICT market and a low level of enabling factors. These are countries where any engendering action can produce significant increase in women’s employment. Some of the countries that fall in this group are Brazil, India, China, and Malaysia. A more detailed analysis of the enabling factors needs to be carried out in such countries. In most countries, the proportion of women in technical and engineering education is small compared to that of women in the ICT workforce. One of the ways in which the presence of women in the ICT workforce can be increased is to help increase enrollment of women in technical and engineering courses. There also exist countries, particularly in the Middle East, where cultural barriers prevent women from seeking employment.

Quadrant 4 represents a small ICT market and a low level of enabling factors. The largest number of countries fall into this category, where any affirmative action without the expansion of the ICT sector cannot produce any significant impact. Once again, information on discrete components

may reveal opportunities to increase women’s employment.

Although ICT employment represents a small portion of total employment, through special efforts it may be possible to significantly increase women’s employment even when the enabling conditions are not very favorable. For instance, even though the overall proportion of women in the Indian ICT sector is low, the Datamation Case Study (Appendix 1) shows that women from lower socioeconomic classes can be successfully employed in the ICT sector through encouragement and proper training. The case study of Mongolia Telecom (Appendix 1) in Mongolia, a transition economy, demonstrates that training and women-friendly company policies can actually increase the number of women at managerial positions.

Unfortunately, information on women’s participation in the ICT workforce is often hard to come by. Web sites and annual reports of the five largest IT software companies in India do not use gender classification when reporting their employment data. Any effort to create gender awareness must be preceded by an attempt to make such data more visible. For example, statutory agencies providing guidelines for publishing annual reports can require gender segmentation of all employment data that are made public.

Labor market participation

A number of studies (MacFarlene, 1990) have shown that though women account for a significant portion of the workforce and occupy increasingly senior positions in the economy, in the IT profession they seem to be concentrated more in the lower ranks. Truman and Baroudi (1994) arrived at the conclusion that IT, like many other fields, is not immune to the problems of gender discrimination. Analyzing the data gathered by the Society of Information Management, they found that women received lower salaries than men even when job level, age, education, and work experience, were comparable. The number

of men in management in their study was found to be disproportionately high. Igbaria and Baroudi (1995) reported that though there were no significant differences in job performance ratings of women, they were perceived to have fewer chances for promotion than men. More current studies in the western world indicate that women account for only about 25 percent of technology workers in the European workforce and about 20 percent in the United States technology workforce. Hafkin and Taggart (2001) indicate that in the developing world, the Philippines has 65 percent women among its technical and professional workers, Mexico and China 45 percent, Zambia 32 percent, and Pakistan 21 percent. Even though these figures seem to demonstrate that women's labor market participation in developing countries is more promising than in developed countries, with differences in data sources, the comparison cannot be pushed very far.

Wirth (2001) found that even while representing more than 40 percent of the world's total workforce, women's overall share of management jobs rarely exceeds 20 percent in most countries. Examining the position of women in the computing industry in the U.S. and the U.K., Shuttleworth (1992) found that a majority of women were employed in routine and specialist work, while men were engaged in analytical and managerial activities. It was found that 10 percent of men and only 3 percent of women in the survey had achieved managerial positions. In 1996 women occupied 30.8 percent of computer programmer and 28 percent of systems analyst positions. The proportion of women in highly technical and analytical positions (30.6 percent in 1996) has practically remained constant for over a decade.

Coming to developing countries, because of a dearth of data, the picture is not as clear. Some observations, however, could be made from the limited data available. According to Hafkin and Taggart (2001), presumably because of the legacy of Communist emphasis on promoting full employment and providing childcare facilities, in

countries like Bulgaria women's presence in the engineering profession is as high as 32 percent. This percentage dwindles to a mere 2.5 in South Africa. Within the ICT sector, there seems to be a gender-stereotyped division of labor which leads to a fair representation of women in desktop publishing and software programming, and underrepresentation in hardware design, operating systems, and computer maintenance. In South Africa, for example, while women constitute overall 26 percent of IT employees, only 19 percent of data communications and networking jobs, 14 percent of hardware and computer architecture jobs, and 18 percent of information systems and IT management jobs are held by women.

While the sex-disaggregated labor market participation data in the ICT sector is woefully inadequate from developing countries, we present below two country profiles which throw further light on the "crowding" of women at lower organizational levels.

Country profiles

(For detailed country studies on India and Jordan, see Appendix 2.)

India

Data from the newly emerging medical transcription industry in India confirmed the crowding of women at lower levels of employment. An analysis of data from 88 percent of all medical transcription companies in India show medical transcription to be one of the few industries in which the overall participation of women is greater than that of men. In September 2002, women constituted 58.3 percent of the total 13,600 employees, most of them working as transcriptionists or as office assistants. When it came to support staff including managers in the industry, women's presence declined sharply to a mere 24 percent.

A recent survey of the Indian software labor market (Rothboeck, Vijayabaskar, and Gayathri, 2001)

Table 4. IT Position by gender (percent)

Position	Male	Female
Call services	40.0	60.0
Programmer/Software Engineer	54.7	45.3
Consultant	75.0	25.0
Project manager	94.4	5.6
Total	67.1	32.9

based on seventeen software organizations in Bangalore and Delhi provides the information in Table 4.

The same source provides a comparison of the average duration of stay by men and women at different organizational levels as presented in Table 5

The study also explored reasons for leaving a job in the software sector, as seen in Table 6.

A much greater proportion of men leave their jobs for better opportunities compared to women, and the proportion of women leaving for personal reasons is significantly greater than that of men. Industry sources suggest that a large number of women professionals leave at the time of marriage or for child rearing. The study reported that with the exception of two firms, the rest of the software firms offered no childcare provision to enable young mothers to continue to work. Organizational policies did not indicate any attempt to post spouses at the same locations. Also, given that women devote more time to looking after the family and household than men, it is possible

Table 5. Average stay by levels of IT employment (years)

Level	Duration	
	Men	Women
Entry-level	1–2	2–3
Middle Level	4–5	5–6
Managerial Level	Stable*	-
(* More than 7 years in the same firm)		

that as their responsibilities increase, women professionals opt out of the labor market. This is one of the reasons why there are fewer women in middle and upper level positions. Women’s crowding in the medical transcription industry appears to be a typical phenomenon of large sectors of the ICT industry.

Another recent study of women in ICT in India (Arun and Arun, 2002) presents the results of a survey carried out in Kerala, a state which has been implementing an ICT-based strategy seeking to create growth and employment through software production. The survey included a sample of 110 software professionals from 20 software firms, each of which employed between 10 and 300 medical transcription employees. The sample was a fair representation of organizations, employee experience, and other factors, but not when it came to gender. Although an average 40 percent of the workforce in the firms were women, 56 percent of the selected sample were women.

The study also indicated that men and women had different attitudes toward the appraisal system in these firms. Three-quarters of the men felt that the appraisal system based on performance was fair. Only 37 percent of the women felt the same way. Most women felt that the appraisal system was not objective. On the contrary, the procedures were secretive and subjective, and therefore, in an industry where senior managers

Table 6. Reasons for leaving IT employment by sex (percent)

	Sex	
	Male	Female
Unstated	1	2
Lack of internal job mobility	15	18
Inadequate salary	23	18
Lack of challenge	23	18
No chance to go abroad	1	-
Better opportunities	32	20
Personal	5	24
Total	100	100

are predominantly male, “the potential for both a perception and a reality of gender bias creeps in” (Arun and Arun, 2002, 45). Thus while entry-level pay may be the same for men and women, appraisal and promotion systems may still reflect larger social biases against women in a technical workplace. Despite the sample being skewed in favor of women, only two women as compared to eighteen men were found to be project leaders.

Though officially the employees were supposed to work eight-hour days six days a week, they spent much more time on the job because of tight project deadlines. Around 82 percent of women, compared to 69 percent of men, felt that their domestic responsibilities were affected by the long working hours. No organizational support was provided for pregnant women or young mothers. The working conditions and practices were not family-friendly. Policies and practices such as flexible office hours, part-time working, working from home, adequate paternity and maternity leave, and childcare facilities, which are often taken for granted in comparable organizations in the developed world, were nonexistent in the organizations surveyed. Since such practices would have benefited women much more than men, their absence had a distinctly adverse effect on the women employees.

The study shows that it is not enough to look at the macro labor participation data for women; the “internal market” of the organization has a reality of its own, that includes stereotypes, unfair treatment, and unequal practices experienced by working women.

Jordan

The situation in Jordan is somewhat similar to that in India. Women constitute 27.4 percent of the ICT workforce. A National Information Centre of Jordan study in 2001 provided the data on women’s share in Jordan’s ICT sector presented in Table 7.

The study reflects the same broad pattern of

women’s presence at different organizational levels reported in western studies as well as in the study on India cited above. Women seem to be mainly employed at the lowest position of data entry operators, particularly so in the private sector. As the organizational level moves upward from programmers to systems analysts to managers, women’s presence declines drastically. The much more favorable figures for women in the public sector suggest that a different set of organizational policies that provide training, childcare, and other enabling interventions can increase women’s presence in the senior management positions.

Initiatives at the organizational level

In addition to the country studies, five case studies looked at workplace reality for women and nonprofit gender-oriented IT employment initiatives (for details see Appendix 1). Summaries of the case studies are given below.

India: Datamation

Founded fifteen years ago with the objective of providing ICT services, Datamation has established a reputation for high quality, and its clients include Fortune 500 companies such as Microsoft, Nestle, KLM, British Airways, GE Capital, and HSBC. It employs over 1080 people across 24 locations in India. It has forged alliances with organizations that provide IT education to the deprived. It has also collaborated with Nari Raksha Samiti (NRS), an NGO for women, and has provided training, support, and employment to disadvantaged women.

Table 7: Share of women’s employment in Jordan’s ICT sector

	Private Sector (%)	Public Sector (%)
Managers	13	30
System Analysts	19	40
Programmers	22	50
Engineers	5	13
Data Entry	93	74

More than 15 percent of all employees, and 55 percent of women working with Datamation are from voluntary organizations. About 25 percent of all employees are women. Training disadvantaged women to deliver high quality industry requirements in technology is a major challenge. Frequent refresher programs are organized. Trainees start with low-end jobs, but there are equal opportunities for promotion for everyone.

Datamation is an example of an unusual technology company, which combines a profit motive with social objectives. Women workers are given constant encouragement and support to help them meet their conflicting work-family responsibilities. New mothers are offered paid maternity leave. There are plans to start a day care center. Women who work in software development are groomed for network administration and maintenance jobs as well.

Kenya: CyberHost

CyberHost, the Budalangi Village Women's Post Office Project in Kenya, is a striking example of a rural women-focused ICT project bringing the benefits of the Internet and e-mail to poor villagers, and in the process generating employment for women. The objective was to combine the best features of the Internet and e-mail with those of the traditional postal system to offer the villagers a cheap, simple, and swift means of communication. Groups of women were given training in the use of the Internet and e-mail, and rudimentary computer maintenance, and were made responsible for sustaining the project by training other women and acting as mentors. CyberHost, run by women and acting as a community post office, receives e-mail for community members, distributes them to the addressees, obtains their written replies, and sends them back by e-mail. Given the fact that the nearest post office is twenty-eight miles away, and CyberHost is right in the neighborhood, the new system, and the women who make it work, have both become very popular among the villagers.

Mongolia Telecom, Mongolia

A public sector enterprise privatized in 1995, Mongolia Telecom (MT) offers various services in the telecommunications sector. More than half of its 4500 employees are women.

To enable professional development of women, MT adopted strategies that included participatory training, and incentives for women workers. Supportive organizational policies helped women to acquire skills that put them on an equal footing with their male counterparts and gave them the opportunity to move up the organization ladder.

MT's enlightened regulations and well-conceived interventions have been instrumental in creating a gender-equal work environment.

Sri Lanka: Centre for Computer and Language Training

The Foundation for Independence of Women with Disabilities (FIWD) in Sri Lanka realized the tremendous employment potential for women with disabilities in the ICT sector. It set up a Centre for Computer and Language Training where women with disabilities are taught English, and basic and advanced computer skills. Taking advantage of a Sri Lankan law which mandates that 3 percent of the workforce in any sector needs to be filled by disabled people, FIWD has been getting its computer-trained women members comfortably placed in the mainstream workforce. It is hoped that eventually the leadership abilities of these women will be recognized the way their other skills are. This is a striking example of how proactive measures intended to take advantage of affirmative laws and policies can use ICT to draw more women into the workforce.

Vietnam: International Telecommunication Centre

International Telecommunication Center (ITC) is a subsidiary of Vietnam Telecom International (VTI), which in turn is a subsidiary of Vietnam Post and Telecommunications, a national agency.

ITC has three units: ITC 1 at Hanoi, ITC 2 at Ho Chi Minh City, and ITC 3 at Da Nang. In the Hanoi unit, women form about 50 percent of the total labor force, and almost 90 percent of the workforce. The top management of VTI consists of 23 percent women, and ITC 3 was headed by a woman until recently. More than 95 percent of the staff are required to use IT. ITC rearranged its employment system to meet the new job requirements. Though ITC provided training, the trade union could not negotiate with the management to retain the old women workers, and many had to leave. Jobs at ITC require knowledge of a foreign language, technical and professional skills, along with personality attributes such as patience, dedication to routine tasks, and the ability to communicate. It was felt that women would be temperamentally suited to certain jobs that were considered “feminine”, while men were regarded as more suitable for highly skilled jobs, and therefore, were offered better pay. In some cases women received relatively lower salary than men in positions requiring comparable skills.

It is evident that even in an organization with a history of employing women, women workers are generally given routine jobs and lower salaries than men. At the same time, professional training provided in ITC 1 allowed 27 percent of the women to take on jobs requiring higher technical efficiency, and four of them were promoted to management positions. VTI aims to promote greater participation of women in leadership, and is planning have a woman manager in every division where women form at least 30 percent of the workforce.

While there are no consistent numbers on the participation of women in IT, especially at higher-paid levels, a review of five countries — the U.K., the U.S., Canada, Ireland, Taiwan, and Spain — brought up the following issues:

- Women are severely underrepresented in ICT occupations and their participation has been declining.
- Women in ICT occupations generally have a

lower status and in the U.K. and the U.S. are paid less than men, the pay differential increasing with occupational status.

- In some countries women in ICT jobs are better educated than men.
- Where there is part-time work, women are better represented.
- There are smaller proportions of women in ICT jobs in the ICT sector than in ICT jobs outside the sector. In the U.K., for example, the majority of women reported to be in ICT jobs are in low-skilled, nonprofessional occupations with limited career opportunities, such as sales or assembly line jobs. Women are particularly rare in engineering-related ICT work.
- Most graduates currently in ICT jobs have not graduated in an ICT-related subjects.
- Women in ICT jobs are on average younger than men (Millar and Jagger, 2001).

Summary

Gender-disaggregated data on women’s participation in the labor market are extremely scarce. When pooled from different sources, it is difficult to compare the data across countries because of differences in the definition of the ICT sector, focus and format of the survey, year of data reporting, and so on. Bearing in mind these limitations, the following observations can be made.

- Though women have varying rates of labor market participation in ICT across countries, by and large it seems to be low, hovering around 30 percent.
- Country studies of India and Jordan and a review of empirical studies confirm that most women are employed at lower levels of the ICT sector. A disproportionately high number of women are found in call centers and working as programmers. A very small number reach the project manager level.
- Women seem to take more time than men to move from the entry level to the middle level, and from that to the management level in organizations.
- An empirical study demonstrates that even

when the entry-level pay is the same for men and women, the appraisal and promotion systems replicate a social bias against women.

- In Jordan, there are more women at lower levels of work in the private sector than in the public sector. The study indicates that with supportive policies and practices in the form of awareness generation, training, childcare facilities, and affirmative action, the gender imbalance can be corrected.
- The case studies demonstrate the positive effect of deliberate organizational interventions. As a result of proactive steps, some of these organizations could generate awareness about objective evaluation and fair treatment of women, help women acquire competencies, and help them move up in the organizational hierarchy.
- Employment generation for women in the ICT sector can sometimes involve identifying existing laws and regulations in other domains (such as reservations for the disabled, mandated by the law) and utilizing them to women's advantage.

The globalization of ICT implies that the workplace realities prevalent in the sector in developed countries, such as long working hours and high-pressure jobs, are present in the developing countries as well. Yet, flexible office hours, part-time jobs, working from home, generous maternity benefits, and satisfactory childcare facilities are almost nonexistent in developing countries. Because of a gendered division of labor in the household, the presence of such facilities would benefit women much more than men, while their absence creates an adverse effect on women working in the sector. Moreover, given the competitive nature of the market and the fact that these facilities are offered in very few companies in developing countries, the companies providing such facilities would surely benefit in terms of attracting more employees. For instance, providing special facilities to female employees can be considered a major reason behind 54 percent of the workforce at Mongolia Telecom being women.

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APPENDIX 1

Case Studies on Labor Market Participation

Datamation, India

Datamation was started fifteen years ago and today has over 1400 employees including women across twenty-four locations within India. The aim of Datamation is to provide quality ICT services to leading firms. To do so, Datamation helps train the disadvantaged to work with ICT and generates employment for them. The services offered include document management, scanning and imaging, data conversion and data entry, application programming, e-services, portals, e-commerce solutions, and geographical information system (GIS) applications. Datamation maintains alliances with organizations that provide IT education to the poor.

In order to achieve one of its major targets of women's welfare, Datamation has collaborated with Nari Raksha Samiti, an organization for women in Delhi. During the two years of this partnership, women from poor families have found supportive and stable employment. Datamation recruited nearly thirty such women, after they acquired basic IT skills at NRS.

The selection procedure at Datamation includes written aptitude and attitude tests for analyzing fundamental skills, data entry speed and accuracy, and database accession, along with knowledge of English. The selected candidates face the interview committee. The stringent selection procedure allows Datamation to retain a competitive edge in the market, and service clients such as British Airways, GE Capital, HSBC, KLM, Microsoft, and Nestle, as well as large local firms.

According to Datamation, the company was the first to establish an alliance with a voluntary organization to deliver high quality services to

international clients. More than 15 percent of the total number and 55 percent of women working with Datamation are from voluntary organizations. The trainees start with lower end jobs but there are equal opportunities for promotion.

Overall, about 25 percent of Datamation's 1400 employees are women. Among them more than forty-five women who work in the Delhi office and about ninety-five women who work at different locations throughout India are from socio-economically disadvantaged backgrounds.

Training and employing women are not simple tasks, as social pressures exist which demand that women stay at home. It is not easy for women to go on working after marriage, and especially after the birth of a child. Only about 40 percent of the women continue to work after giving birth to the first child. In such cases Datamation tries to provide a more favorable and comfortable work atmosphere for them.

Datamation is looking toward increasing women's access to ICT, which can benefit them at a later stage in pursuing better jobs. There are plans to offer hostel facilities to those women workers who otherwise cannot afford to live in urban areas like Delhi. Those who are already employed can continue their education in IT, have sustainable careers, can get special advantages such as paid maternity leave, and a supportive work environment before and after the birth of a child. Datamation is also trying to work out with government agencies the establishment of a daycare center.

Impact

The alliance of Datamation and NRS is a promising one: twenty-nine women employees in Datamation are from NRS. As a result of their economic empowerment these women can now lead independent lives. The women workers are already involved in software development, and there is increasing demand for them in network administration and maintenance.

Inhibiting factors

- Social pressure is a major constraint in recruiting more women from poor and deprived backgrounds.
- Updating skills among the employees from disadvantaged families is not an easy task.
- High standards of work need to be maintained at all times.
- Without a daycare center, the turnover resulting from marriage and motherhood can be a challenge.

Facilitating factors

- The alliance of NRS and Datamation as well as the links of Datamation with big firms in domestic and international markets
- Growing demand for IT and related services in the market
- Government support of telecommunication infrastructure
- A comprehensive selection procedure assuring quality work

Lessons learned

- Women, even those from deprived backgrounds, can become a valuable resource once trained.
- Women need guidance and support, especially during child rearing, so that they can continue working.
- Social pressure against women's employment can be countered by employing more female employees.
- Providing residential facilities can help to solve the problem of staying in costly urban area.
- A daycare center is needed in order to share the burden of working mothers.

CyberHost, Kenya

Denise Odhiambo, a young Kenyan information technologist who received his training in the U.S., Japan, and Switzerland, initiated the project. He wanted the rural people to reap the benefits of the ICT revolution and found that in Kenya, as in

other developing countries, rural areas had very weak infrastructure facilities. As considerable numbers of rural men move out to urban areas in search of higher education or better employment opportunities, mostly women are left behind to face the grim rural reality. They are caught in the trap of poverty, disease, ignorance, and isolation, with no access to information and means of communication.

The objective of the project was to provide universal access to information and communication for sustainable development of the rural poor in Kenya. The idea was to combine the best features of the Internet and e-mail with traditional mail to offer the villagers cheap, safe, simple, and swift means of communication. Villagers had to be trained in using e-mail, which provided fast and cheap communication globally, and to learn to combine it with the traditional mail system that ensured fast distribution over a small area.

The project proposed that CyberHost acting as a community post office would receive e-mail messages for community members from the Internet, print them out, and distribute them in envelopes to the addressees as the post office does. The addressees would hand over their handwritten replies to be e-mailed through the Internet. The mail was collected and distributed by three people on bicycles. Villagers could come to the center to check for and send their mail. Given the fact that the nearest post office was twenty-eight miles away, and this center was in the vicinity of the village community, the new system was quicker and much more convenient for sending and receiving mail. The villagers could enjoy the benefit of the Internet at low cost without having to own a computer and get an Internet connection at home.

Making it work

The CyberHost team required physical resources such as computers, printers, Internet connection, phone, office space, bicycles, and money. It also needed people who could coordinate the activities,

or train the operators. It was decided to launch the project in the Budalangi, one of the poorest areas in the Busia district, which borders Uganda. The Budalangi Women's Group with a membership of 3,000 women was involved. The local administration provided the premises of an abandoned health center. Teleafrique provided Internet connection and technical support. Public meetings, health centers, and churches were used to publicize the project. A memorandum of understanding was signed between CyberHost, the Budalangi Women's Group, and the local administration. After much effort to raise funds, help arrived from an individual working at Keio University (Japan), Africa Connections, and the U.S. and the Royal Netherlands embassies in Nairobi. The Network Start-up Resource Center, U.S.A., donated network accessories and a modem.

The project started in March 2000 with eight networked computers and a printer. Three solar panels were used for power. They had to be placed on the roof every morning and removed in the evening. The women's group selected the ninety women to be trained. They were made responsible for sustaining the project, training other women, and acting as mentors later on. A three-month training in the use of the Internet and e-mail was given to batches of fifteen women for four hours every day. At the end of the training, women participants had learned computer basics, word processing, sending and receiving e-mail, printing, photocopying, and rudimentary computer maintenance.

Impact

For local women who received training, the project opened up new employment opportunities. Also, during the outbreak of the Ebola virus in Gulu, Uganda, the border between Kenya and Uganda was closed. With the help of e-mail, several times a day, the villagers could get information about their suffering relatives on the other side of the border. Women communicated regularly with their children in Nairobi and other cities.

Inhibiting factor

- Funds were not easily available.

Facilitating factors

- Successful training of local rural women
- The premises of an abandoned health center provided by the local administration
- Internet connection and technical support given by Teleafrique
- Public meetings, health centers, and churches publicizing the project
- The alliance of CyberHost, the Budalangi Women's Group, and the local administration
- Funding from various sources

Lessons learned

- The new technology can prove instrumental in reaching out to the people under extreme situations, such as the outbreak of a disease.
- Rendering a service that is directly useful to the community can ensure project sustainability and related gains for women.

Mongolia Telecom, Mongolia

Mongolia Telecom started in 1992 as a public sector enterprise, and was privatized in 1995. It offers services such as international telephone calls, telex, leased lines, television and radio broadcasting, the Internet, payphone, cable television, and facsimile services. Of its 4500 employees, 54 percent are women.

In 1996, with the help of the Telenor Consultant Firm, MT adopted a human resource development plan that reduced the crowding of women at lower levels by equipping them to move to managerial levels. The two-pronged strategy included measures to help women cope better with their dual responsibilities at home and work, and measures enabling professional development of women that could lead to their career growth. The target was to have women fill at least 20 percent of the managerial positions. A large number of training and management development programs were organized which drew extensive participation

from women employees. The company understood the work-family conflict experienced by its female workers. To help ease pressure on women employees, a number of measures were taken. These included company assistance for single mothers and financial aid for childbirth and education of children. There is an annual “best woman achiever” award with a two-week stay in a rest house or health resort at company expense. As a result of proactive steps, women now constitute over 20 percent of senior managers, compared to just 9 percent when the plan was introduced.

MT avoids gender discrimination and the Mongolian Labor Law, a regulating as well as worker’s protection law, has contributed to maintaining gender equality. The human resource development has been very successful. In 2000, thirty-seven training programs were conducted, and 735 participants attended the courses. More than 65 percent of the participants were women (Purevsuren, 2001).

Inhibiting factors

- Lack of training and opportunities for women
- The work-family conflict that affected women most
- Lack of incentive and appreciation for women

Facilitating factors

- Being a large public sector enterprise to begin with, MT could continue to be a major employer of women after privatization.
- Enlightened regulations helped maintain gender equality.
- MT contracted professionals to roll out the human resource development plan.

Lessons learned

- Proactive and supportive organizational policies can help women acquire relevant competencies and move up the organization ladder.
- Enlightened official regulations and well-conceived organizational interventions can

together help women overcome the invisible glass ceiling common to many organizations, specifically in the ICT sector.

Centre for Computer and Language Training, Sri Lanka

In 1990, the Foundation for the Independence of Women with Disabilities was established to combat the discrimination faced by women with disabilities in Sri Lanka. Women with disabilities in rural areas were educated by FIWD about their rights and how to overcome prejudices. Women participated in a microcredit program, along with learning sewing and tailoring, to better their economic conditions.

FIWD carried out a survey in 1986 with the Central Council of Disabled Persons. The survey in Uva province showed that 7 percent of its total population had disabilities, half of them being women. It indicated that 81 percent of the disabled people (ages sixteen to thirty-five) received no vocational training, nor were they employed.

The IT revolution, however, has brought more and more computer jobs to Sri Lanka. FIWD realized the great employment potential for women with disabilities in the ICT sector. Despite advancements in IT, the country has only one national computer center. FIWD decided to develop a computer training program for its members by taking full advantage of a 1987 law, according to which 3 percent of the workforce in any sector need to be filled by disabled persons.

In 1999, FIWD established the Centre for Computer and Language Training with the help of a seed grant from the Global Fund. The Centre seeks to teach English, and basic and advanced computer skills (such as word processing, database and spreadsheet programs, and Internet use) to women with disabilities.

Impact

After ensuring the competitive employment skills in women with disabilities, FIWD has been able

to place them comfortably in the mainstream workforce. It has also challenged the prevalent negative stereotypes of women in Sri Lankan society. FIWD is optimistic that in course of time the leadership abilities of women with disabilities will be valued too, along with their other working skills.

Inhibiting factors

- Women with disabilities encounter discrimination.
- A majority of the disabled received no vocational training, nor were they employed.
- Despite IT advancements, the country has only one national computer center.

Facilitating factors

- The 1987 Sri Lankan law stating that 3 percent of the workforce in each sector need to be filled by disabled persons
- The initial grant coming from the Global Fund

Lessons learned

- The ICT sector has great potential to employ women with disabilities.
- Despite their disabilities, the trained women can make their mark while becoming a part of the IT labor force.
- Proactive policies can extend equal opportunities to all women, including the disabled.

International Telecommunication Center, Vietnam

In Vietnam, telecommunication has spearheaded technological advancements, which in turn have proved to be vital for socioeconomic reform in the country. Although previous studies suggest that women workers have fewer opportunities to receive training in case of technological change, not all women are excluded from training and professional jobs in telecommunication. At the International Telecommunication Center, Hanoi, about 50 percent of the total labor force are women, while almost 90 percent of the workforce in post and telegraphy are women.

ITC is a subsidiary of Vietnam Telecom International. VTI, founded in 1990, is a subsidiary company of Vietnam Post and Telecommunications (VNPT), which is involved in nationwide activities. There are three ITCs — ITC 1 at Hanoi, ITC 2 at Ho Chi Minh City, and ITC 3 at Da Nang.

In the top management of VTI, 23 percent are women. Until recently a woman headed ITC 3. A report on training activities of the company in 2000 indicates women's participation in technological training sessions, but the number of female participants varied from 0 to 100 percent, based on the training content.

In the mid-1990s almost 50 percent of the ITC workforce were women and most of the staff were required to use IT. Today a majority of the employees are young, the average age of women employees being thirty-six. During the installation of the new technology the trade union failed to negotiate with the management to retain the older women workers. Although ITC provided training opportunities, the older women (particularly women with young children) were unable to benefit from it.

The work requires knowledge of a foreign language, technical and professional skills, along with patience, dedication, and the ability to communicate. This was the main reason behind employing women. Women are allocated tasks with "feminine" requirements, while men do the highly skilled jobs and therefore get higher pay. In some cases, women receive lower wages than men in comparable occupations.

Impact

Recently, a survey of 112 employees (36 percent of the total labor force) conducted at ITC 1 showed that:

- Gender gaps exist in work allocation and professional qualifications of women and men.
- In order to reduce existing gender gaps, in-service training for women is essential.
- There is urgent need for gender-sensitive

changes in the firm's organizational structure to promote women's involvement in technology.

Inhibiting factors

- Older women and women with children have to look for other employment alternatives.
- Gender gap in professional qualifications inhibits better work allocation for women workers.
- Women in skilled occupations are paid less than men doing the same work.

Facilitating factors

- Regular training courses are available for all employees.
- Women are allowed to work at all levels.
- The requirement to have female employees in telecommunications has increased.

Lessons learned

- Efforts are needed to removing the gender gap in work allocation and salaries.

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APPENDIX 2

Country Studies on Labor Market Participation

India

Education differentials

Table 1. Literacy

	No. literate	% literate
Persons	566,714,995	65.4
Males	339,969,048	75.9
Females	226,745,947	54.2

Source: Census of India 2001, Series 1, Paper 1

Department of Education figures for 1988 show that there were 285,137 boys and 57,968 girls enrolled in engineering, technology, and architecture at the graduation level — a 5:1 ratio.¹

Internet use

About 0.2 percent of the country’s total population have access to the Internet. There are 115,000 female Internet users, accounting for 23 percent of India’s total Internet users.²

Labor market participation of women

Women constitute 31 percent of the official workforce in India (ILO, 2001). They have a share

Table 2. Enrollment (%)

Female secondary school enrollment	48
Females among tertiary students	36
Females among tertiary students in natural sciences*	30.4
Females in tertiary teaching staff	19

*Natural sciences include computer science, engineering, math, architecture, town planning, transport, and communications.
Source: UNESCO 1999 Statistical Yearbook India Literacy Project
<http://www.ilpdc.org/ILP/education.htm>
<http://genderstats.worldbank.org>

of around 15 percent in paid employment in industry and services (UNIFEM, 2000).

IT labor market participation of women

According to the National Association of Software and Service Companies (NASSCOM), women currently constitute 37 percent of the employees in the IT-enabled service sector. Women hold 27 percent of professional jobs in the Indian software industry, which accounts for \$4 billion annually. The overall participation of women in the software industry was estimated to be around 30 percent in 2001.³ However, according to the *Dataquest India* web site, just three out of the top 200 IT companies in India have women CEOs.⁴

AED’s analytical study on gender and IT in developing countries (Hafkin and Taggart, 2001) suggests that India, along with China, Singapore,

Table 3. Employment in the Indian ICT sector

Category	1990-91	1999-2000	2000-01	2001-02 (Estimated)
Software exports sector		110,000	162,000	170,000
Software domestic sector		17,000	20,000	22,000
In-house software development		115,000	178,114	224,250
IT-enabled services		42,000	70,000	106,000
Total	56,000	284,000	430,000	522,250

Source: Strategic Review 2000, NASSCOM, which also indicates that the present share of IT in India’s Gross Domestic Product is 2.87 percent.

Table 4. Female employees (%) in major Indian software firms (2002)

Company	Female employees
Infosys	19
Tata Consultancy Services	20
Wipro	17

Source: E-mail from Infosys, TCS & Wipro

and Vietnam, is one of the largest vendors of outsourced data processing. Call centers and satellite offices performing back office functions are also offering ample employment opportunities. The study also indicated a 20.5 percent share of women among the total number of professional and technical workers.

Women at different skill levels in MT industry

The following table covers 139 companies, which are about 88 percent of all medical transcription companies across India (September 2002). This is one industry in which the overall participation of women is greater than men. But interestingly women seem to be “crowded” at lower levels. For support staff including managers, they constitute only 24 percent.

Gender-disaggregated data on networking professionals in India were not available, but according to Hafkin and Taggart (2001), there are fewer women employed in networking than in the software industry. The reason lies in the preconception that such physically strenuous jobs, which often involve long hours of work and travel, are

Table 5. Females (%) among IT professionals in Indian software companies (estimated)

Company	Female Professionals
NIIT	29
Cognizant Technology	25
Philips	25
Iflex	20
Hughes Software Systems	20
SAP	20
TCS	20
Kshema Technologies	20
Wipro	19
Infosys	16.7
Cadence Design Systems	16.7
HP	16.7
Sun Microsystems	14.3
HCL Technologies	14.3
Digital Globalsoft	12.5
Datacraft India	11.1
Adobe	8.3
HCL Infosystems	7.7
Mascon Global	5
Rolta	4

Source: IDC (International Data Corporation), 2002

unsuitable for women. However, a survey carried out by NASSCOM discovered female programmers to be 38 percent more efficient than male programmers, signifying better potential for women in the ICT sector.

It is expected that by 2007, around one million jobs in call centers will be created in India, and above 350,000 women will be employed in remote data processing by the year 2008.⁵

The IT-enabled services sector is expected to expand

Table 6. Participation in medical transcription companies, India

Occupation	Male	Female	Total	Female %
Transcriptionists	4,899	7,383	12,282	60.1
Proofreaders	575	406	981	41.4
Office Assistants	65	93	158	58.9
Support Staff incl. Mgrs.	131	41	172	23.8
Total	5670	7923	13,593	58.2

Source: Maj. Dr. Amit Chatterjee, www.mtindia.org, September 2002

and offer even more employment opportunities for Indian women in coming years. According to a NASSCOM projection based on the McKinsey analysis, the IT industry in India will employ over 4 million people by 2008.⁶

Government policy on ICT

The government of India has incorporated measures to increase the number of trained professionals to encourage the growth of the ICT sector in the country. A national task force was set up in 1998 by the government to look after growth prospects in the industry. The Information Technology Bill of 2000, based on suggestions of the task force, emphasized implementation of a legislative

mechanism for extended IT applications, which was expected to act as a catalyst in promoting IT throughout the country. For employment opportunities in the sector, accessibility is a major area that needs to be taken care of. A Working Group on IT was created in May 2000, but the recommendations of this group lacked specific emphasis on women. The suggestions were on access, education, and increasing awareness about advantages and uses of IT, which would also be useful for women after implementation. No specific agenda on access and skill development for women was discussed.

Some of the state governments such as Andhra

Table 7. IT-enabled services – market segmentation, India

Rs Crore	1999-2000		2000-2001		2001-2002 (estimated)			2008 (forecast)	
	E	R	E	R	E	R	Growth in revenue (%)	E	R
Customer interaction services including call centers	8,600	400	16,000	850	33,000	1,650	94	270,000	20,000
Back office operations/ revenue accounting/data entry data conversion including finance and accounting/HR services	15,000	950	19,000	1,350	35,000	2,850	111	300,000	21,000
Transcription/ translation services	5,000	120	6,000	160	5,200	150	-6	50,000	4,000
Content development/ animation/ engineering and design/GIS	15,000	820	27,000	1,600	30,000	2,100	31	300,000	21,000
Other services including remote education/data search/ market research/ network	1,400	110	2,000	140	3,000	210	50	180,000	11,000
Total	45,000	2,400	70,000	4,100	106,200	6,960	70	1,100,000	81,000

E = employment; R = revenues. Source: NASSCOM

Pradesh have also started developing their own IT infrastructure and pool of skilled professionals. According to the Ministry of Information Technology, the central and state governments have initiated steps to promote computer use in marginalized areas, for instance by setting up information kiosks with computers run by local entrepreneurs in rural areas. Some other states such as Uttar Pradesh are also taking interest in the sector.

In 1988, the central government established a World Market Policy focusing on software development for export, reform in telecommunications policy, privatization, and a more comprehensive approach toward ICT. The Software Technology Parks of India scheme was also initiated.

Government policy on gender

The Indian government has certain policies in place that should help promote women's status and overcome the problems they face in the society. The education ministry has education programs for girls. The Department of Women and Child Development formulates strategies, policies and programs, enacts or amends legislation, and guides and supports work done by other government or nongovernment bodies for improving the lives of women and children. The department has initiated training programs for employment, awareness building, and gender sensitization; it has also established hostels for working women, which are likely to work against the mobility barrier that stops women from taking up IT jobs in urban areas. The impact of such initiatives is not known because of lack of statistics in this area.

An important education policy from women's perspective has been observed in the state of Andhra Pradesh where one-third of all places in institutes for higher education are reserved for women. Such a policy is likely to increase the number of women opting for IT and related fields at higher levels.

Accessibility

Internet is usually inaccessible for the majority of the country — especially in the rural areas — due to the dearth of telecommunication infrastructure. With a total population of over a billion, the country has only 26 million fixed telephone lines, and teledensity is just 24 per thousand people as compared to the global average of 150 per thousand. The lack of telecommunication infrastructure is the greatest hurdle in extending IT application across the country.

Indian villages now have somewhat better facilities as 60 percent of the villages have at least one telephone connection. There are about 0.8 million Village Public Telephones (VPTs) in India. In four states of the country, Worldtel is carrying out a pilot project for upgrading these VPTs by providing access to the Internet.

Social and cultural factors

The education of girls in India is a priority for the government. Still, not many girls have the opportunity to go for higher-level studies, especially in technical fields, except for a few from the middle and upper classes who can bear the expenses of professional education. Another reason behind the smaller number of girls in professional education is that initially such courses were considered unnecessary and inappropriate for girls. Although this situation has changed over time, there is still much to be done to improve the ratio of women workers in this sector. The low share of women in the ICT workforce is largely due to the low enrollment of women in IT and related courses.

The country has a number of NGOs working on women and education, but there is a dearth of ICT initiatives for poor, uneducated women.

Mobility is a concern, especially when women contribute a secondary income to the family and have the primary responsibility for the household. It is unlikely that they will be able to move with the job. Nor are they able to take on night jobs

which global time differences often require.

Women's low status in the society is partially responsible for their dismal share in the ICT sector. Although things have changed to some extent in the urban areas, there is much scope for change in rural and peri-urban areas.

Conclusions

India's female literacy rate is improving, and an increasing number of girls now attend secondary school; but women continue to be inadequately represented in IT and other technical courses. With growing employment opportunities in the ICT industry, the share of women may rise in the coming years. To make women equal participants in the ICT industry, however, a proactive policy environment will be required. As a major part of the Indian population live in villages, targeting women from poor and remote areas for ICT employment and education should become a crucial part of the government's agenda.

Jordan

Education differentials

Jordan's female adult literacy rate has increased from 46.8 percent in 1972 to 84.4 percent in 1996. Today girls constitute around 50 percent of the total number of students at primary, secondary, and tertiary levels. At the tertiary level, women account for 35.5 percent of students in natural sciences (the predefined stream for IT-related jobs), which is higher than in most other Middle Eastern countries.

Table 8. Status of women's education in Jordan (%)

Female adult literacy	84.4
Female secondary school students	55
Female tertiary students	42
Female tertiary students in natural sciences	35.5
Female teaching staff at tertiary level	8
Source: UNESCO Statistical Yearbook 1999, World Development Indicators 2000.	

Twenty-nine per cent of students enrolled in computer science and 13.8 percent of students in computer engineering are female.⁷

Internet use

Internet access is increasing in Jordan at a fast pace: there were 87,500 users representing 2.2 percent of the total population in February 2000. The number of female Internet users in Jordan is 3,700, which accounts for 6 percent of the total users in the country (Hafkin and Taggart, 2001). Among the Maktoob.com users in 2001, over 26 percent users were female.

Labor market participation of women

Better education for women, reduced wages, and increasing costs initiated by economic liberalization have resulted in an increase in the number of women joining the labor force in Jordan during the last decade. Still, women's share in the labor market was found to be quite low; in 2000 women accounted for just 11.7 percent of Jordan's total workforce. The contribution of women is mostly in the education sector where they are around 51 percent of the workers and 62 percent of the teachers.⁸

IT labor market participation of women

Women workers constitute 27 percent of the ICT workforce in Jordan. According to a study conducted by the National Information Centre of Jordan in 2001, women hold about 13 percent of managerial positions in the private sector and also have a 22 percent share among the programmers. The study revealed a higher share of women in the public sector where they hold 30 percent of managerial positions and a 50 percent share among the programmers.

Table 9. Share of women in Jordan's ICT sector (%)

	Private Sector	Public Sector
Managers	13	30
System Analysts	19	40
Programmers	22	50
Engineers	5	13
Data Entry	93	74

Wage differentials

Information on wage differentials in Jordan shows that higher education has been unsuccessful in drawing higher salaries for women. Studies also show that the social viewpoint that considers men as family breadwinners explains why men in Jordan earn higher salaries.

Government policy on ICT

Jordan's government has been trying to modify its telecommunication sector for the last few years. In 1999, the Reach Initiative was planned for achieving job creation, ICT sector investment, and exporting of IT-related products and services by 2005. The government has privatized around 40 percent of Jordan Telecommunications Corporation, which was set up as a public sector initiative.

The King of Jordan recently opened an Information Technology Community Center in Tafileh for basic training on computer and Internet skills, with the aim of supporting economic activities and building an Internet literate population. Internet access continues to be free from government restrictions or censorship.

Government policy on gender

The policy environment in Jordan has become more open to women's issues because of the involvement of the Queen and Princess of Jordan. The Princess heads the Jordanian National Committee for Women (JNCW), a government body that was established in 1992. JNCW promotes policies related to women's social, economic and political interests. In 1993, JNCW played a major role in the formation of the National Strategy for Women, and it continues to work with organizations in public and private sectors to implement the strategy.

The National Strategy for Women is based on the values of Arab and Muslim society and principles of human rights. It emphasizes women's equality as well as their contribution to a society where their primary role is to raise children. The strategy

favors equal access to education but does not focus on women's right to access or acquire non-traditional skills training and education.

Sociocultural factors

In Jordan, as in most of the Middle Eastern countries, women get government support for education and economic and political participation. Yet the social values, which designate men as providers and women as caretakers in the family, discourage women from taking up paid work. In the private sector, a dearth of daycare centers and problems with maternity leave become hurdles for working women with families, and often influence employers to select unmarried women. In addition to social constraints, the poor economy and social patterns obstruct women's participation in the workforce. As a result there is a high unemployment rate among women in the formal sector. In rural areas accessibility and high cost are major constraints besides the basic problem of illiteracy.

Conclusions

Jordan is an example of a country that has seen noticeable improvement in women's literacy levels in recent years. Their presence in computer science (29 percent) and computer engineering (14 percent) courses, however, indicates that there is still scope for improvement. Though the government is actively encouraging the growth of the ICT sector and working toward gender equality, conservative social beliefs still prevent women from benefiting from the emerging opportunities in this sector (Heresh, 2001).

As with a number of developing countries, however, today Jordan too is influenced by globalization and IT trends, and the country's ICT sector appears to be full of opportunities for enterprising young women. In the last few years the participation of women in the ICT sector has increased.

Notes

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3

Micro and Small Enterprises and ICT: A Gender Analysis

Women dominate the micro and small enterprises (MSE) sector in most developing economies.¹ It is increasingly recognized that women's micro, small, and medium enterprises stimulate domestic economic growth while promoting a more equitable distribution of social and development benefits. This chapter focuses on the use of ICT in the MSE sector and existing gender transparency issues in developing and transition economies. It draws upon representative documented case studies as well as first-hand experience and observations. Where MSE specific data are not available, data and examples from medium enterprises are included.

The chapter is divided into seven sections. The first section provides a framework within which to understand the implications of MSE development for both poverty alleviation and women's economic development. The second outlines the context within which women entrepreneurs conduct their businesses. The third identifies the primary concerns that the typical woman entrepreneur faces — these include the

trade regulations that continue to work against her export potentials, the implications of ICT taking her out of the informal and into the formal sector, her time issues, and cost implications of investing in ICT. The following three sections build on experiences from the field. The fourth section contains a brief status report on how ICT has affected women-run businesses and women entrepreneurs. With the help of case studies, this section investigates the impact of ICT on women's access to credit, training, networking and strategic alliances, and new markets, concluding with a summary of the main challenges. The fifth examines the critical roles that business development service providers should and can play in relation to the needs of women entrepreneurs. The sixth suggests an approach to good practice to encourage ICT development for MSE run by women with an emphasis again on business development services. The final section looks at possible future steps within the World Bank Group.

The importance of the issues

Some of the gender differentials specific to the MSE sector include the following:

- There are distinct differences between men and women in their access to resources, information, and support that have a direct impact upon their business sustainability and success. Women usually face higher barriers to computer literacy or engagement in ICT-related employment than men. They also have less access to collateral or to capital that would enable them to invest in ICT. Also, compared to men, women have less time in which to balance out the tension between earning an income and caring for their home and family.
- At the same time much of women's work remains unpaid. In developing countries, women spend only one-third of their time in paid standard National Accounts activities, compared with three-quarters for men. If unpaid labor is counted, women do more work than men (ILO, 2001). This means that many more women remain in the informal sector, which has a direct negative impact on their access to capital, information, support, and by extension, to ICT.
- At national levels, the business sector continues to be male-dominated. Male bias is reflected, for instance, in the gender balance on trade team representations at national levels. Some of this is cultural bias and some institutional.
- Women are less likely to be members of business or employers' associations than men. There remains great opportunity for representative associations, such as employers' organizations or chambers of commerce, to increase the number of women members.

On the positive side, over the past two decades, there are many women entrepreneurs, with women in advanced economies owning more than 25 percent of all businesses. The number of women-owned businesses in Africa, Asia, Eastern Europe, and Latin America is growing rapidly, and with that growth, their direct impact on

job creation and poverty reduction (UNCTAD, 2002). The Internet has had a real impact on the growth rate of women-owned enterprises. In China women initiate about 25 percent of business start-ups, and in Japan four out of five small business owners are women.

The World Bank has identified pro-poor market development as one of its five priority areas. It follows that women are an especially important target group to support, given their roles and number in the MSE sector. One of the four sector strategy papers produced by the World Bank Group in 2002 was on integrating gender into the World Bank's work. Two others were on ICT and private sector development. There is a need for cross-fertilization of ideas and policies, and interactivity between these three sectors to ensure a systemic approach to poverty alleviation through women's business development.

A macroeconomic context

Any examination of the increasing participation of women in the MSE sector has to include the changing economic context within which they operate. This understanding will allow us to appraise their motivations, their avenues of support, and the applicability of ICT to their business functions

Economic rights and globalization

An article in the July 2000 special edition of *World Development* outlines "a rights-based approach to economic policy which aims directly at strengthening the realization of human rights, including social, economic and cultural rights, as well as civil and political rights" (Cagatay, Elson, and Grown, 2000). This approach indicates a profound political shift that became evident during the Fourth World Conference on Women, where the rights focus extended beyond a narrow range of women-specific economic issues to the broader arenas of economic policymaking. This new engagement in economic rights goes hand in hand with the realities of globalization that women are dealing with on a day-to-day basis.

The World Bank's *World Development Report 2000/2001: Attacking Poverty* delineates the singular failure of traditional prescriptions of balanced budgets, sound currency, and free trade to by themselves significantly reduce poverty in most developing economies. While it is true that globalization drives a level of integration for individuals, corporations, and nation-states which reaches farther, faster, deeper, and is cheaper than ever before,² it has also brought with it wider economic disparities, greater feminization of poverty, and increased gender inequalities.³

Trade and investment regime

Structural Adjustment Programs (SAP) and the more recent Poverty Reduction Strategies papers (PRSP) of the World Bank and the International Monetary Fund (IMF) base their premise on preparing economies for liberalization of trade and investment. With liberalization, however, has come greater competition and deeper economic fluctuations. The Asian financial crisis of the late 1990s virtually wiped out the livelihoods of men and women in Thailand, Korea, and Indonesia. The prescriptions to relieve the Asian crisis were built on the traditional SAP model that continues to shift the responsibilities of social development away from government to the private sector and society, where women generally absorb the extra load of social services. It is no coincidence that some of the more advanced MSE initiatives among women are now in these economies.

One woman's gain, however, may be another woman's loss. In African economies, in some sectors, women's informal sector businesses and women employed in small-scale industries have been adversely hit by trade liberalization. Women involved in sisal bag manufacturing in Kenya are now losing their market share to imported mass-produced imitations from Southeast Asia.⁴ What is needed with globalization of economies, is greater mobility of labor between sectors, and by implication, more information, training, and capacity building.

In most economies, the globalization process has pushed policy strategies in favor of removing barriers to trade and financial flows, privatizing state-owned enterprises, and, in some cases, lowering public spending, particularly on social services.

These policies have transformed patterns of production, contributed to accelerated technological advances in information and communication, and impacted the lives of men and women. For women in developing and transitional economies, the cumulative effects of these changes have been particularly negative, making more demands upon them, while simultaneously diminishing the support systems upon which they depend.⁵ The gender impact of these changes has not yet been systematically evaluated. Even so, there is sufficient evidence to conclude that although some women have been able to take advantage of greater economic opportunities and independence — either through establishing their own businesses or securing employment — many more have been unable to take advantage of possibilities offered by open markets, leading to increasing inequalities within countries.

Definition: micro and small enterprise

For the purpose of this study, we will use the definitions provided by the small and medium enterprise (SME) department of the World Bank Group.⁶

- Microenterprise: up to 10 employees, total assets of up to \$100,000 and total annual sales of up to \$100,000
- Small enterprise: up to 50 employees, total assets of up to \$3 million and total sales of up to \$3 million

These definitions are broadly consistent with those used by most international financial institutions. Despite its size, the MSE sector is a fragile one; at the same time it shows tenacity in its ability to adapt to and survive the shocks and stresses of economic swings. There are other definitions of MSE that are arguably more relevant

when analyzing the issues facing enterprises in developing economies — such as those framed in a Ugandan policy paper (Snyder, 2000):

- Microenterprises are, in quantitative terms, “business undertakings employing less than 5 people, often family members; value of assets excluding land, buildings and working capital is below US\$ 2.5 million; annual turnover is below US\$ 10 million (about \$10,000 at the time of the interviews), which is the threshold for business-related tax.... They operate seasonally; usually they are not registered formally and hence have no formal services. They do not pay enterprise-related taxes and their management is rather weak in terms of both education and administrative capabilities.”
- Small enterprises are “enterprises employing a maximum of 50 people; value of assets excluding land, buildings and working capital is less than US\$ 50 million; annual turnover is between US\$ 10 to 50 million, which is the tax bracket for one per cent business tax on annual turnover.... They operate the whole year round, are formally registered and taxed, and owners/managers are educated and/or trained.”

ICT and e-commerce in the context of MSE

The three defining characteristics of ICT are their convergence, speed, and reducing operating costs, which have created a range of possibilities for information collection, manipulation, transmission, storage, and presentation. A combination of these possibilities has ushered in a whole new approach to conducting business.

ICT in the small business sector lends itself to an expanding universe of applications such as electronic mail, electronic data interchange, virtual enterprises and groupware. E-commerce is the most visible aspect, but it is just one segment of a larger whole. E-commerce is limited to those enterprises that have the technical and financial infrastructure to support encryption, online transaction processing, just-in-time production

systems, and order handling and management systems. Enterprises in developing countries that have less reliable access to this infrastructure may be excluded from harnessing the power offered by these new tools.

The increasing virtualization of the three components of a market (agents, products, and processes), allows for a better envisioning of the future of ICT in the MSE sector of developing countries. Internet access and wireless communication are already of critical importance to businesses, small and large. A business transaction consists of many successive processes (information gathering, comparison, negotiation) most of which can be carried out more efficiently over the Internet, even if the final step of the transaction is taken offline (UNCTAD, 2001).

Meanwhile, convergence — the pulling down of the technical and commercial barriers that hold telecommunication and computing apart — will continue to open up all kinds of avenues for business development. The economies of scale in running all types of communication through the same conduit are especially realizable in developing countries where the bulk of the population has still to be wired for television and telephones. At the same time, technology trends demonstrate that businesses can rely more and more on wireless telephony as their primary connectivity.

If we regard ICT applications for MSE as three-dimensional (Table 1), it would be fair to conclude that most such enterprises are still grappling with the first dimension of ICT development.

Differentiating between businesses

The most important difference is between those enterprises that are purely income-survival entities and those that are financially viable, sustainable businesses. Survival-oriented enterprises probably form the largest component of MSE, which also produce the lowest value and are caught in a poverty trap (see Figure 1). The generally accepted argument is that ICT can extend

the reach of a business beyond its immediate market — and thus widen its customer base. However, at this point, it is difficult to assess how, if at all, ICT may contribute to the financial viability of microbusinesses.

Case studies will focus on businesses that suggest long-term viability (though they may still be at pilot stage). Broadly speaking, these businesses can be categorized as:

- Existing businesses that introduce an ICT platform to their commercial functions and modify or expand their markets (such as, bookkeeping services)
- New businesses that are built entirely around ICT (such as portal entities or virtual outlets that sell crafts or services through commercial sites, offshore outsourcing companies)
- New businesses that service the ICT sector through product and service supply (such as call centers, software programming businesses).

MSE trends from a gender perspective

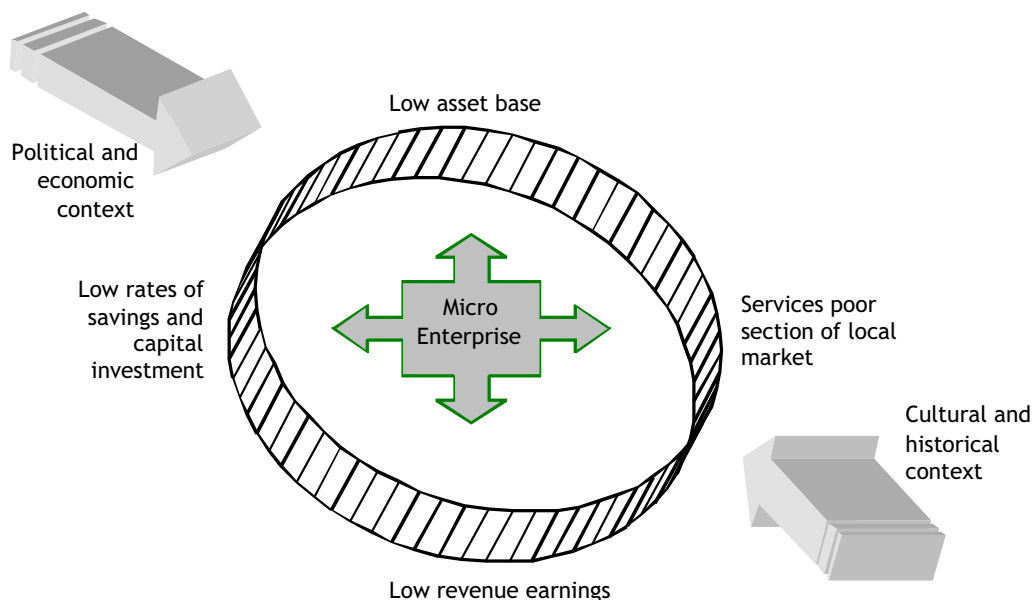
Gender-differentiated data on MSE are especially difficult to come by, because this sector is often outside the realm of national surveys. A 1994 survey of SME in the Asian Pacific Economic Community (APEC) countries, however, found that they account for 90 percent of all MSE. Between 1978 and 1996, women-led enterprises accounted for a quarter of all business start-ups in the region. Between 1995 and 1997, women business operators increased by 9 percent while male business operators increased by 2.6 percent. These businesses typically specialized in small farming, retail, or handicraft (UNIFEM and CIDA, 1998). In Tanzania, MSE and the informal sector dominate the economy — earning about 35 percent of GDP in 1999, employing 20 percent of the population, of which 50 percent was in the trade or retail sector.⁷ More recent figures in Asia suggest that women head 35 percent of small and medium sized enterprises in the region (UNCTAD, 2002).

Table1. Three-dimensional aspects of ICT business applications

I. Connectivity and Communication (changes economic and social organization)	II. Computing (changes business and information management practices)	III. Commerce (changes modes of production and distribution)
<ul style="list-style-type: none"> • Access points, public and private • B2B networking and special interest groups • Support groups • Chambers of Commerce membership • Interest representation to policymakers • Revenue forecasting • Simplifying applications 	<ul style="list-style-type: none"> • Management software choices • Training • Software support services • Financial and accounting packages • Inventory stock 	<ul style="list-style-type: none"> • Virtual malls/commercial sites • Cooperative producers/retailers • Teleservices • Entirely new kinds of economic activities and services

Source: Networked Intelligence for Development

Figure 1. Micro-enterprise caught in the poverty cycle



Socicultural issues from a gender perspective

Any policy debate around MSE in developing countries must take into account the historical and economic roles of women in the development of small-scale enterprises. Entrepreneurship is culturally mediated. Many women entrepreneurs in West and Central Africa for instance, boast a long history of crossborder barter trade. In contrast, women in South Africa have had a good portion of their traditional systems dismantled over a long period of time, and do not have established business instincts. Entrepreneurship development is influenced by political, cultural, and economic considerations, which have propelled women into extra-wage pursuits for a whole range of reasons.⁸

In sub-Saharan Africa, small-scale enterprises in the formal and informal sectors have absorbed relatively large numbers of workers at low cost. A combination of economic and political policies both pre- and post-colonialization in countries such as Ghana, Nigeria, Tanzania, and Uganda confined women almost entirely to the agricultural sector, because many of them were not initially engaged in wage labor and were not in a

position to legally establish themselves in business. They earned an income working in fringe (often illegal) activities such as prostitution, food selling, beer brewing, and domestic service. Their markets were also limited to the poorer groups of the community. Studies on women entrepreneurs in Zimbabwe show that women tend to be employed in small-scale, home-based, low capitalized enterprises that supply goods and commodities to low-income consumers particularly in the urban areas. This clearly restricts their possibilities for growth and outreach. They are not able to absorb labor beyond the household and rely on credit from personal savings. Most of the entrepreneurs use labor-intensive methods of production in activities such as baking bread, tailoring, and agricultural production and processing.

Women in the MSE sector – convenience or necessity?

It is important to distinguish between the push and pull factors that draw women increasingly into the arena of micro and small enterprise development. The push factors include:

- Withdrawal of or decline in state expenditure on social programs as a result of structural

adjustment programs, which continue to place a disproportionate burden on women

- Flexibility of formal employment and resulting insecurity of income rising from increased competitiveness through trade liberalization⁹
- Scarcity of alternative occupations and professions that women can engage in.

The pull factors are expectation led. Women are turning to innovative means of livelihood, and want to take advantage of ICT and new knowledge sources that may create business opportunities in expanding markets.

Over and above these issues, there are factors specific to women. These include limited access to and control of resources and marketing outlets, and less access to formal channels for networking.

MSE and ICT – the promise and the reality

In many developing countries, the adoption of ICT-based functions within formal business and financial services sectors is rapidly catching up with parallel sectors in industrialized states. In India, for instance, most of the high street banks depend on the top 5 percent of their customers for 70 to 80 percent of their margins and these are the customers who are already wired to the Internet.

In developing countries, demand among small businesses for basic communication services such as local and long distance phone and fax services is constantly rising. As new telecommunication services have become more available, a wide range of businesses has emerged as some of the more avid consumers. In many sub-Saharan countries for instance (Nigeria, Senegal, South Africa, Uganda, to name a few), public phone shops which have upgraded their services to offer e-mail and Internet-based information and training services, have mushroomed in the last five years.

Business-to-business transactions currently account

for 80 percent of e-commerce worldwide, a trend likely to continue in both developed and developing countries. The vast majority of these exchanges continue to be among the information rich.

In the immediate term, the domestic MSE Internet subscriber base in most developing countries is too thin to make e-commerce viable for local business-to-consumer transactions. Relatively speaking, most small enterprises are still characteristically “information poor”. At the same time, they provide a critical source of employment for the world’s poor — especially women in developing and emerging economies — by generating much needed revenue and low-cost jobs.

While awareness and demand for the higher end of value-added services is still low, there are a growing number of initiatives in the developing world where ICT is being incorporated into small business models. Small and medium enterprises, and in certain situations, micro enterprises, are seeing the new technologies for what they are — cheaper and more effective means of communication — which can be adapted to a multitude of business purposes. The case studies included in this paper outline some of these adaptations.

ICT does not flatten trade barriers

Current arguments for the adoption of ICT by MSE point to their potential to become more competitive using the Internet to access information about cheaper finance or markets, or learn about improving customer service and reorganizing procurement processes. While the Internet may make it easier to directly access new, better quality suppliers and markets, the MSE participation in international trade continues to suffer from inadequate trade-supporting services, including finance, insurance, transport, and business information. Time and again, however, it is the terms of international trade and national regulations that work against the aspiring MSE exporter (not within the scope of this study). According to the World Bank’s *Global Economic Prospects 2002*, the

average poor person selling in global markets confronts barriers that are roughly twice as high as those facing the typical nonpoor worker. If we agree that the larger proportion of the poor are made up of women, it is possible to conclude that women-run MSE face even more stringent business conditions than most. ICT does not flatten trade barriers. Nor does ICT automatically take an MSE to overseas markets. The aspiring MSE exporter has to reinvent its supply chain (see Case Study 1) to cater to new markets.

Case Study 1: Cottage Industry Global Market (CIGM), India

CIGM is essentially a network with horizontal and vertical linkages. The core of the network consists of women's weaving cooperatives in rural Himachal Pradesh, northern India, whose main products are handmade woolen shawls and other woolen attire. CIGM fosters links between the cooperatives as well as with other players, including local NGOs, local government, Georgetown University in the U.S., and the World Bank's Development Marketplace (the funder). Three women are responsible for coordinating materials supply, marketing and recordkeeping out of a center that also provides training to the cooperative members. Government provides support in the form of loans, training, and marketing. Plans to set up a marketing portal for the products were laid aside when it became clear that production capacities would not meet the demand or quality requirements from international markets. The immediate needs were identified as management training, accounting procedures, product standardization practices, and computer training as a means to streamlining and systematizing the cooperatives' business. Motivating the cooperatives toward a business model has proven difficult so far.

Non-formal sector implications

Typically, an MSE operates in what is loosely defined as the informal sector. ILO studies of major African cities report figures for the urban labor force engaged in the informal sector ranging from

30 percent in Abidjan, to 50 percent in Dakar and Lagos, 73 percent in Ouagadougou, and 80 percent in Accra. Globally, women represent 75 percent of workers in the informal sector, which comprises over 55 percent of the economy in Latin America, 45 to 85 percent in parts of Asia, and close to 80 percent in African countries (Taggart, 2002).¹⁰

For the most part, enterprises are classified as "informal" when they fall outside the state system of licensing, taxation, and regulation, and therefore do not form part of the official economic statistics. In reality there is a substantial gray area between the formal and informal sectors. Small businesses operating in retail markets for instance, might not declare income, but are nonetheless required to pay regular market stall, retail, and related taxes. Because of the irregular way in which these businesses sometimes function, it is difficult to track or forecast their spending patterns, income sources, and costing.

How does the entrepreneur perceive the introduction of ICT into this kind of business? Most entrepreneurs of microbusinesses have no option but to remain in the informal sector because they cannot afford to pay the taxes required in the formal sector, and this influences the kind of ICT they are willing to invest in. Usually it begins and ends with the ownership of a mobile telephone. Almost all the participants in training events for women entrepreneurs in Cameroon, Lithuania, Mozambique, and Tanzania have mobile telephones — reflecting the dramatic growth of cellular subscribers in these countries. Training workshop reports from Networked Intelligence for Development (NID), a consultancy firm engaged in ICT training and mentoring programs in developing countries, state that participants would be requested to switch off their mobile phones during training courses, otherwise there would be incessant ringing! In fact, in sub-Saharan Africa and central Asia, the numbers of mobile phones exceed line phones, an indication of the unmet demand for telephones in those

regions (Eggleston, Jansen, and Zeckhauser, 2002).

A larger or more ambitious business, however, whose market extends beyond the immediate community, may consider investing in ICT to support both communication and computerization. Small pharmaceutical stalls in Burkina Faso, for example, have benefited from using data software to track and stock their inventory, and therefore their past and projected income.

NID has found that the typical woman-led enterprise that participates in its e-commerce training events straddles both the informal and the formal sector. Women pick and choose those elements of the formal sector that will enable the business entity to maintain accountability and transparency, critical for business auditing and export-trading purposes. But they also run a “shadow” business that keeps some of the income “safe” from declaration.¹¹

By implication, the application of ICT to MSE may push the business entities from informal to formal economies; and while this may be desirable from a national economy perspective, it may not be considered desirable from an individual entrepreneur’s point of view.

Members of the Uganda Women’s Finance Trust (Case Study 4) for instance, use loan-tracking software, which is diffused nationally through local post office outlets for lenders to track their account balances, and repayment plans. This part of the lender’s business is clearly “formalized” and financially documented, but that does not mean that all other elements of the business are similarly documented or accessible.

Women’s management and structure issues

There is growing evidence that generally women structure their enterprises differently from men, establishing flatter management structures, using consensus building approaches to decisions, and evaluating performance results differently.

In most APEC economies, women earn half of the household income. Women are often heads of households — in Korea, 18 percent of female workers are principal breadwinners. Three years ago as a percentage of the male rate, the female economic activity rate ranged from 94 percent in Vietnam to 43 percent in Peru, while the average for all APEC economies was 70 percent.

At the same time, women have less time to devote to their businesses than men, and are usually forced to strike a balance between work, family, and childcare. Women also tend to be more hesitant to seek counseling and advice often because these services do not target women-owned MSE, are provided in “male” settings, and are not adapted to the specific needs of women. In a number of e-commerce training events organized by NID, simply creating the space to foster dialogue between women entrepreneurs and representatives from financial intermediary services, Internet service providers, local government, and IT policymakers was of critical and timely importance. For example, at a training event in Tanzania in 2002, NID brought together 30 women entrepreneurs with the senior staff of the National Microfinance Bank who recently launched a 2.5 percent MSE microloan program of which the participants were unaware.

Cost implications and opportunity costs for women

The poor in Chile spend more on telecommunications than on water — a reflection of the perceived opportunities associated with acquiring ICT (Melo, 2000). Latest trends show consumer preference for prepaid cellular phones that do not require strong credit records and where expenditure can be controlled in detail. In several poor countries where payphones are scarce, some ingenious microbusinesses provide ambulant payphones in the form of cellular phones charging a modest markup (as in Bangladesh). In Peru, these entrepreneurs of microbusinesses make themselves more visible in public places by wearing brightly colored headwear and clothing, and

have become known as “cholos celulares” or “cellular Indians” (Melo, 2000).

Training experiences show that women entrepreneurs are prepared to invest in their own training on e-commerce — between \$10 and \$20 per participant — a measure of the desire for and value given to information and know-how. In most of these economies, \$10 is a significant amount in local currency. As costs of connectivity continue to drop, the obstacles women face typically have less to do with hefty hardware or connectivity costs and more to do with purchasing and applying the most appropriate kinds of software applications, and functioning in a policy environment that influences their access, use, and opportunities.¹² Small enterprises that understand the importance of business applications often face difficulties in making informed choices on simple business software, and resort to investing in pirated software that is substantially cheaper than off-the-shelf packages.

Summary remarks

A great opportunity exists in introducing ICT to women entrepreneurs. In many ways, precisely because of the business challenges that women face, women recognize the quantum difference that ICT could make to their business activities and are ready to adopt the new technologies. They need resource and information support to

- Assess the risks and benefits of using ICT
- Adapt ICT to both informal and formal sectors work
- Allocate time to integrate ICT into business strategies.

Integrating MSE and ICT for women

ICT-based small businesses are part of a rapidly changing market and an environment of experimentation and reinvention. ICT has introduced new ways of conducting business, such as home working via the Internet, outsourcing, and telecommuting which are especially attractive to women. Online training manuals, search engines, virtual international telephone directories,

sources of business management models, and software are all effective learning tools for women entrepreneurs.

Transformation of financial services delivery

One of the most exciting applications of ICT for the direct benefit of MSE is in the arena of extending and managing credit support to businesses. As yet, it is in its infancy. The shortage of affordable capital is one of the most critical constraints for MSE. The World Bank’s microfinance program Consultative Group to Assist the Poorest (CGAP),¹³ was set up in 1995 to respond to the demand from low-income people for access to loans which would help them to establish their enterprises on a firm financial footing. According to Women’s World Banking (Barry, 1995), to reach just 10 percent of the low-income entrepreneurs by 2025 requires lending capital of about \$12.5 billion. To reach a target population of about 180 million low-income entrepreneurs by 2025 would require about \$90 billion (current total aid transfers are valued at approximately \$54 billion, and the World Bank Group’s total disbursements in fiscal 2002 was \$11.5 billion). Microfinance is serious business. About 1200 institutions worldwide provide microcredit to 13.8 million people for a sum of \$7 billion. Nearly all the loans are repaid, with interest; loan sizes vary, but a mere \$150 is the typical amount borrowed. More than 75 percent of loans are made to women.

Like other international finance institutions, the World Bank Group has found that intermediary service models work best and has concluded that new financial products and initiatives must be designed and made available to MSE (World Bank, 2001). Arguably, communities of business networks have been ingenious in pooling resources and capital; the barter system continues to work for MSE in both industrialized and developing economies, and these models can be further extended and built upon.

The financial intermediary sector that services

small business is doing some radical thinking around extending its reach to poorer sections of the economy and taking its services to those clients who might not otherwise have access. While it is early days yet, the potential uses of IT and software systems to service the credit and savings expectations of the small entrepreneur are immense. Some of these are:

- Adapting accounting software to service traditional accounting or barter systems
- Extending credit outreach in creative ways, such as mobile banking (see Case Study 2).
- Computerizing financial reporting and performance measures to make them cost effective, transparent, and accessible to borrowers and lenders (see Case Study 4)
- Providing individual borrowers with secure account access

Mobile banking brings in a number of players together, providing interaction through connectivity and integrating with existing financial service support. The leading credit and loan agencies are keen to retain and maintain customer loyalty and to improve information flow from their clients so as to keep a finger on the pulse of their local credit rating and markets.¹⁴

Case Study 2: Mobile banking for blue collar workers, India

The Global Alliance (GA) is an alliance among the World Bank, global brands, and the International Youth Foundation. Its mission is to promote the development and aspirations of workers, mostly young women, in the global supply chain. GA's program consists of surveying workers to determine their needs and aspirations followed by intervention programs, mostly related to health, personal finances, and life skills. Early in 2002, GA entered into discussions with the International Finance Corporation (IFC) to pilot banking services among blue-collar workers in southern India, many of whom are women. The IFC is in the process of developing the plan for the feasibility study. Once a plan and budget are finalized, efforts will begin with a private bank

in India and with outside donors to raise funds for the project.

Bringing banking services directly to women is not a new phenomenon — there is ample evidence of the economic value of extending credit services to rural women, but introducing the electronic factor to the sector has major implications. It would enable women to track their own accounts, conduct their own financial planning, and maintain the transparency of accounts at both individual and institutional levels.

Case Study 3: Milk cooperative smart cards, Rajasthan, India

The all-women Dhoblai Milk Cooperative Society of Naila Village has pioneered a business accounting and payment system, using smart cards for its members. It helps maintain authentic and accurate milk supply records as well as secure payment transactions. The card has replaced the existing error-prone, paper-based records, which were open to misappropriation. Smart Chip Ltd has developed this concept for the milk collection center and has implemented it through the state-owned Rajasthan Electronics and Instrumentation Ltd. The managing director of Smart Chip Ltd explained, "There were times when their spouses or other male relatives would collect dues on their behalf, leaving them with little or nothing at all. But after the smart card revolution, this has changed. The cash can only be given to a smart card holder. It also serves as an identity card as the photograph of the woman is printed on it."

Cash flow restrictions and capital investment limitations notwithstanding, the typical MSE continues to face foreign currency restrictions and related clearinghouse broker facilities that work against crossborder trade. The application of ICT will eventually make these processes less time consuming and bureaucratic than they are now, but first the regulatory environment needs to change.

Case Study 4: Uganda Women's Finance Trust (UWFT), Uganda

Clients of UWFT are able to access their accounts at post office outlets across the country using a software package that was customized for UWFT. The LOAN PERFORMER program was initially developed as the "Trust Information System" and started as a DOS-based client data entry program in 1995. Later, the client module was rewritten for Windows95 and new modules were added. The Kampala Branch now has almost 15,000 clients and has registered over 150,000 savings transactions and 6,000 loans in their database. Development at UWFT took about three years, from 1995 to 1998. As of today, development of the software product continues, and more and more organizations want their requirements incorporated into the program. Toward the end of July 1998, LOAN PERFORMER became available as a commercial product. Since then many other Ugandan and non-Ugandan microfinance institutions have started working with LOAN PERFORMER. The installed base as of today is about 50 organizations with more than 100 sites. LOAN PERFORMER is now used by CGAP as one of the ten major off-the-shelf software packages for microfinance institutions.

Established as a trust in 1984, UWFT began operations in 1987. Its mission is to economically empower low-income women by providing a consolidated package of products and services that includes savings and credit. All of UWFT's clients live below the poverty line and 80 percent live in rural areas. The majority are in commerce (64 percent), with a smaller percentage in services (15 percent), agriculture (14 percent), and manufacturing (8 percent).

Among the first to mobilize savings from low-income women in rural and urban areas, UWFT collects savings from its clients and deposits the funds into savings and fixed deposit accounts with commercial banks. For the fiscal year ending June 2001, the portfolio outstanding was

\$3,156,515 and the amount of savings mobilized from clients was \$1,704,192. It now reaches 31,656 borrowers and 43,594 savers. Women are able to access their personal accounts at local post offices and banks at computer terminals.

Investing in training for women

Enabling women to understand the potentials of ICT in its three dimensions (Figure 1 above) is frequently the critical turning point. Too often ICT is seen purely as a set of connectivity tools, and not as networking, information management, or business system tools. In a recent survey of forty African women entrepreneurs,¹⁵ less than half felt comfortable using computers but only nine respondents did not have access to a computer. With a little keyboard training, many of these women would make use of the computer as a business tool quickly and comfortably. All the businesses responding to the survey had access to the telephone, 88 percent had access to and used electronic mail, and 79 percent had email addresses. Only one business had a web page, and another's was in process of construction. Without exception, all the businesswomen were keen to learn more, own a computer, and access Internet connectivity. About 80 percent of the businesses were in the textiles and garment design sector. When asked for specifics on their training needs, the survey respondents singled out

- Easier access to in-house training and more diffusion of basic ICT awareness
- Introduction to specialized computer packages adapted for small businesses
- Retaining trained staff and the constant need to retrain.

The women unanimously called for access to sponsorship for basic training, distance learning, and more exposure to the technologies. None of the responses contained any concern about security or legal issues, which may be because these businesses are still at the very basic level of computer use, and are not conducting any transaction over the Internet.

Table 2 presents a simple matrix of the ICT needs and training priorities of women running different sizes of businesses, gathered from training experiences in recent years.¹⁶ While by no means comprehensive, this matrix can serve as an indicator of the different levels of expertise and objectives that the World Bank may need to address for women-run MSE. The matrix, however, does not reflect the complexity of women entrepreneurs, who are not a homogeneous group. Target groups include women, women entrepreneurs, women entrepreneurs of microindustries, and women who are active in SME, MSE, and women's self-help organizations.

A summary review of the training content brings up the following:

- A primary objective should be to remove pre-conceptions about the technology.
- ICT lends itself to problem-based learning. Women are unlikely to invest the time required to explore ICT on their own, but are more inclined to ask questions and to determine their training needs in a workshop.
- MSE users still have not grasped the full implications of virtual networks, user support groups, freeware, shareware, and basic computerization software. Diffusion, and making these basic tools free and user-friendly are the first steps to taking businesswomen across the threshold to full ICT use.
- There is a growing trend toward investing in ICT training for small-scale businesswomen with new "sponsors" joining the small rank of agencies that support MSE development, such as the Inter-American Development Bank's recent initiatives for women in Costa Rica and Bolivia.

Case Study 5: The International Women's Tribune Centre (IWTC) CD tool, Uganda

Working in partnership with the International Development Research Centre's Eastern and Southern Africa Office, IWTC developed a training tool that offers direct access to information for women who are among the most marginalized

in development — poor women with little or no reading ability. The starting place for this initiative is Africa and the starting point is a CD-ROM, *Rural Women in Africa: Ideas for Earning Money*.

Networking, special interest groups (SIG), and new alliances

Given that MSE have less access to formal market-support institutions than their larger counterparts, networking is especially important. Unfortunately, in the competitive environment the tendency for the successful enterprise is *not* to network, or share information publicly, or consider strategic alliances with potential competitors. Encouraging MSE owners to pool resources or to join networks goes hand in hand with raising awareness among small scale entrepreneurs about the global marketplace where they must conduct their business.

Case Study 6: Tortas Peru

Initiated in 1996, Tortas Peru is a woman-owned enterprise that uses ICT to reach and service a wider market to sell cakes and desserts. A network of housewives takes Internet orders for their cakes and uses the net to provide baking tips in Spanish and English. The company covers the major cities of Peru, including Lima, and guarantees delivery within seventy-two hours. Tortas Peru also targets over 2 million Peruvians who live outside the country. Through their website <http://www.tortasperu.com.pe/>, clients in San Francisco or New Zealand can send a home-made cake to friends or family in Cusco, Lima, Arequipa, Trujillo, Ica, Juliaca, and Puno. The tortas are prepared and delivered by one of the housewives in the network. Customers can order a cake from a catalog and pay by credit card, check, money order, or electronic payment to the bank. The order is sent by e-mail and depending on the destination they contact a housewife-member of the network to bake and deliver the cake.

To maintain low prices, the company is based mainly on the Internet, making it necessary for the housewife-member to be familiar with computers.

Table 2. Dimensions of ICT and training needs – MSE matrix

Entrepreneur interests/ ICT dimension	Infrastructure	Interventions	Informatics and applications (training needs)
Microbusiness	Cellular phone, sometimes an email account (through public access point)	Access to micro credit scheme. potential client for mobile (phone) based financial services	<p>Usually interested in getting an email account set up.</p> <p>Wants to understand the web, the functions of search engines, how to find information, and navigate the web.</p> <p>Requires introduction to concepts of strategic alliances, and B2B (business to business) business models.</p> <p>Needs to access information on government programs, credit schemes, market prices.</p>
Small enterprise	Cellular phone, email account access at public or other cyber center	<p>Some financial intermediary services may be delivered with ICT, or by traditional means. May have graduated from microcredit schemes to formal banking and credit sources.</p> <p>Marketing through trade shows.</p> <p>Usually member of a business support organization.</p> <p>Interested in ICT policy and likely impact on business.</p>	<p>Wants to use listservs, group discussions, user support groups, and virtual networks.</p> <p>Interested in applying simple accounting software, curious about other MSE-specific applications. Looking for online courses.</p> <p>Wants to understand how software can be downloaded off the Net. Interested in “free” software until it is understood that “free” means nonproprietary as opposed to nonmonetary.</p> <p>Curious about other web sites that market products or services, digitization of images, and secure transactions over the web.</p> <p>Keen to compare business models with like-sized businesses.</p> <p>Beginning to understand the business opportunities of providing telecommunication services to other businesses.</p>
Medium-size enterprise	Cellular phone, personal computer, dial-up connection	<p>Usually a member of local Chamber of Commerce or business association.</p> <p>Usually a B2B networker, even if ICT is not applied in the network.</p>	<p>Looking at different operating systems, curious about LINUX.</p> <p>Beginning to computerize some basic business processes, payroll, accounts. A few beginning to link information systems within the business. Interested to compare and use CD ROM business tools. Most are keen to set up a business web site and build virtual company profiles.</p>

Peru has an innovative national network of public computer booths where Internet access is cheaper than phone calls. Prior to starting in the tortas business the housewives in the project have to participate in a course designed to give them the basic knowledge of marketing, preparation of the tortas, and the use of Internet tools for e-commerce. The most important experience from these courses is computer knowledge. With just three hours of instruction the women learn to use e-mail, find the web site, and interact with clients. Once they familiarize themselves with these tools, they can use public computer booths and get the information they needed.

Information-only networks

The networking element of ICT is invaluable and often understated. There are research studies that measure, or attempt to measure, the results of networking on entrepreneurial activity.¹⁷ The growing numbers of women joining, forming, and using virtual networks is almost a natural phenomenon of the Internet. At the time of writing, it is fair to make the following assumptions:

- While virtual networks of women entrepreneurs at national level tend to be information only (as opposed to commercial) hubs, some are quite sophisticated in managing information between members.
- Often a web site entity is an indication of the existence of a nonvirtual business network.
- It is impossible to measure the amount of business traffic between (informal) wireless networks, but it must play a significant part in MSE business links.
- Costs of hosting sites are still prohibitive for MSE and MSE associations and many sites continue to be hosted overseas.
- There are a number of “externally driven” initiatives to pull businesswomen together.
- Successful, self-sustaining virtual networks of women that work together under one business entity are few and far between.

*Les femmes chefs d'entreprises mondiales*¹⁸ (FCEM) (World Association of Women Entrepreneurs) was

established in 1945 and now hosts a web site that links together members from thirty-three countries. This has allowed them to be interactive; they boast a marketing list of around 45,000 members. The more recently established National Association of Women Entrepreneurs of Malaysia¹⁹ (NAWEM), formed in 1993, now has 170 members. The Alliance of Micro-Enterprise Development Practitioners²⁰ is a subsection of the Women and Enterprise section of WomensNet, a South African initiative still in the making. Organization of Women in International Trade (OWIT) is an example of a special interest group that brings together women exporters from developing and industrialized countries.

At the time of writing, there are a number of new initiatives underway. In association with colleagues in the Gender Promotion Programme (GENPROM), and with the support of the U.K. Department for International Development (DFID), a global program aimed at assisting women entrepreneurs to gain better access to international markets is being initiated. This will explore innovative approaches to help women producers and entrepreneurs to bridge the product-market divide.

The ILO's Women's Entrepreneurship Development and Gender Equality services (WEDGE) supports women entrepreneurs through a number of innovative services and alliances in Cambodia, China, India, Nepal, Pakistan, Thailand, Viet Nam, and a number of African countries that should be examined for their use of ICT.²¹ New alliances between government, financial intermediaries, and small business sectors are also in the making in support of MSE development.

Case Study 7: Industrial Information Network, Pakistan

In May 2002, United Nations Industrial Development Organization (UNIDO) launched the Industrial Information Network (IIN) in Pakistan in collaboration with SME Bank, COMSATS Institute of Information Technology²² and Small and

Medium-Size Enterprise Development Authority.²³ Poised to service the development of SME in the country, IIN aims to be the largest source of information generation, exchange, and dissemination for providing value-added support to SME in Pakistan. The SME Bank will extend its lending and other financial services and finance various projects on recommendation from UNIDO. UNIDO will help identify an agreed number of new SME clusters as well as potential “cluster development agents”. It will also provide technical expertise to improve the efficiency of the selected clusters and their members.

Assistance in improving the quality of products; access to new and unexplored markets; information on the new technology; distance learning and training opportunities for SME; and a platform for investors to invest in this sector in Pakistan were some of the benefits expected from this initiative. Information regarding rules, regulations, and laws; opening of new export avenues and virtual shops; business information centers and cybercafes where people can learn about IIN will also be made available on the portal.

New markets, increased competitiveness, virtual cooperatives

MSE entrepreneurs are hoping that ICT will transform their businesses. While these are early days yet in the use of ICT by small businesses in developing countries, there is no doubt that management information systems (MIS) and new connectivity tools are introducing changes to the ways in which small firms do business. ICT increasingly plays a role in all aspects of competitiveness: the converging technologies compensate for size and distance and enable companies to grow and “go global”. Electronic conferencing, the Internet, electronic commerce, electronic networking, and home working via the Internet are some of the key technological innovations that allow women entrepreneurs to be competitive and creative in their effort to develop their businesses.

Case Study 8: AQ Solutions, Ghana

AQ solutions is an offshore outsourcing company that provides software development and other related services through professionals working in Accra. Established in 2000 by a Ghanaian businesswoman based in Connecticut, AQ Solutions now employs twenty-five people in Ghana who service American companies. The company solicits women employees by making presentations at educational institutions and head hunting for top students graduating in computer sciences.

About 85 percent of Ghana’s ICT sector employees work in end-user support, and only about 10 percent of them are women. At the same time, while the national government supports a telecommunications policy that encourages ICT business development, employment laws in the country actually ban women from working in the evenings — and this presents a major obstacle to women’s employment in the ICT sector, particularly for those who want and need to work odd hours.

Business service providers, extending ICT support to women

Enterprise support agencies, business intermediaries, and the whole array of membership and nonmembership agencies that are broadly referred to as business service providers (BSP) can play a critical role in supporting women entrepreneurs. This is a highly neglected area, an impression that is confirmed by the Donor Guidelines for Business Development Services that state that it is a field yet to be developed (Hofstede, 2002).

Chambers of commerce and industry and small enterprise representative associations are active in practically every developing country. Compared to their counterparts in developed economies,²⁴ membership is not obligatory and they often lack the funding and the political clout required to service their members. In most African and Asian countries, it is still the government agencies that, for the most part, dominate MSE support programs.

Chambers of commerce do have the potential to play an important role in facilitating the growth of ICT-based services for local enterprises and for the markets they service, but are often under-resourced themselves. All the same, in many ways they are ideally positioned to cater to the e-business needs of MSE. They:

- Can straddle both the private and the public sectors
- Can be demand-driven, customer-led organizations
- Already provide business development services
- Are an intermediary agent that MSE have access to.

There are at least three critical areas that require expansion and consolidation:

- ICT and ICT-related services: BSP can complement their existing services — providing web-based support — by introducing an integrated platform for the services they offer.
- ICT-related services targeted at women: client-specific business services that reach out to women entrepreneurs, catering to their interests and needs, could include women-only training sessions, and incentive packages for women-run businesses.
- New alliances, user groups and networks: initiated and maintained by BSP to encourage membership and involvement of women-owned MSE, these new alliances can use ICT to pull together a number of different players. Businesswomen can be given a seat at the drawing board to make the best use of business networks.

The recommendations and examples that follow are by no means comprehensive, but serve to suggest the range of existing services that can be offered to MSE and to women to enable both to integrate ICT into their business activities.

ICT services targeted at women

It is important to recognize the different starting points of men and women entrepreneurs, so that

a BSP may cater to demand-driven client-specific needs differently. A BSP will do well to conduct regular membership drives aimed at women entrepreneurs and market client-specific business services that attract women entrepreneurs.

Case Study 9: *Centro de Promocion Integral (CEPI) business service center, Peru*

CEPI is a private services center (externally funded) that enables SME access to large orders, by coordinating the work of SME in the clothing industry. CEPI is based in a workshop especially equipped for sample products, participates in invitations to tender, and subsequently monitors the completion of orders through technicians. CEPI guarantees that orders will meet both the necessary quality standards and delivery deadlines within the SME. CEPI also supports two branches outside Lima. The system makes it possible, on the one hand, for the SME to gain new clients and, on the other hand, to transfer the production of larger orders to the smallest enterprises, thus contributing to the move toward decentralization in the region.

After eight years of operation, CEPI undertook a participatory diagnostic to acquire a better understanding of their female clients, and to know more about their business potential, family situation, and so on. The findings of this diagnostic allowed CEPI to make important gender-oriented adjustments in their services.

Case Study 10: *Association pour le soutien et l'appui a la femme entrepreneur (ASAFE), Cameroon*

ASAFE, an association to support and help women entrepreneurs, was created in 1989 to provide information, business support, and banking services to its membership of medium and small-scale business-owners who live and trade in Benin, Cameroon, Chad, Guinea, and Mali. It has focused its attention on the needs of women entrepreneurs through awareness raising, counseling, providing specific training programs such as

bookkeeping and accounting, and through delivering credit support.

The demand for ASAFE's services is not only growing, but is also changing in nature as women entrepreneurs face increasing competition in the face of globalization. With domestic markets saturated and the possibilities of using information technologies to access overseas markets, ASAFE is taking the unprecedented step of introducing an IT platform to consolidate upon and amplify its existing functions.²⁵

ASAFE realized that introducing an ICT platform to its existing functions would transform the scope, depth, and efficiency of these services, and open channels for new functions. ASAFE's ICT strategy has evolved over three phases: first, understanding how ICT might be used to support current functions; second, determining the physical infrastructure that would house an ICT platform; and third, identifying the kind of connectivity most appropriate to support this ICT platform.

Business incubation: the next step

Business incubation, arguably the next step to providing business support services, can:

- Nurture a young MSE by providing services such as raising the profile of young businesses and attracting local sponsorship, organizing trade and marketing fairs, promoting product and process technology upgrades, and managing office space on a shared, affordable basis
- Provide the financial, marketing, and design support, and the managerial training that the emerging entrepreneur requires
- Foster the internal dynamics and business networks and contacts that are critical to the launch of successful ventures.²⁶

Case Study 11: GrameenPhone, Bangladesh

At the end of 2001, Iqbal Quadir demonstrated how a venture in a developing country can be profitable to investors and provide a useful service to the community, when GrameenPhone, the cellular phone company he founded in Bangladesh,

made \$27 million in pretax profits. It turned that profit after just five years — far sooner than many industrialized country start-ups. With help from Telenor, the Norwegian telecommunications giant, and Grameen Bank, an established lender in Bangladesh, GrameenPhone began operations in 1997. Investment to date has totaled nearly \$200 million. The enterprise has two tiers: it sells phones and time to urban customers, and it sponsors Village Phone, a program in which people without phone service in rural areas take out small loans for cellphones and buy air time at cost. Most borrowers are women; Grameen Bank's founder, Muhammad Yunus, claims that women are better credit risks. The borrowers then charge other villagers the market rate to make calls. GrameenPhone now has 575,000 subscribers in 12,000 villages, and the number is rising rapidly.²⁷

Case Study 12: Gender Sensitive Venture Capital, Thailand

The Gender Sensitive Venture Capital (GSVC) project started in 1993 to introduce a new financial instrument — commercial loan and equity financing — especially to women entrepreneurs who ran small businesses. The project promotes women's ownership of business and financial assets, and trains women in entrepreneurial skills. The aim is to:

- Provide women in disadvantaged rural areas of Thailand with access to capital for enterprise development activities
- Provide opportunities for women to own assets and establish linkages with mainstream financial institutions, so that they can increase and retain control over their incomes

The project began with a seed capital of \$150,000 and has financed MSE in bread making, silk flower production, pottery, and retail fish sales.

A guide to gender-sensitive ICT development for MSE

This is meant to guide Bank task managers and other development practitioners who, it is hoped, will consider each stage from project design to post-implementation.

Stage I: A depository of information

The first stage involves building a depository of information on differences in the way men and women would run their MSE. These are suggested steps to build such a depository:

- Gather information on the role of women in financial management, local business practices, in decisionmaking and its relation to their earnings, responsibilities, and ambitions.
- Determine existing systems of financial and business management that women have access to, what kinds of business associations and service centers women already tap into, and what needs are not currently met.
- Involve businesswomen and their representative organizations in discussions on the role that ICT can play and learn more about their needs and objectives.

Stage II: Setting objectives

This stage involves processing the information gathered and setting collective objectives based on World Bank goals. When setting objectives the following need to be considered:

- Identify those women-run businesses that are viable businesses and not just income-for-survival initiatives.
- Design and conduct training “outreach” workshops that provide an “applied training” environment to enable businesswomen to understand the three dimensions of ICT in business.
- Work with regulatory bodies to determine what policies need to be implemented in order to ensure that women have equal access to ICT with men.
- Identify the support services that would prove helpful to women entrepreneurs; determine the feasibility of the World Bank Group providing and supporting some of these client-specific services.
- Determine strategies to ensure that women’s perspectives and input are incorporated into the decisionmaking processes around World Bank Group initiatives.

Stage III: Implementation

The implementation stage brings together the predetermined objectives and strategy. Outreach and access are two important features to focus on. There is need to ensure that businesswomen are encouraged to become not only end-users of ICT but also designers of applications. A community-based approach to reach out to businesswomen and their networks can provide the best means for including women from the start. Telecenters are a good example of such an approach.

Telecenters operate under many labels: “community technology centers,” “virtual village halls,” “telelearning centers,” and “telecottages” are some of them (Anderson, 1998). In the last few years, development agencies and private sector organizations have established telecenters in both rural and urban areas, to tap the growing demand for telecommunication services in both developing countries and in disadvantaged communities in industrialized nations. Telecenters usually serve a specific community. In rural areas, the target community may be a set of villages. In large cities, the telecenter may serve particular neighborhoods within the city, such as low-income areas. There are a number of telecenter initiatives that ensure that their outreach includes women or are exclusively geared toward women. Telecenters can build on these models to allocate time and space exclusively for e-marketplace activities that target businesswomen by:

- Conducting active outreach, advertising, and sponsoring training events. A side product would be increased use of telecenter services by a wider audience whose comfort level increases with each visit.
- Sponsoring training events to ensure that initial training and sensitization for businesswomen is nominal in cost, thus reaching out to the small business owner in low-income urban and rural communities.
- Ensuring physical accessibility. This includes not only reasonable and safe distances for women, but also possibly extending opening

and closing hours to reach women whose preferred times may be early mornings or late evenings. Some telecenters may also consider offering other services such as childcare facilities.

- Extending beyond training services to provide women with an opportunity to gain invaluable work experience within the telecenter itself.
- Ensuring relevance of services to business-women who must make choices among competing demands for their time. Telecenters can ensure relevance by providing training and services directly linked to women's needs, particularly those driven by economic pressures and family responsibilities.
- Continuing participation strategies. Telecenters can only serve women's needs if the barriers women face are well understood, and such understanding will emerge only with the direct involvement of women in decisions about operations and management. Women clients may identify needs and obstacles that are invisible to telecenter staff. They may also be able to help develop effective, efficient ways to meet those needs.
- Developing alliances with women's business education institutions, chambers of commerce, and other intermediary business associations that already have a strong business-women membership base.

Stage IV: Evaluation

The following key data, qualitative and quantitative, should be collected and considered in this phase:

- Collect average monthly statistics on how many women participants come to training events, how many drop out and why, how many return to further training events.
- What are the main marketing research sites that women entrepreneurs frequent.
- What software, software training, and support services do women entrepreneurs in the region prefer, and what is the upward trend in the use of ASP services.

- How have women responded to the financial and support services offered. How have they benefited personally, in the context of their family, and with respect to larger society.
- Which groups of women have or have not been reached with the services.

Stage V: Maintaining flexibility in program design

A feedback mechanism can translate the lessons learned from the previous stage into management decisions. Staff and clients should collaborate to determine if and how the program design should be changed to improve results.

How to build on the momentum

The World Bank Group has a substantial portfolio of investments in SME related activities. In the fiscal year running from June 2001 to 2002, the World Bank and the IFC together provided \$5 billion in new SME support.²⁸ The Bank clearly recognizes that small businesses are a powerful force against poverty. So far the focus has been on supporting a better business environment, capacity building, technical assistance, access to capital, and information technology. This is a foundation that can be built upon.

A number of IFC's SME initiatives include women, or have employed women's groups in cooperative business efforts. India's Self-employed Women's Association (SEWA), for example, is preparing to market its handicraft products overseas. IFC provided \$400,000 in seed capital and technical assistance to upgrade SEWA's trade facilitation center.

All the same, strategic steps are required at the policy level to ensure that the Bank addresses women's needs in all its MSE development projects. These may include:

- Incorporating the Operations Manual guidelines on gender, ICT, and MSE development, in policies that will impact project management
- Examining how the Bank's microfinance program, CGAP, responds to the specific

needs of women

- Evaluating the impact of SME initiatives on women, and providing gender-disaggregated data
- Furthering the goals of the World Bank Group in technical assistance and capacity building through service providers, by extending these services to include women
- Incorporating gender awareness in all project-reporting procedures.

By building on its commitment to the Millennium Development Goals, the Bank can:

- Champion MSE development by underpinning this to the Bank's and International Monetary Fund's (IMF) poverty reduction strategies and country assistance strategies (CAS)
- Build alliances with national governments proactive in MSE development
- Support women-run MSE, for example, through the Small Enterprise Donor Committee, which has incorporated neither ICT nor gender in its agenda so far
- Take the lead in promoting women entrepreneurs by investing in their businesses.

The Small Enterprise Donor Committee serves mainly as a forum for member agencies to share information, organize conferences, and produce documents such as the "Guiding Principles" drawn up for microfinance (in 1995) and business development services (in 2001). The Committee serves more to coordinate work that several agencies are doing in a common area, rather than to direct the work. There is interest among some of the agencies in information on how ICT and gender may relate to MSE, but at present these do not appear to be very likely areas for coordinated work. The Donor Committee could be a possible channel for disseminating knowledge that has already been developed on gender-ICT issues that relate to MSE.

In Asia, national governments have been acknowledging the roles of women-run MSE for some time now, and the APEC Readiness Initia-

tive 2000: a partnership of the Business Community with APEC economies is one of the few assessment guides that addressed policy support for MSE.

The Bank's role in today's international trade regime – a final note

The success of local efforts to address poverty depends on supportive policies that promote and sustain the economic viability of small income-generating projects, and help to develop domestic markets. The trade and investment regime institutionalized during the 1990s restricts decisionmaking at national levels in a way that is detrimental to women. Trade rules continue to favor transnational corporations at the cost of community-based, family-based, and other small-scale enterprises.

To quote a World Bank publication, *Global Economic Prospects 2002*, the average poor person selling into global markets confronts barriers that are roughly twice as high as those facing the typical nonpoor worker. The document suggests that seizing the opportunity to reshape the global trade architecture will reduce poverty and lift an additional 300 million people above the poverty line of \$2 a day. In 2002 the developed world spent \$300 billion on agricultural subsidies to its own farming communities, and \$8 billion in agricultural aid to developing countries. This is tantamount to a net reverse flow of resources from the developing world to the developed world. Until these more fundamental aspects of trade and aid relations between and within developed and developing countries are addressed, project-based assistance for MSEs will provide at best short-term palliatives.

Any work on sustainable MSE development, therefore, has to take a hard look at trade regime barriers to local economic development and self-reliance.

Notes

1. www.unifem-eseasia.org/resources/globaleconomy

2. Keynote Speech, Chamber of Commerce Annual Convention, Mohamed Muhsin, Vice President and Chief Information Officer, The World Bank Group, October 2001.

3. See the Beijing+5 Outcomes document for an analysis of the negative effects of the continuing debt crises and global economic integration on women.

4. <http://www.unifem.undp.org/trade/text/tsa8.htm> — UNDP study on Trade in Services and Women's Employment.

5. See "Engendering Adjustment for the 1990s," Report of the Commonwealth Expert Group on Women and Structural Adjustment, 1989.

6. World Bank Group Review of Small Business Activities 2001: its definition of medium sized enterprise is — up to 300 employees, total assets of up to \$15 million and total annual sales of up to \$15 million.

7. Networked Intelligence for Development, 2002, training for women entrepreneurs, background analysis, www.networkedintelligence.com

8. See Claire Maneja's thesis for impact of socio-political models on women in Kyrgyzstan is an example of the complex context for women in transition (post-Soviet) economies and how their entrepreneurial activities are culturally and economically mediated. M.A. thesis, Georgetown University. <http://cct.georgetown.edu/thesis/ClaireManeja.pdf>. See also "Women, Weaving, and the Web: An Analysis of Rural Indian Women's Agency in Attaining Economic Empowerment," *Cottage Industry — Global Market*, 2002.

9. Suggested further reading on women in informal sectors and income implications are available from fact sheets put up by "Women in Informal Employment Globalizing and Organizing" at www.wiego.org

10. Further information also available from www.wiego.org and from Simel Esim, "See How They Grow: Business Development Services for Women's Business Growth."

11. Networked Intelligence for Development, training experiences 1999 to 2002.

12. That is not to downplay the challenge of capital investment for connectivity. Most MSE, however, do not have to concern themselves about

infrastructural investment. In India, for instance a local entrepreneur with \$1000 can get a phone, PC, web cam, speakers, UPS, and printer with Indian language software. Profits of \$2/day pay for this cost. ("Connecting rural areas of developing nations," by Ashok Jhunjhunwala, TeNet group IIT Madras, conference presentation, Montreal Global Congress for Community Networking in the Digital Era, October 2002).

13. See www.cgap.org for further information.

14. Interview with Hany Assaad, Head of Micro and Small Business Finance and Financial Technologies, International Finance Corporation, June 2002.

15. Findings from a sample survey of e-commerce use and capacity at a meeting of the African Federation of Women Entrepreneurs, 2000, conducted by Networked Intelligence for Development.

16. NID regional training courses for women entrepreneurs: Cameroon 1999, Lithuania 2001, Tanzania 2002.

17. One study put together a model in which the structure of the network linking the members of a population of entrepreneurs affects the amount of knowledge each has available to apply in the process of production. This in turn affects their output, and under certain assumptions, leads to sustained economic growth. Abigail Barr, "Social capital and technical information flows in the Ghanaian manufacturing sector," *Oxford Economic Papers* 52 (2000).

18. www.fcem.org

19. www.nawem.org.my

20. <http://womensnet.org.za/enterprise/mdep.html>

21. ILO: The Services Wedge: Developing support services for women entrepreneurs. Within IFP/SEED, special emphasis is placed on "increasing economic opportunities for women", as well as on "gender mainstreaming". A unit has been developed on Women's Entrepreneurship Development and Gender Equality, or WEDGE, to spearhead SEED's work in this field.

22. www.comsats.net.pk

23. www.smeda.org.pk

24. Support for MSE in developed countries mostly comes from associations, federations and chambers of commerce. In most European countries, North America, and Japan, there is a strong movement to create small firm representative bodies that are distinct from the larger associations. The main purpose of these bodies is to advocate and lobby

governments to respond to the interests of small-scale businesses in the formulation of national policies. In many of these countries, membership in the local chamber of commerce is obligatory.

25. www.asafe.org

26. Further information available from www.unido.org

27. "Helping the Poor, Phone by Phone," *New York Times*, May 26, 2002.

28. 2002 review of small business activities, IFC, The World Bank Group, Small and Medium Enterprises Department.

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4

Women and ICT: Social Service Delivery and Political Participation

As the ICT sector unravels unprecedented benefits and opportunities the world over, a widespread concern is how do women, especially in developing countries, stand to gain from these developments. How far are women in the developing world really benefiting as passive recipients of the latest advances in technology? Are there social service delivery and e-government efforts that are tailored to benefit women in particular? Are women using ICT for awareness generation, networking, advocacy, and their own political empowerment?

There are lessons to be learned from the success and failure of other engendering efforts that can provide the basis for designing new engendering programs.

This paper is based on case studies and data from secondary sources that describe the current status of social service delivery for women through the use of ICT. They also indicate the kind of actions and proactive measures that can increase women's economic and political empowerment

with the help of the ICT. Additionally, primary data were collected for case studies such as TARAhaat where the organization was contacted directly for information.

ICT-led service delivery is expected to radically improve the delivery of social services to the poor. Services can be delivered at convenient locations saving on travel time; number of visits to delivery points can be minimized; time taken to deliver the services can be shortened. Often when government is delivering the services, corruption can be minimized and transparency enhanced. It is important to ascertain how far women benefit from such ICT-enhanced services. Do the service planners and deliverers keep women at the center of their service design and delivery efforts? For example, in the delivery of health services, are there special programs geared to women's needs? Will ICT serve larger number of women, generate greater awareness among women about child and health care, improve the mobility, reach, or effectiveness of the auxiliary nurse midwives (ANM) who deliver the medical and extension

services to poor women? Do e-government initiatives view women as a special category of service recipients with unique needs and preferences?

An equally important concern is political empowerment. Do women use ICT to empower themselves by networking, mobilize themselves as pressure groups, and give voice to their special concerns?

Social service delivery and political participation: a framework

ICT can directly help women in both social service delivery and political participation, but the role of women in relation to ICT is different in each area. In social service delivery, women are recipients of benefits arising from the use of ICT, especially through services such as health and education. Being passive beneficiaries of these services, women have little power to influence the use of ICT. It is necessary, therefore, that these services are designed and implemented keeping in mind the special requirements, convenience, and preferences of women.

If empowerment can be defined as helping people acquire “choice” and “voice”, ICT provides an excellent opportunity for women to gain both and transform their status from passive beneficiaries to interested users and participants, active watchdogs and influential advocates. ICT can be used as a powerful tool to participate in governance and in strengthening democracy. Use of ICT for political participation by women represents the enabling factor by which women can assume an active and assertive role and emerge as an influential group. ICT can help empower women by providing more information which was not available earlier. For example, the power of e-mail to bring together a large group of widely dispersed people can help mobilize women around their shared concerns. Also it is much cheaper to disseminate one’s point of view through e-mail to a large number of concerned people. All these features of ICT help contribute to women’s empowerment.

Data collection

This paper uses case studies to understand how ICT can provide greater convenience in the delivery of social services, and increase the political participation of women. Thirteen case studies were developed for this section. The case studies were selected from a variety of secondary sources that provide pointers for new policy initiatives in this area. Attempt has been made to analyze each case in terms of the context, women’s participation, facilitating and inhibiting factors, policy implications, and lessons to be drawn for engendering ICT. A conscious effort was made to include rural as well as urban experiences, and to report examples of a variety of activities undertaken in different regions and countries, especially from the developing world. The lessons indicate the replicability of these projects in a similar context. The detailed case studies are presented in Appendix 1 and 2.

Social service delivery

The case studies confirm that the use of ICT to deliver any kind of social service in developing countries is currently very limited in scope and extent. Electronic delivery of services by governments is largely confined to regulatory agencies, such as issue of certificates, licenses, and tax collection. There are very few examples of e-government where health and education services are being delivered through the use of ICT. In most of these examples there is little focus on content that is especially useful for women or on services that are primarily used by women. There are many more examples of services delivered by private sector and NGOs working in the health and education sectors. For example, in Andhra Pradesh, India, ANMs use hand-held computers or the Personal Digital Assistant (PDA) to record service data on mother and child health care and family planning. The use of PDA makes the task of the ANMs less burdensome, increases efficiency in data collection and storage, and streamlines the actual delivery of services.

Summaries of some case studies provide insights

into the use of ICT for the benefit of women in this sector. These cases reflect various possibilities for service delivery through ICT to women living in rural as well as urban areas. The cases cover countries from different regions. The technology for service delivery mentioned in them ranges from the Internet to virtual reality computer program and simple radio technology.

Case Study 1: TARAhaat, India

Started by an NGO with a strong social commitment, TARAhaat is a business entity dedicated to offering ICT-related services to the rural poor in central India. Located in a region where a traditional view of women is still pervasive, TARAhaat offers women encouragement, training, and economic opportunities through its network of franchised information-cum-education kiosks. Its web site is designed to give information on education, health, government schemes, governance, women's rights, and important issues concerning ordinary villagers. Out of the eighteen currently functional training centers that provide training in computer and Internet literacy, two are run by women, and almost every center has at least one woman instructor. Although both girls and boys attend the courses, the presence of female instructors encourages more girls to come forward for training and education in an otherwise conservative social milieu. Girl students often outnumber the boys. The physical proximity of the training centers to their homes, presence of supportive women trainers who also serve as role models for young girls, and the use of the vernacular language (since rural children, particularly girls, are not conversant in English) are some of the factors contributing to the success of this effort. Rural parents are now becoming more open to the idea of their daughters learning new skills and becoming financially independent.

Case Study 2: Virtual Delivery Room, Slovenia

The Virtual Delivery Room (VIDERO) project in urban Slovenia is a successful prototype of an Internet-based virtual reality interactive medical

training program that allows instructors to guide the delivery and resuscitation of a virtual human infant. Started in collaboration with the System Software Laboratory, Stanford University, and Hewlett Packard, the project allows trainees to learn from their mistakes without endangering lives of mothers and newborns. This convergence of the latest tools in the new medical and Internet technologies will ensure safer childbirth and improved health of new mothers.

Case Study 3: Association of Uganda Women Medical Doctors, Uganda

A study of electronic dissemination of information on reproductive health by the Association of Uganda Women Medical Doctors (AUWMD), Kampala, demonstrates how basic Internet training could help NGOs to scout for and download information on the latest advances in reproductive health, make the information easy to understand for rural women, repackage it, and print and circulate it extensively through different women's groups, especially in rural areas. The positive feedback from NGOs, clinic records, and exit interviews with clients, as also an increase in requests for smear tests at clinics in rural areas, were evidence that this combination of electronic and traditional methods of information dissemination had lifted the awareness level and health status of rural women.

Case Study 4: Rural Extended Services and Care for Ultimate Emergency Relief, Uganda

The Rural Extended Services and Care for Ultimate Emergency Relief (RESCUER) is another Ugandan initiative adopted by the Ugandan Ministry for Health, to reduce Uganda's high maternal mortality rate through improved local care and referral. Arguing that it would be impractical to provide expensive Internet facilities in rural Uganda, but realizing the importance of quick communication for maternal health, the project has installed very high frequency (VHF) radios at base stations, health units, referral hospital ambulances, and the medical officers' vehicles and given walkie-talkie sets to birth attendants.

This has been a source of empowerment for the birth attendants who can now deliver their services more promptly and can consult health officials swiftly in case of emergency. The image of midwives has improved, they can attend to many more patients, and their clients have greater confidence in them. Most importantly, maternal mortality has been reduced by 40 percent.

Does ICT make services more convenient for women to access?

In most cases, the use of ICT makes services more convenient for both women and men to access. However, no special attention is paid to the needs of women in choosing the location where such services are offered or the timings when they are offered. For example, individual entrepreneurs have set up nearly 600,000 public call booths in the last decade in India. This was a very innovative initiative, which significantly increased the access to phone services. In designing this initiative no thought was given to promoting access by women. For example, the policy did not provide any incentives to women to apply for the ownership of such telephone booths. Ownership by women usually promotes access by women. Also, the policy did not specify a preferred location for such centers. Most of the centers in urban and peri-urban areas are located in the homes of the male owners, making it inconvenient for women to use them.

Case Study 5: Gyandoot, India

The Gyandoot project, initiated by the Madhya Pradesh government at Dhar District in India, is an example of providing a platform for e-governance through Intranet links between cybercafes. These kiosks were located on the roadside of central villages, and they were maintained and run on commercial lines by youth from local villages. Using the local language, they provided information about agricultural commodities, examination results, and gave an opportunity to villagers to lodge complaints through e-mails about the inefficiencies in service delivered by government officials. These complaints

were supposed to be redressed promptly.

Though the enthusiasm and efficacy of the project have lost their initial vigor, and there was no special effort to benefit women, the project succeeded in helping a few rural women. For example, widows in villages could send e-mails at negligible cost to the local bureaucracy to put pressure regarding payment of pensions that had not been paid for several months. Small town women traders could check the latest market price for their products through the computer so that they were no longer at the mercy of middlemen.

Despite the project's potential for benefiting women, the study team could not locate a single woman user. The waning effectiveness and declining popularity of the Gyandoot project and its kiosks indicate that any well-meaning effort needs to be supplemented by hard work and prolonged commitment to the project so as to ensure its sustainability. Also, in such fledgling experiments, the space for women needs to be carefully protected. If this is not done, women tend to get crowded out.

Does ICT use promote greater use of these services by women?

Most of the service delivery applications are of recent origin and have not been evaluated in detail to determine whether the ICT use promoted greater use of these services by women. However, in one study of an e-government application commissioned by the World Bank, there is evidence that electronic delivery has promoted use by women.

Case Study 6: FRIENDS, India

FRIENDS in Kerala, India, provide one-stop service centers to collect all kinds of payments made to government agencies, including utility bills, university fees, and license fees. An evaluation of the project in 2002 showed that the number of women making such payments at the FRIENDS service centers was more (11.3 percent) than the number of women making similar payments at

departmental counters (3.1 percent). Eighty percent of women respondents indicated a preference for using the FRIENDS center. Whether this helps women in any particular way is difficult to state.

Has ICT been used to facilitate provision of services specifically for women?

In some cases ICT have been used to facilitate provision of services specifically for women.

Case Study 7: Swayam Krishi Sangh, India

Swayam Krishi Sangh (SKS) provides microcredit to women's self-help groups in Medak district of Andhra Pradesh. For the last two years SKS has been using a smart card — a plastic identification card for each member, which carries a chip that can store transaction information. The use of smart cards has made the transactions faster and more flexible as various data records that are usually stored in branch offices need not be accessed to perform the transactions. This has led to an overall increase in the efficiency and effectiveness of the microcredit program that exclusively targets women.

Can appropriate content make ICT more attractive to women?

It has often been argued that the appropriateness or otherwise of the content can make ICT attractive or unappealing to women. The following case study suggests that the design of appropriate content is an important factor in promoting the use of ICT by women.

Case Study 8: Sub-secretariat for Telecommunications, Chile

The Sub-secretariat for Telecommunications (SUBTEL) of the Chilean government launched a program of IT integration that aimed at exposing a large section of the Chilean population to computers, the Internet, e-mail and other uses of digital networks such as information sharing. Two community networks were set up in rural areas. The content as well as the locations for telecenters were chosen on the basis of a community survey.

At both locations the government partnered with local NGOs to promote the telecenters. Although one of the telecenters had to be closed down for want of financial and infrastructural support, an evaluation of the pilot project revealed that 55 percent users were women.

The high participation of women happened without any special effort, and only because the content which included health, AIDS, domestic violence, and assistance for women farmers, was of direct relevance to women. Evidently, if the program content is valuable for women, they come forward and benefit from a project. The case study underscores the importance of the content if projects are to find acceptance among women.

Political participation

ICT presents powerful tools for women in developing countries to come together and form influential groups to safeguard their own interests, assert their rights, and to give voice to their aspirations.

ICT can be used effectively for women's political empowerment in numerous ways. Information technology can be used for networking women for political and social advocacy; for reducing their isolation and giving them a collective voice; for improving women's access to information about government schemes of concern to women; and for encouraging women's participation in the political process. In essence, it enables women to find allies across the globe and to consolidate support for causes of special significance to women. The power of the new technology to support women's mobilization and information sharing was highlighted dramatically during the Fourth World Conference on Women in Beijing in 1995. Thousands of women from across the world worked electronically to develop the agenda and influence the conference deliberations. Large numbers of women accessed draft versions of the "Platform for Action" document, regional action plans, and caucus documents. Documents were downloaded, analyzed, alterations suggested,

discussions initiated, support mobilized, and consensus reached, all with considerable IT help (Gittler, 1999).

The Beijing Conference provided a major boost to networking among women's groups, particularly for political advocacy, and numerous women's groups are actively networking today. For example, Virtual Sisterhood operates in all the six official languages of the United Nations plus Japanese and German to disseminate information, give advice, and share experiences with women around the world. Women from developing countries participate with enthusiasm. The Latin American and Caribbean Committee for the Defense of Women's Rights is a new entrant, providing advocacy for women's rights. Another notable addition is a group called Arab Women Connect. Operating from Jordan, it came into existence in February 2001 and uses website, e-mail, and an electronic newsletter to raise important issues such as questioning Arab governments' official position on women. Women members of parliament in South Africa and West Africa using e-mail to build solidarity are other examples of networking for political empowerment (Hafkin and Taggart, 2001).

Since there are very few e-government applications in use, the contact between women citizens and government has not increased through the use of ICT. There are, however, examples where ICT use has improved the status of women in the family, community, and the larger society, thereby empowering them in some areas. Studies indicate that in the case of GrameenPhone in Bangladesh, the ownership of mobile phones by women living in rural areas has improved the status of the owners. In many cases women's earnings have become the main income for their families, increasing their importance and influence within the family. Both men and women in the villages are now dependent on these cell phone owners for a valued service. The fact that women owners need to take the cell phones to other homes (in case of incoming calls), deliver messages, and

remain privy to many conversations, has given them more awareness, knowledge, and power in their communities.

In the case studies reported here, there are many examples of web sites being used by women's groups to carry on discussions on gender-related issues. Women also use the web sites to draw public attention to government policies that need to be changed. It is possible that the maximum impact of ICT on women is in the area of political participation and networking.

Case Study 9: Chasquinet, Ecuador

A nonprofit organization, Chasquinet in Santa Rosa, Ecuador, demonstrates how ICT could be used to protect the economic interests of poor women, empowering them to assert their rights and build international support for their cause. When the livelihood of the women who harvest mussels from the mangroves of Santa Rosa was threatened because the town mayor decided to buy the mangroves to build shrimp farms in violation of local environmental laws, Chasquinet and leaders of the Mussel Pickers Association decided to garner support for their cause. Women members were trained in local telecenters to carry forward the information campaign. These impoverished mussel pickers needed to be convinced that they had the right to make legitimate demands and feel valued as women. Through sustained training and encouragement, and with guidance, these women could use the Internet to launch an information campaign and draw the attention of ecological activists in Latin America and the Caribbean to their plight. As a result of the pressure mounted through women's use of the Internet and other information outlets, the government had to issue a directive ordering a halt on the construction of shrimp farms.

Case Study 10: Women's Information and Communication Technology, Kenya

The objective of the Women's Information and Communication Technology (WICT) project in Kenya was to develop a methodology to enable

the poorest members of the community to participate in decisionmaking at the policy level through the use of ICT. The project was based in some informal settlements for the poor in Nairobi. These settlements suffered from overcrowding, disease, poverty, and lack of basic amenities like electricity and running water. Though many women played a key role in community development and neighborhood improvement, women's concerns were completely ignored by the policymakers in the government. The WICT project focused on creating opportunities for participation by these poor women at the policy level. Selected women from these settlements were given extensive training in the use of the video camera and other related skills such as script preparation. They made videos in Swahili titled "Telling Our Story", which vividly captured the reality of living in these settlements. Launched ceremoniously in an assembly of policymakers, these videos became powerful tools for women to share their viewpoints and influence the thinking at the policy level. The women who made these videos have acquired a reputation for their thoughtful and authentic reporting of immediate problems. In times of civic unrest they are invited to cover the events and officials often seek their advice and suggestions. They earn additional money from the documentary assignments they receive from time to time. Many young girls see their new skills and growing professionalism as possible career options.

Case Study 11: Modemmujer, Mexico

Modemmujer, the women activists' e-mail network in Mexico, used the Internet to generate support for a rape victim, Claudia, to save her from possible imprisonment of 15 years for her act of self-defense that resulted in the death of her would-be rapist. Modemmujer has alliances with nearly 400 women's organizations, activists, and academicians across Latin America. It updates members on women's activities, events, announcements, and documents, and provides analytical summaries of scholarly work and NGO reports. It reaches out to provide support to

women through the Internet despite the physical distance separating them. In case of Claudia, Modemmujer spread the word through the Internet about Claudia's suffering as an under-trial prisoner and her poignant words: "If I'd known I was going to live this nightmare, I would have let him rape me," to mobilize support from hundreds of women and organizations across Latin America and North America. As a result of strong local and international pressure generated through the Internet, Claudia was given her freedom.

Case Study 12: Bayanloco Community Learning Centre, Nigeria

Bayanloco Community Learning Centre (BCLC) trains women in rural Nigeria to use ICT for peace and poverty alleviation. With the help of the Fantsuam Foundation, a community-based, community-sustained computer center was started to train rural women in using ICT for income generation and networking against communal violence. It was realized that the fast communication between women could save lives in an emergency. Now there are plans to provide scholarships to rural girls to pursue IT training, and to start Community Learning Centers for women in other local communities.

Case Study 13: WomensNet, South Africa

WomensNet in South Africa demonstrates how ICT can be used not only to exchange gender information but also to empower women and work toward promoting gender equality. Thirty-three women from different organizations in South Africa participated in developing the mission statement and a blueprint for the WomensNet. Reviewing the experiences of "empowered women" who could not exploit ICT, especially the Internet, they concluded that it was not sufficient to just upgrade the technology and the medium; the content was equally important. While WomensNet is dedicated to promoting the development of South African women through active participation in community affairs, activism, leadership, and developing awareness about

law, public policy, and legislative proceedings on women's issues, it lays special emphasis on information content to make it useful particularly to women.

Impact of ICT on service delivery and political participation

The use of ICT for any type of service delivery by government or nongovernment organizations is evidently in its infancy. Perhaps no more than a few hundred service delivery applications exist today in all the developing countries of the world. Because of the small scale of these applications the impact on the citizens is minimal, and any gender impact is unlikely to be discerned at this stage. In some cases of e-government women have emerged as unintended beneficiaries. For example, in Brazil's efforts to provide e-government services in rural areas of Bahia, because men migrate to cities to seek employment and women constitute the predominant rural population, women happen to gain most from the visits of the mobile SAC (Assistance Service Center) unit. The SAC is a large truck equipped with a computer and other facilities to provide birth certificates, identification cards, labor identification cards, and criminal record verification to the rural community at their doorstep. It remains parked near a rural community for a few days before moving to the next rural area; and most of the users are women because most of the men are away. Examples of conscious incorporation of women-friendly policies and practices in e-government are almost nonexistent.

From an analysis of the applications of ICT for social service delivery and political participation presented above, the following conclusions can be drawn:

- ICT applications do not necessarily have to include the latest technology. The relevance, usefulness, and functionality of the applications are more important. Thus a hybrid approach combining, for example, the Internet for accessing relevant information and traditional methods for information dissemination can have a positive impact.
- An understanding of women's needs for social service delivery and an imaginative use of appropriate technology such as VHF radios for midwives in remote rural areas can show dramatic results in reducing mortality rates. Thus a judicious application of relevant technology, even intermediate technology, can have a much greater impact than a preoccupation with the latest technology for its own sake. In order to be successful, ICT interventions need to be primarily need-driven, and not technology-driven.
- ICT not only improves social service delivery, but also helps initiate social change when dedicated women acting as role models inspire young girls to emancipate themselves and move towards financial independence.
- For ensuring sustainability, initial high enthusiasm needs to be backed by prolonged commitment and effort, otherwise even well-meaning efforts will fail to take root. Planning for sustainability is as important as planning for initiating an intervention through ICT.
- ICT projects meant to benefit women can succeed, provided women are consulted and involved both at the design and implementation stages, and their concerns and requirements are addressed through the project.
- ICT can be also used as powerful tools to generate collective support for women's causes.
- ICT can help women find a voice and exert pressure on policymakers to incorporate women's perspectives and concerns.
- Relevant content for women should be a priority in ICT projects and components. When content is managed consciously, women themselves become eager to seek out a particular service and benefit from it.
- Although current access of women in developing countries to ICT-supported social services and political participation is severely limited, there are some success stories that show that if ICT use is grounded in local reality and if the technology is used imaginatively, women have much to gain from the effort.

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APPENDIX 1

Case Studies on Social Service Delivery

Community telecenters, Chile

Chile, with a population of 14.6 million, is facing the same challenges as other developing countries in building its IT infrastructure. On the one hand Chile's teledensity has tripled during the last decade; on the other hand, the digital networks are usually found either in large companies or in government agencies.

Over a period of time, in an effort to embrace computerization, the government departments modernized the IT infrastructure but not in a uniform manner. This became a major challenge to the implementation of any e-government initiative. Initially e-commerce was not perceived as a viable alternative because it required legal reforms as well as a regulatory agency which could standardize transactions and ensure transparency. The government's ability to formulate a strategy to put itself online for G2G (government to government), G2P (government to public), and G2B (government to bank) transactions was also restricted. To overcome these problems, the Chilean government established an intergovernment committee, regulated by the Ministry of Economy with the participation of other ministries, to coordinate a new IT Policy. Since the cost associated with IT remains the principal factor in the digital divide, the committee decided to focus on providing IT infrastructure and services to the sectors that had insufficient resources, such as small business, and regions or segments of society that lack adequate access to information and knowledge.

The Program of Information Technology Integration aims at promoting IT development and exposing a large portion of the population to the use of digital networks. The Sub-secretariat for

Telecommunications (SUBTEL) created a development fund for technology, managed by the Industrial Engineering Department of the University of Chile. The fund is meant to provide rural areas with access to information and services through the telecommunication networks. Chile implemented the *Redes Comunitarias* (Community Networks) as a pilot project. An interdisciplinary team led by *Informatica Educativa de la Frontera de Temuco* implemented the project. In 1997, the government started two community telecenters as part of the project.

The aim of the pilot project was to define the information and service needs of the community, develop a prototype of services that can be used as the basis of a community information network, and work out an evaluation process to measure the impact of the telecenters. It took two years to plan, implement, and evaluate the pilot project. The telecenters were located in two towns, Temuco and Cunco. An operator was employed to facilitate access to the services at each telecenter. At both the locations, the government partnered with local NGOs and associations to promote the telecenters and evaluate the impact of the project on the community.

The evaluation found that 55 percent of the users were women. Health, AIDS, domestic violence, assistance for women farmers, education, and services were the major areas in which people sought information. Support from the mayors in both towns, particularly Cunco, was really helpful. However, the lack of initial support from the mayor of Temuco in cofinancing the project, as well as poor promotion, reduced the user rate.

The enthusiasm, commitment, and quality of telecenter operators along with the efficient management and development of the content proved useful. The government's awareness program for promoting the telecenters through radio, local officials, and opinion leaders also helped. At the same time local businesses and associations received some publicity while promoting awareness of the telecenters.

Keeping pace with the new technology proved difficult, and contributed to the failure of the Temuco telecenter. It was observed, however, that in general the utility of the telecenters could be improved by providing more relevant content and services.

The telecenters proved more beneficial to individuals rather than organizations. A number of local organizations were situated too far away from the telecenters to derive any benefit from them. Moreover, there was a dearth of information that would have helped these organizations, as some public services were unwilling to share such information. In other cases, information input consumed too much time. As the local governments lacked enough resources to maintain the centers, partnering with the local NGOs and universities became a worthwhile option.

The study suggests that despite no emphasis on a particular segment of the population, women emerged as prominent beneficiaries of the program. Health (AIDS, domestic violence), assistance for women farmers, education, and services — the major areas in which people sought information — were all areas of interest for women.¹

Inhibiting factors

- Lack of financial support from the mayor of Temuco and poor promotion at initial stages of the project.
- Inability of many local organizations to use the telecenters as they were situated at a distance and proper information about them was not available.
- Unwillingness displayed by some public services to share information.
- In some cases the inputting the information was too time consuming.
- Local governments alone did not have enough resources to maintain the centers.

Facilitating factors

- Support from the authorities, particularly the mayor of Cunco

- Participation of local businesses, associations, NGOs, and universities
- The enthusiasm, commitment, and quality of telecenter operators
- The efficient management and development of the content
- The government's awareness program for promoting the telecenters

Lessons learned

- If the content is relevant for women, they come forward to participate and benefit from a project.
- When local governments lack infrastructure or resources for an ICT project, partnering with the local NGOs and universities prove helpful.
- Keeping pace with new technology is difficult but necessary for sustaining such efforts.

Gyandoot, India

*"Digital empowerment is prodding slothful administrations to become more accountable. In Premnagar, Dhar, Rami Bai, 87, a destitute widow and two neighbors didn't get their Rs 150-a-month old age pension for four months last year. The three trudged to the nearest cyber-kiosk and paid Rs 5 each to e-mail their complaint to the administration. The next day, a team of officials landed up at the village and found out that 47 other villagers were sharing Rami Bai's plight. Since Gyandoot kicked off a little over a year ago, over 6,000 e-mail complaints have poured into the central server of the district administration at Dhar."*²

The Gyandoot project initiated by the Madhya Pradesh Government at Dhar district in India provided a platform for e-governance through Intranet between twenty-one rural cybercafes or kiosks known as *Soochanalaya*. Presently, there are thirty-eight such kiosks, and the youth from local villages have taken the responsibility of running a majority of these cybercafes on commercial lines. Those who run the *Soochanalayas* are known as *soochak*.³ The Intranet is spread in nine out of thirteen Development Blocks in Dhar.

The kiosks, which are located on the roadside of the central villages, serve a population of over half a million. They provide prices of agricultural commodities, and central examination results, as well as register complaints via e-mail in the local language. Women may file complaints regarding their problems through the network using e-mail after paying five to ten rupees. The complaints are about anything from pensions for widows, to broken down tubewells, and paperwork for housing or land. The government officials are held accountable since their superiors get a copy of the complaint. Some *soochaks* have come up with a basic computer course for girls, for which a fee is charged. The girls are also able to use the kiosks to access their school-leaving examination results for a payment of ten rupees.

The information available at the kiosks is timely and easily accessible. However, with the lack of power supply and a raging drought in Dhar district for the last three years, a majority of villagers are facing acute poverty. Thus, even spending five to ten rupees at the kiosks is not always feasible. There is a clear lack of motivation among the villagers, and this is a major drawback.

A recent evaluation of the Gyandoot rural telecenter project had disappointing results. The team reported that only three kiosk owners out of thirty-eight were women. Of these, ownership by two women is in the records, but in actual practice men run the two kiosks. There was no special effort to recruit women. The only kiosk run by a woman was failing to attract users. Users made the largest number of complaints against this particular kiosk. There was no conclusive evidence that the complaints made were a result of a male bias against a women owner (as suggested by the owner) and not on account of poor service, such as not keeping the center open or not being helpful (as suggested by the male users).⁴

Out of the thirty-two users surveyed, not a single woman user could be located, although anecdotes

were narrated to the study team of how a few widows had been helped by the system in expediting their pension.

Inhibiting factors

- Dearth of power supply
- Drought in Dhar for past three years
- Lack of motivation for the villagers to use these kiosks

Facilitating factors

- The formation of an Intranet connecting twenty-one rural centers helped at the initial stage.
- Information is available in a language easily understood by the villagers, especially women.
- Rural youth showed interest in learning the new technology and running the kiosks.
- Easy and timely information is available to the farmers.

Lessons learned

- A program with great possibilities can fail because of lack of monitoring.
- Easy access to senior officials made for greater accountability in government service provision.
- The fact that women were not really involved in the program meant that a large percent of the population was left behind.
- It is important to motivate the beneficiaries to sustain such a program.
- Contextual and environmental factors such as drought can adversely affect the fate of such projects, especially in rural areas.

TARAAhaat, India

TARAAhaat is a business entity with strong social commitment. Development Alternatives, a development agency, and its marketing wing Technology and Action for Rural Advancement (TARA) promoted the project. TARAAhaat became operational in September 2000 in the Bundelkhand region of central India. Its success prompted the promoters to start another similar venture in Bhatinda, Punjab.

Bundelkhand is the second poorest region in the country. As elsewhere in rural areas, girls are trapped in a situation where parents do not see much point in educating them. Thus education and subsequent self-sufficiency remain a distant dream for most women. In addition, the lack of infrastructure further denies the rural poor, especially the doubly disadvantaged women and girls, an access to education, information, and employment, the three most powerful tools for empowerment.

One of the major objectives of TARAhaat was to help rural women overcome their social obstacles through a network of franchised information-cum-education kiosks called TARAkendas. TARAhaat's homepage, <http://www.tarahaat.com/tara/home>, is user-friendly and can be handled even by a relatively less-educated person. The web site is intended to give information on education, health, government schemes, governance, women's rights, and other important issues concerning an ordinary villager. A woman can be an instructor or a counselor for students, or even a TARAkendra owner.

Three determined and enthusiastic sisters, Rajmani, Madhuri, and Priti (also known as the Punavali sisters), from an upper class family in the remote rural area of Bundelkhand, trained themselves in using IT. Presently they run a TARAkendra in their home where PCs are installed and basic computer education is given to the villagers. One of the sisters is studying for her graduation, while the other two have already completed their post-graduation in sociology. Because of these girls, nearly all the family members know how to use a computer and the Internet.

The dynamism of another woman, Vimender Gill, led to the establishment of a TARAkendra at the Chak Fateh Singh Wala village of Bhatinda district in Punjab. The clientele are mostly women and children. The courses developed by TARAgyan, the education division of TARAhaat, are offered in the local language (Hindi or Punjabi) and are designed to allow the learner to follow at her own pace. Certificates are awarded on completion

of the course. The villagers are demanding more such courses.

Currently there are eighteen TARAkendas in Bhatinda and Jhansi out of which women run two (one each at Bhatinda and Jhansi). Almost every TARAkendra has at least one female instructor, or center manager, or counselor. Although both boys and girls take the courses, the presence of women instructors has encouraged more girls to come forward to attend the courses. Further, the fact that the TARAkendas are not far from their homes has encouraged many girls to come forward to attend. At times girl students far outnumber boys. To date 160 girls have completed their basic IT course consisting of MS-Office and Internet training. These numbers may be small but they represent a major achievement for these children, of whom 80 percent had never seen a computer before entering a TARAkendra.

Many girls are coming forward to use the TARAkendra facility for sending e-mail or browsing the Internet. Many have enrolled in higher education through distance learning schemes offered by different universities. Their experiences at the facility have triggered this desire for higher education. The successful experiences of these girls have led rural parents to take increasing interest in sending their daughters to learn new skills, so that they too can be financially independent. Thus TARAkendas are ushering in a visible attitudinal change in some rural areas.

There is a plan to form a women's club at Bhatinda where women belonging to the local community can meet periodically at the TARAkendra to share their experiences. Some needs can also be identified through these experiences and can later be addressed by the experts.⁵

Inhibiting factors

- There is widespread resistance to girls' education.
- Lack of infrastructure is a pre-existing problem in rural India.

- The operations are costly, thus setting quality standards and bringing uniformity in the growth of the project became a demanding task.
- There is a lack of quality instructors who are willing to work in villages.
- Technical problems include having to provide information in multiple languages.

Facilitating factors

- Having women as trainers or in some other leadership position in the TARAKendra encouraged more girls to come forward.
- Not having to travel too far, and having the center close to home helped more girls to join the course.
- Conducting the classes in the vernacular language made it easier for the students, none of whom were fluent in English.
- Keeping the training program simple and flexible helped diminish the fear of the computer. Flexibility enabled the students to follow a learning pace that they could comfortably handle without getting intimidated by the technology.

Lessons learned

- It is important to have people who are deeply committed to women's empowerment through ICT. The Punavali sisters and Vimender Gill played the role of catalysts.
- Initial experiences of success are important as these women become opinion leaders and can persuade other girls and women to come forward to benefit from ICT. They are also seen as role models.
- Locally designed content can make learning easier. Courses developed by TARAGyan could be followed easily as they were in the local language and contained local flavor.
- Initiatives such as TARAhaat can change social perceptions: families became interested in sending girls to TARAKendras once they realized that the knowledge will help the girls to earn an income.

Virtual Delivery Room, Slovenia

“Although pregnancy is not a disease, it does pose risks to the health and survival of a woman, in addition to the risks faced by the infant she bears. These risks are present throughout the world and in every setting. In developed countries they very rarely lead to death or disability because every pregnant woman has access to special care during pregnancy and childbirth. This is not the case in many developing countries where each pregnancy represents a journey into the unknown from which many women never return.”⁶

According to WHO figures (1998) almost 1,600 women die from the complications of pregnancy and childbirth every day across the globe — a total of 585,000 women every year. For every 100,000 live births globally, there are 430 maternal deaths. In developing countries the figure is 480, while in developed countries there are only 27 maternal deaths per 100,000 live births.

The System Software Laboratory at the Faculty of Electrical Engineering and Computer Science of Maribor City in Slovenia, along with Stanford University and Hewlett-Packard, has created VIDERO (Virtual Delivery Room), a prototype for medical training in virtual reality. The prototype provides a virtual environment of a delivery room with all the necessary medical devices and instruments. The prototype was installed at the Lucile Packard Children's Hospital at Stanford University in October 2000 and functional testing is currently under way.

VIDERO is a successful prototype of an Internet-based, virtual reality, interactive medical training program that allows instructors to observe and guide trainees from a distance in resuscitating a virtual human infant or in dealing with common normal and abnormal clinical scenarios during a virtual birth. As virtual patients are not real women, the trainees can make mistakes and then learn from them without endangering human lives. The VIDERO prototype is being evaluated by the medical students of Stanford University.

The trainees use the program's features, such as 3-D modeling, motion tracking, and live communication between instructor and trainee, to experience the realistic web-based training program, where they can identify an intervention, apply it, and see the results in real-time. Navigation is available through either standard browser interfaces or a special tracking device combined with a head mounted display.

Inhibiting factors

- The project may suffer due to lack of economic self-reliance.
- Internet connectivity and advanced technology has not yet reached a major part of the developing world where such an innovation can prove to be life-saving.

Facilitating factors

- Commitment of and initiative taken by leading scientists
- The experience of successful collaboration in the past among the research partners

Lesson learned

- An innovative technology-based solution can have the potential for reducing maternal deaths in developing countries.

Association of Uganda Women Medical Doctors, Uganda

The Association of Uganda Women Medical Doctors (AUWMD), Kampala is an NGO working toward improving the health of women, youth and children in Uganda. It undertook an ICT project in 2000-2001 to electronically disseminate information on reproductive health issues to women's NGOs. Four members of the association were trained in basic e-mail and Internet skills. They now scout for relevant information on the Internet, download it, repackage it to make it readily and easily usable for the women's NGOs, and e-mail it to the NGOs. The NGOs download information on latest developments in reproductive health, and circulate the printed information to their staff and different women's groups, particularly in rural

areas. This also helps promote networking among women's groups and women's NGOs.

The NGOs can send their feedback through e-mail. There are occasional online queries from the NGOs showing an increased desire to use such information. Clinic records and exit interviews with clients, as well as an increase in requests for smear tests at clinics indicate that awareness and concern for reproductive health are increasing among women. This suggests that a combination of methods, such as dissemination of the latest information electronically from the AUWMD to the NGOs, and through traditional methods from the NGOs to rural and urban women, can have a salutary effect.

Inhibiting factors

- The paucity of IT skills and infrastructure.
- Not all women's NGOs have a computer and network connectivity.

Facilitating factors

- The fact that the association members and NGO office bearers are educated is a major help. The only additional effort required is a brief training in using the Internet for browsing and e-mail.
- Availability of computers at the AUWMD and many women's NGOs.

Lessons learned

- This experience shows the tremendous power of the Internet and how with a little imagination, a simple application can lift the awareness level and health status of women.
- Instead of using an either-or approach, hybrid forms of communication channels combining Internet and e-mail with traditional methods of information dissemination such as hard copy can be a creative, less costly, and effective approach.
- This approach is particularly useful in areas such as health where it is important to have the latest information available in the shortest time, and it may not be possible to provide ICT

training to all possible women beneficiaries.

Rural Extended Services and Care for Ultimate Emergency Relief, Uganda

The United Nations Population Fund (UNFPA), Uganda's Ministry of Health and Population Secretariat, and Iganga district authorities together initiated the Rural Extended Services and Care for Ultimate Emergency Relief (RESCUER) program. RESCUER is part of the Ministry's effort to reduce Uganda's high maternal mortality rate (506 per 100,000) by improving local care and referral systems. Around 80 percent of 17 million people in Uganda live in rural areas where the fertility rates are high. Traditional midwives, relatives, and friends handle over 60 percent of child-births.

Communications, transport, and quality health services are the three components of this project. The communication system uses VHF radios installed at base stations, health units, referral hospitals, ambulances, and the District Medical Officers' vehicles, while the walkie-talkies are with the birth attendants, to be used variously for help from more experienced medical staff.

According to Maria Musoke, an information specialist who studied the communications component of the pilot RESCUER project in eastern Uganda's Iganga district, training of the birth attendants was structured according to specific needs of a community that survives with few health care amenities. It was a refresher course for the midwives as some of them had been out of school for ten years or more. All health workers were given special training for using the communication equipment.

The authorities started the project by creating health awareness and providing basic training. People began to see other benefits in the project too. Earlier if a refrigerator broke down one had to travel miles for repairs, but now a technician could be sent down to do the job with just a radio call. Communication had a significant contribution in the success of this project. If transport failed, a midwife's presence and the communica-

tion system played a vital role in saving lives. The birth attendants consulted health unit officials who, in turn, consulted colleagues and seniors. The walkie-talkie technology proved to be a great source of empowerment for birth attendants. It not only improved their image, but also built confidence in their clients and helped them attend to more women.

The initial cost of the project was below \$124,000 (including the cost of the equipment and training for technicians and users). In the later phase, the running costs reduced. The system utilizes solar energy for electricity. After the initial investment the usual maintenance cost is small and easy to bear, which indicates that even if the donors pull out, the project will survive.

The project has succeeded in reducing the maternal mortality rate by as much as 40 percent over the past three years. Another significant development is that now health personnel are able to call and get practical advice even when no vehicle is available. The project has also helped to overcome the major problem of absenteeism among the health workers. Moreover, these calls are heard on the other receivers too, including the one at the Chief Medical Executive's office. The senior officers contact the responsible officer in case a call is not taken care of within about thirty minutes. Because of the positive results, the RESCUER project is already being replicated in three other districts, and there are plans to extend it to thirty more districts in the future.⁷

Inhibiting factors

- There are problems of transport in rural Uganda.
- Around 80 percent of 17 million people in Uganda live in rural areas with a high fertility rate.
- The traditional birth attendants are illiterate.
- Some of the midwives have been out of school for ten years or more.

Facilitating factors

- UNFPA, Uganda's Ministry of Health and Population Secretariat, and Iganga district authorities took the initiative.
- A multidimensional approach in responding to different abilities and needs through intermediate technologies helped a lot.
- After the initial investment the maintenance cost is small and easy to bear.

Lessons learned

- Radio can play a vital role in improving basic health and reducing the rate of maternal deaths.
- Even if the donors pull out, the project can survive due to low maintenance cost.
- By providing convenient and appropriate means of communication, the project has reduced the severity of the problem of absenteeism in the hour of need.

Notes

1. "Community Telecenters: The Chilean Experience," developed by the University of Chile for the Sub-secretariat of Telecommunications, rough translation, 1999.
2. "Digital Empowerment: Seeds of E-Evolution," *Outlook*, April, 2000.
3. A Block may consist of hundreds of villages. A number of such Blocks come under Dhar District in Madhya Pradesh.
4. Data compiled by Center for Electronic Governance, Indian Institute of Management, Ahmedabad (India) during its survey on Gyaandoot, Dhar, May 2002. Other sources: <http://www.cddc.vt.edu/knownet/articles/womenandICT.htm>; http://www.fao.org/sd/2001/KN0602a2_en.htm; <http://gyandoot.nic.in/gyandoot/intranet.html>
5. Document and e-mail from TARahaat — Surender Rana, 8 May 2002.
6. WHO Press Release, 6 April 1998, World Health Day highlights, "Scandal of 600,000 maternal deaths each year." Other sources: <http://storm.umi-mb.si>, <http://www.who.int/inf-pr-1998/en/pr98-33.html>
7. <http://www.un.org/ecosocdev/geninfo/afrec/vol13no4/26musoke.htm>; George Koomson, "Telemedicine in rural Uganda". Koomson is the editor of *African Agenda*, an Accra-based bimonthly magazine published by the Third World Network Africa Secretariat.

APPENDIX 2

Case Studies on Political Participation by Women

Women mussel pickers of Esmeraldas, Ecuador

The high cost of telecommunication infrastructure is one of the greatest barriers faced by Latin America, particularly countries such as Ecuador. Telecenters have the potential to bridge the gap between those who have access to technology and those who do not. Telecenters (housing between one to ten computers with modem access to an Internet service provider) act as community-access points to the Internet. A telecenter not only responds to the communication and information needs of a community, but is also a measure of the ability of the new technology to accelerate social equity and economic development at the grassroots.

The Santa Rosa Association of Female Mussel Pickers is a group of 120 women whose primary work is to harvest mussels from the mangroves. A majority of these women have minimal formal schooling; most have only basic education, while some are illiterate. Many have children who work in parking lots, taking care of cars at the nearby beach resort of Muisne. Only a few children have attended school. On average, each woman collects nearly thirty mussels an hour and gets \$2 per pound from the middleman. The meager earning is what the women and their families survive on.

In 1999, the mayor of the town decided to buy the mangroves to build shrimp farms. He disregarded Ecuador's environmental laws which have designated the mangroves as bioreserves and prohibit their destruction and commercial development.

Upon learning about the situation of these women in Santa Rosa, Chasquinet got in touch with the leader of the mussel pickers' association and offered help.¹ It was soon realized that the most important step was to spread the word around on what was happening in Santa Rosa. This was a challenge as the mayor and the powerful owners of the shrimp farms controlled the local media and major communication networks in the area. Therefore, a campaign was designed to catch the attention of ecological activist organizations such as Greenpeace, Green Alert, and others in Latin America and the Caribbean, and persuade them to pressure the government to enforce the laws guaranteeing protection of the mangroves. To kickstart the movement, Chasquinet used its telecenters at Esmeraldas and trained the women in carrying forward the information campaign.

Initially, the women were skeptical because they were computer-illiterate. Another part of the campaign was to use other mass media, such as radio and newspapers, besides the Internet. Radio Netherlands, Inter Press Service, Pulsar Information Agency, and some other media and information outlets were targeted. Eventually, Greenpeace came to the rescue of the mussel pickers, and ensured that the Ecuadorian environmental laws were enforced to protect not only the women in Esmeraldas but also other poor communities. Greenpeace continues to serve as an international observer in Esmeraldas. Most of the women in Esmeraldas have been through difficult life experiences. It was hard to elevate their self-esteem and keep their spirits up throughout the campaign. They needed to know that they have the right to make demands and feel valued as women workers.

As their culture is primarily oral, the women ended up writing long treatises on the Internet that failed to make a strong initial impact and draw people's attention to the gravity of the situation. They were then taught to adopt appropriate ways to communicate through the electronic media. Improvised training methods were required,

founded on local realities and the culture of Esmeraldas.

Eventually, as a result of the pressure generated by the women's groups through the Internet, the government issued a directive, ordering a halt to the construction of the shrimp farms. The women could work again in the mangroves.

Today the local women regularly use the telecenter installed by Chasquinet. They continue collecting mussels in their mangroves and use the telecenter as a meeting point to share their everyday problems. Interestingly, the children too started taking advantage of the telecenter after being encouraged by their mothers. Meanwhile, the Internet remains a very useful forum to carry out public campaigns on burning issues at the grassroots by bringing a community's struggle and appeal for solidarity and support to a global audience.²

Inhibiting factors

- The high cost of telecommunication infrastructure
- The local media and major communication networks in the area being controlled by the mayor and the powerful owners of the shrimp farms

Facilitating factors

- Chasquinet's initiative in helping the mussel pickers
- Intervention by Greenpeace which ensured that Ecuadorian environmental laws were enforced
- Improvised training methods for the women in harmony with the local realities and particular culture of Esmeraldas
- The encouragement given by mothers to the children to learn more that led them to take advantage of the telecenter at a later stage

Lessons learned

- Telecenters have the potential to bridge the gap between those with access to technology and those without.

- Improvised training methods grounded in local realities and culture can empower the poorest and the most disadvantaged.
- The Internet can play a key role in bringing a community's struggles and their appeals for solidarity and support to a global audience.

Women's ICT project, Kenya

The objective of the project in Kenya was to develop a methodology for enabling the poorest members of the community to participate in decisionmaking at the policy level through the use of the ICT. The Intermediate Technology Development Group initiated the project on Women's Information and Communication Technology (WICT), and the Kenyan initiative was one of three pilot projects; the other two were implemented in Peru and Zimbabwe.

The Kenyan project was undertaken in some of the informal settlements for the poor in Nairobi. Living conditions in these settlements are characterized by overcrowding, poverty, disease, and a lack of access to modern amenities such as electricity and running water. Although women form half the population living in these slums, and, in addition to their maternal responsibilities, many of them are also heads of households, policymakers in the past had completely ignored them. This was despite the fact that in these settlements, women often played a key role in community development activities such as neighborhood improvement, waste management, and self-help groups.

To correct this situation and give women a voice, the WICT pilot project focused on the participation of these women in policymaking with the help of ICT, using interactive video as a tool for women's empowerment. After careful scrutiny and planning, two settlements were selected for the pilot project, and two women's groups identified. Twenty women received training. Many of them were over fifty; several were illiterate; a majority were single and sole breadwinners in their families. Some were responsible for looking after grandchildren who had lost their parents to

AIDS. Some women operated grocery stores, kiosks, and second-hand garment sales.

The women were given extensive training in using a video camera and other related skills such as script preparation. Armed with these skills, the two women's groups made two videos of fifteen minutes each, capturing the problems and aspirations of women in these settlements. Titled "Telling our story" and made in Swahili, these videos depicted their everyday struggles and challenges. The videos also captured favorable features, such as women's income-generating activities and community service initiatives (including a saving scheme in one of the settlements to acquire land for permanent housing). The videos were shown at an assembly of policymakers and planners, representatives from NGOs, the private sector, and local functionaries.

The experience gave the women a feeling of empowerment. Today, if there is civic unrest, these groups of trained women are often invited to cover the happenings, and offer their suggestions and advice. They have entered into arrangements with a leading Kenyan broadcasting company to supply development videos. They often shoot video and supply clippings of newsworthy stories. Additionally, they have been documenting activities of several NGOs in these settlements. The women are respected for their objective and authentic coverage and enjoy far greater confidence of the community than many local media agencies. Their productions command high credibility. Their newly acquired skills also bring them an income. At the same time, they provide valuable feedback to policymakers about the problems and improvements taking place in these settlements. The project received an international award in 2001 in recognition of its contribution to social justice through ICT.

Inhibiting factor

- In the past, policymakers ignored the concerns of Kenyan women despite their significant role in family and community development.

Facilitating factors

- The enthusiasm of promoters and the women themselves
- Getting visibility for early success through a formal launching of their videos

Lessons learned

- To ensure the usefulness of ICT, it helps to plan carefully so as to achieve success in the first round. The initial batch of participants should be selected and trained carefully. After a positive experience, the road to self-empowerment becomes easier.
- Access to technology can create new possibilities for women. For example, training in handling video cameras led to powerful new opportunities for these poor, often uneducated women, which included a chance to shape public policy, inform the community about their daily realities, win the confidence of the people, emerge as dependable suppliers of authentic news, and earn an income while rendering these services.
- Women can rise to challenges and opportunities offered by ICT. These need to be visualized and planned imaginatively by the project functionaries.

Internet-driven women's movement, Mexico

After spending more than a year in prison, Claudia Rodriguez could now go back to her routine life with her children and a husband who worked for the Mexico City Water Department. At the time of her arrest she was earning three times as much as her husband. Things would not be the same anymore, but she had been saved from being victimized by an even worse situation. There was a possibility of fifteen years' imprisonment for her act of self-defense that resulted in the death of her would-be rapist. In 1996, Claudia Rodriguez, a thirty-year-old mother of five went out dancing with her friend and her friend's boyfriend. The man tried to rape her while they were on an elevated walkway, and became violent when she protested. Claudia

pulled a pistol from her purse (which she had started carrying two weeks earlier after a robbery) and shot him to save herself.

Modemmujer, the women activists' e-mail network, spread Claudia's story through the Internet to hundreds of women and organizations across Latin America, and North America. Mobilization by women's organizations in Mexico City resulted in large gatherings of women at the hearing, and public protests. Letters were also sent to the government from all over Mexico, Cuba, Argentina, Colombia, Bolivia, Canada, and the United States. Ultimately, in the face of a public outcry, Claudia was freed.³

Modemmujer came into prominence during the United Nations' Fourth World Conference on Women in China in 1995. Its e-mail correspondents' network throughout Mexico comprehensively covered the conference in Spanish. Modemmujer has built alliances with approximately 400 women's organizations, activists, and academicians across Latin America through e-mail. It provides caring support for women through the Internet irrespective of the distances separating them. It also provides regular updates on events, announcements, documents, and analysis from NGOs and the academic women's community.

Modemmujer's campaign for Claudia on the Internet is one of many instances where the women's movement has succeeded through technology to ensure that the Mexican government lives up to the commitment it made at the Women's Conference. Today, in countries such as Mexico, the Internet is playing a key role in organizing women's networks and garnering political support and justice for victimized women.⁴

Inhibiting factor

- The reluctance and delay in decisionmaking by the authorities

Facilitating factors

- Modemmujer's ability to remain in touch with

approximately 400 women's organizations, activists and academicians across Latin America and North America

- Support from a number of places, including the U.S.

Lessons learned

- The Internet has tremendous power and potential to establish networks which can give women's concerns a voice.
- Problems (such as injustice for women) can be addressed forcefully and speedily with the use of technology and networking with the external world.
- ICT can be successfully used for improving communication between women of both the developed and developing countries.

Bayanloco Community Learning Center, Nigeria

The Bayanloco Community Learning Center (BCLC) trains women in rural Nigeria to use ICT for peace and poverty alleviation. The first recipient of the Association for Progressive Communications (APC) Africa Hafkin Communications Prize in recognition of outstanding uses of ICT, BCLC trains rural women in using ICT against communal violence and acting as peace brokers. With the help of the Fantsuam Foundation, a community-based, community-sustained computer center was started a few years ago for the Bechechet Bayinring clan of Kpunyai village as part of the Foundation's microcredit and poverty alleviation scheme. BCLC disburses loans to women and provides them basic computer literacy classes. Women are expected to pay fees for training and using the computer facilities.

BCLC had to overcome numerous obstacles, including opposition from an all-male board of trustees, technophobia among rural women, high levels of illiteracy, initial lack of Internet access, along with the absence of a phone link, and an irregular supply of electricity. Today new technology helps rural women in meeting their basic needs and even saves lives in times of

crisis (where the women act not only as detectors of potential flash points of communal violence but also as peace brokers). There are plans for the Bayanloco women's microcredit groups to supervise the community learning center and provide ICT training in other local communities to help them start their own such centers.

Kazanka Comfort, the spirit behind the establishment of BCLC, is concerned with helping girls overcome their technophobia. Initially, she realized that fast communication between rural women could make a difference between life and death in cases of emergency. She had seen e-mail in action earlier while she was studying abroad, and felt it could be a solution. She plans to use the prize money to finance IT scholarships for girls in rural Nigeria. The proposal is to start a "catch them young" initiative in girls' secondary schools in which students will be given inputs on IT. It was proposed to organize an essay competition, and the winners and runners-up were to be given scholarships for IT training at Bayanloco. The rest of the prize money was to be used for providing BCLC with e-mail access.

Because of Kazanka Comfort's determination and the enthusiasm of local communities for ICT training, eight more rural communities and two tertiary education institutions have requested Fantsuam Foundation's help to start their own learning centers. The Bayanloco women's microcredit groups supervise the centers, and two training colleges are using the facilities for their distance learning program for teachers in rural communities. The success of BCLC in training and helping rural women has had a significant effect: there is greater awareness among rural women about benefits from ICT education. As a result there is a demand for help to start learning centers for women in the communities. There are plans to provide satellite-based e-mail and Internet access from a recent grant.

Inhibiting factors

- Resistance from board of trustees consisting only of male members
- Technophobia suffered by women
- High rate of illiteracy among women — a common feature in rural areas
- Lack of Internet access at the initial stage
- Inadequate electrical supply and nonavailability of phone links

Facilitating factors

- Kazanka Comfort's exposure to the Internet and e-mail while studying abroad, and her determination to help rural women master the new technology
- Support given by the Fantsuam Foundation
- Enthusiasm of local communities for ICT training
- Apt use of technology to meet the basic needs

Lessons learned

- If applied thoughtfully, ICT can be a powerful tool for poverty alleviation and maintaining peace.
- To provide ICT education to women, the problem of illiteracy has to be addressed first.
- The training of young girls (as information intermediaries for the older generation) can act as a catalyst for social change.
- A successful experience can generate interest and demand for ICT training among women.⁵

www.WomensNet.org.za, South Africa

In the past, South African women, black women in particular, silently suffered economic and racial discrimination in a male-dominated society. In 1994, the South African Constitution provided "constitutional equality" for women in South Africa. Since then, the government has taken a number of initiatives focusing on women's rights and equality among the sexes. Although the constitution now provides equality for women, it is only a first step toward women's equality in the real sense of the term. South Africa approved the Convention on the Elimination of All Forms of

Discrimination Against Women in 1995, which proved helpful, as it adopted international standards set for women's equality.

An important indicator of equality for women is their access to and utilization of new opportunities that are unfolding rapidly in the field of communication technology. The key question is how many women benefit from these new technologies, or from the Internet. According to a 1998 survey, only 19 percent of Internet users in South Africa are women. So far women who use ICT are able to reap the advantages. They are able to identify ICT as the driving force in their search for equal opportunity in the workplace. Initially, no South African web site was interested in empowering the women of South Africa. Yet some documents associated with women's empowerment were accessible through the Internet.

The survey found that in spite of having access to the Internet, a number of "empowered" women could neither exploit the medium fully, nor were they putting any information relevant to women on the net. As a result, there was not much relevant content available for women on the Internet.

Systematic development and exchange of gender information in South Africa began with Women'sNet (womensnet.org.za). This initiative was started by the Southern African Non-Governmental Organization Network (SANGONeT, active since 1988 and a member of the Association for Progressive Communications or APC) in alliance with the Commission on Gender Equality (CGE), an official body that advises the government of South Africa on legislation related to gender issues and the status of women. The aim of Women'sNet is to use ICT for empowering women and to work toward promoting gender equality in South Africa. However, it is not possible for a program to succeed by upgrading the medium and not the content. Women'sNet understood the critical importance of content right

from the beginning and started generating meaningful and relevant content.

SANGONeT and CGE brought together thirty-three women from organizations around the country in online discussions. The discussions generated a high degree of interest in the participants for promoting gender equality in South Africa through the new medium of the Internet. A mission statement and outline of information for further guidance were then developed by the women. APC also contributed considerably to shaping the project.

The major objectives of Women'sNet were to :

- Support women for equal and active participation in society
- Promote development of South African women
- Promote awareness about policy documents, laws and legislative proceedings on women's problems
- Support women's activism, leadership, and work
- Discuss issues related to women at a global level
- Highlight the subjects from a "gender" perspective.

As Women'sNet evolved, the members were particularly concerned about reaping the benefits of the reserved cyberspace for women. But it was also realized that the actual challenge would be in formulating a project to benefit disadvantaged women. It was decided that women who were deprived of using ICT in the past had to be on the top of the list. For increasing information access to women, it was decided to use approaches such as "e-mail to print" and "e-mail to radio" as potential means. Most of the women who built the project could not make the best use of ICT themselves, and expressed a strong desire to get trained by Women'sNet.

Women'sNet established an advisory group that set down essential guidelines after considering

the requirements of several communities. The information content and form of Women'sNet were designed by an information strategy team. To create the Women'sNet web site, an information strategy workshop was held in December 1997, in which women from Uganda, Senegal, and Zimbabwe participated. The workshop identified some essential information areas, such as human rights, health, ICT, education, and violence against women. Later, Women'sNet added more subjects, including women and enterprise, Internet links, gender in parliament, job and study opportunities, and news. The site has a bulletin board and a search engine. According to Lynn Danzig, a staff member, the objective of Women'sNet is not just to deliver the information to women but to make them participate in the development of that information.

Women'sNet is also involved in a telecenter project that is being carried out by the Universal Service Agency.⁶ The project was conceived to provide ICT access through telecenters to the underprivileged in both urban and rural areas. The Universal Service Agency not only provides support in establishing the telecenters but also gives ICT training and helps in managing these telecenters. During the process of reaching out to women through ICT, basic computer skills have emerged as an important prerequisite. Women have been gaining practical experience at Internet cafes hosted by Women'sNet. Still, there is need to expand the available training to cover the increasing number of beneficiary communities.

Women'sNet is also planning to pursue a "cross-media outreach" in the hope of influencing the mass media to take an interest in women's issues.

The South African women who initially lacked the required technical skills were able to construct and maintain the web site. The women are now able to utilize these skills in more innovative ways. Women'sNet has shared information at organizational and individual levels with different partners

in its attempt to develop the content effectively.

While often there is a lack of "gendered perspective" on ICT at the public policy level, initiatives such as Women'sNet should continue with their objectives without waiting for policy changes to take place.⁷

Inhibiting factors

- No South African web site was previously interested in empowering the women of South Africa.
- Access to the computer and the Internet became a huge challenge in the absence of adequate infrastructure.
- Lack of "gendered perspective" on ICT at a public policy level was an impediment.
- Women'sNet was unable to find partners in the private sector to get assistance in terms of resources.
- Women'sNet has not developed a training program of its own, although training was an integral part of all past workshops.

Facilitating factors

- The alliance with the government's Commission on Gender Equality
- The gathering of thirty-three women from organizations around the country as a result of combined effort made by SANGONeT and CGE
- A high degree of interest generated among the participants for promoting gender equality in South Africa through the Internet
- Contribution by APC that also shaped the project
- The advisory group that gave essential guidelines to Women'sNet after considering a number of requirements
- Consultation, involvement, and participation of individuals and organizations resulting in "information partnerships."

Lessons learned

- During the process of reaching out to women through ICT, it was realized training basic

computer skills was a prerequisite for further training.

- ICT initiatives involving other more conventional media are likely to be more effective in areas with no infrastructure to support the sole use of ICT.
- Even among women who are relatively computer literate there is a dearth of technical learning.
- Partners in the private sector can provide assistance with resources such as computers, software, and connectivity.

Notes

1. Chasquinet is a nonprofit organization in Ecuador involved in empowering grassroots organizations and impoverished and minority groups through the promotion and use of the Internet. Chasquinet considers the Internet a tool for enabling women and poor communities to improve their living standards, voice their opinions and demands, and create an impact on official policies that affect them.

2. <http://www.worldbank.org/gender/digitaldivide/Stories%20from%20Ecuador.doc>; "Stories from Ecuador: Finding One's Voice through the Internet", in *Acting Locally, Connecting Globally: Stories from the Regions*, — *Women in Sync: Toolkit for Electronic Networking*, Karin Delgado, Association for Progressive Communications, Women's Networking Support Programme. <http://www.apcwomen.org/gem/resources/phase4-stories.pdf>

3. After she was charged with murder and jailed, Claudia had over thirty hearings on her case. The evidence supported her version of events, and the judge was convinced that she was actually attacked. However, the prosecutor attempted to make a case against her because of her perceived lifestyle: "If she was a married woman, what was she doing out dancing?" he asked. Claudia stated that unlike the usual marriage where the woman remains at home and the man works and goes out partying, she and her husband shared the work. Occasionally, Claudia would go out with friends

without her husband. Claudia's lifestyle obviously made officials unwilling to free her, and this in turn stimulated the women's movement in Mexico. Claudia had neither money nor influence, but women (even those who can never be considered feminists) gathered for her sake and signed a letter demanding her freedom. According to Ana Laura Magaloni, a professor of constitutional law who fought Claudia's case free of charge, in Mexico City a male executive shot and killed a robber who was trying to grab his watch and "in 24 hours they decided it was self-defense. Claudia's case isn't about robbery, but about rape."

4. <http://www.connected.org/women/erika.html>; <http://www.pacificnews.org/jinn/>; Christine Bagge, "Mexico: communication between women in first and third world," email posting, 12 March 1997. <http://csf.colorado.edu/forums/femisa/mar97/0076.html>

5. <http://www.apc.org/english/hafkin>; http://www.apc.org/english/hafkin/2001/haf_hafkin_speech.txt; <http://www.digitaldividenetwork.org/content/stories/index.cfm?key=199>

6. An authoritative body aiming at enabling South African communities to utilize telecommunication and information services. www.usa.org.za

7. Lydia Levin, "Women'sNet: Information Technology to Empower Women in South Africa," *Voices from Africa: Information and Communication Technologies*. <http://www.womensnet.org.za/about/about.htm>; <http://www.unsystem.org/ngls/documents/publications.en/voices.africa/number9/a10levin.htm>

5

Gender, ICT, and Education

As Hafkin and Taggart (2001) argue, “The single most important factor in improving the ability of girls and women in developing countries to take full advantage of the opportunities offered by information technology is more education, at all levels from literacy through scientific and technological education.”

Women and girls are poorly placed to benefit from the knowledge economy because they also have less access to scientific and technical education specifically, and to education in general. They have less access to skills training and development which will enable them to gain employment in the information technology sector, and when they do, they generally get work at the lower levels, with less pay.

These initial disadvantages have prevented women and girls from benefiting equally from the opportunities that the entire range of new technologies can bring; yet paradoxically, the same technologies also offer many opportunities for women and girls to gain the education and

technical skills required for them to participate equally in the knowledge economy.

Education status of girls and women worldwide

Girls and women experience serious disadvantages in access to education in most developing countries. In some regions gaps between the enrollments of girls and boys have narrowed — for example in East Asia — and there should be parity between them by 2005. North Africa and South Asia have also made some progress; but with the exception of a few countries, in the developing world, girls and women have less access to education at all levels and lower levels of literacy. The UNESCO Education for All Initiative recognizes that girls and women lag far behind boys and men in this sector:

- Two out of three of the 110 million children in the world who do not attend school are girls, and there are 42 million fewer girls than boys in primary school.
- Even if girls start school, they are far less likely to complete their education.

- Girls who miss out on primary education grow up to become the women who make up two-thirds of the world's 960 million illiterate adults.
- A six-year-old girl in South Asia will typically spend six years in school, compared with nine years for a boy.
- Living in the countryside widens the gap; a girl living in a rural area is three times more likely to drop out of school than a city boy.

According to the 2002 UNDP Human Development Report, girls make up 60 percent of children not in primary school worldwide. Of the 113 million school age children not in school, 97 percent belong to developing countries. Many countries do not even keep systematic data — the ninety-three countries whose population makes up 39 percent of the world's poor do not have enough data to be able to ascertain the access of children to primary education. Of the twenty-one countries in sub-Saharan Africa with data, fourteen are far behind their primary education targets, or have deteriorating enrollments.

International agencies have recognized that the imbalance between the enrollment of girls and boys is a global concern. The Millennium Development Goal 3 includes as its target the elimination of gender disparity in primary and secondary education, preferably by 2005, and at all levels of education no later than 2015. The education-related indicators consist of the ratio of girls to boys in primary, secondary, and tertiary education; and the ratio of literate females to males between fifteen and twenty-four years of age.

The related goals of the United Nations Girls' Education Initiative (UNGEI) are:

- Building political and resource commitments for girls' education
- Ending the gender gap in attendance and completion
- Eliminating gender bias within national educational systems
- Supporting girls' education in areas affected by or recovering from armed conflict, natural disasters, or external shocks
- Eliminating social and cultural discrimination that limits the demand for girls' schooling (Unesco, 2002).

Girls who do enroll in schools participate less in science and technology education and professions. For example, even in countries like Brazil, where over half the students at the tertiary level are female, girls form only 34 percent of the students who join the natural science courses that include math, engineering, and computer sciences. Barriers to female participation in scientific and technical education include:

- Perceptions of teachers and parents that girls and women are intellectually unsuitable for science and technology courses
- Tendency of teachers to pay more attention to boys in math and science classes
- Intimidation of girls and women in science and technology classes
- Masculine image of science and technology in curricula and media
- "Narrow" focus of technology courses which often may not connect to life outside the classroom
- Social class.

Further, while literacy figures have continued to improve substantially in all developing regions since 1975 — East Asia, the Pacific, Latin America, and the Caribbean have close to 90 percent adult literacy — sub-Saharan Africa, South Asia, and the Arab States have much lower rates of adult literacy, around 60 percent. Other forms of literacy measures, although not applied in a systematic way in many countries, also affect participation of girls and women in science and technology education. These include:

- Functional literacy — the ability to understand and use common channels of communication and information in an everyday context, from newspapers and books to pamphlets and instructions on medicine bottles (UNDP, 2002, 22).

- Functional technological literacy — the kind of literacy required to operate a cell phone or Internet connection, as well as to understand the implications of its use (Huyer, 2002).
- Scientific literacy — an everyday working knowledge of science which enables someone to respond in an informed way to the technical issues of personal and national life. Scientific literacy is not only necessary for the workforce required by modern industries, but also for informed public discourse on public policies in such areas as public sources of energy, preservation, and use of natural resources; where and how public roads should be built; and what form of health care system would best serve the needs of a particular locality. It also pertains to the ability of communities and families to make appropriate decisions concerning resource allocation, diet, sanitation, and community development (Huyer and Westholm, 2001; Ayala, 1996; Gupte, 1996).

With their low levels of scientific and technological literacy, women and girls are underrepresented in almost every area of recognized scientific activity. Studies have shown that women's employment is heavily concentrated in a few occupations. They work typically as home and farm helpers, nurses, lower-school teachers, and secretaries. Compared to men with similar qualifications, women are overrepresented in part-time employment or unemployment and in low-paid and insecure jobs (McGregor and Harding, 1996).

In particular, the participation of women in IT design and development is generally low. While many women in Asia, for example, engage in "telework" or remote processing, their participation tends to be at the administrative or clerical level, in data input and processing. Concentrated at the low or unskilled end of employment, women do not get the training that new jobs require. This is leading to fears of a global feminization of labor, whereby occupations in which women predominate will see a drop in salaries,

status, and working conditions (Mitter, 2001; Hafkin and Taggart, 2001).

Women's technical education and their participation in science and technology-related professions are critical for a nation's future. Increasing the pool of human resources in the area of technology will contribute to increased creativity, expertise, and competitiveness in the technology sector. Increasing the pool of potential and available expertise will allow a country to arrive faster at the "critical mass" of IT professionals who will facilitate a national knowledge economy and attract foreign direct investment. The Gender Working Group of the United Nations Commission on Science and Technology argues that it is important for all nations to move toward gender equality in science and technology, so as to accelerate the pace of national progress and achieve sustainable development (Gender Advisory Board, 2001; Oldham, 1995).

In many countries women constitute the majority of the poor, and the connection between women's poverty and national development (or lack thereof) is well-known. The World Bank recognizes the links between gender equality, development, and public policy. Evidence presented in the recent report, "Engendering Development — Through Gender Equality in Rights, Resources, and Voices," demonstrates that societies that discriminate by gender pay a high price in their ability to combat poverty. Educated women are better able to engage in productive activities, find formal sector employment, earn higher incomes, and experience greater returns from schooling. Investments in female education therefore tend to increase the incomes of families, with benefits for men, women, and children. For those women who work in the informal sector, it has been demonstrated that access to primary education will increase the productivity of peasant farmers, particularly when they have access to the other inputs needed to enhance their production; and that the earnings of the self-employed, including those in urban and informal sector activities, are

higher for the educated than for the uneducated (World Bank, 2002; Oxaal, 1997).

Consequently, strategies which increase the participation of women at all levels of the knowledge economy will increase national human capacity and help to raise the standard of living.

Much needs to be done. Although gender-disaggregated data are not gathered systematically and is often unreliable, it is clear that women's access to ICT in developing countries is much lower than men's. In Ethiopia, men make up 86 percent of Internet users; in Senegal, 83 percent; in China, 70 percent; in France, 67 percent; and Latin America, 62 percent (UNDP, 2001). Rates of access to the Internet for women range from less than 1 percent to over 40 percent in Mexico, Brazil, the Philippines, and South Africa. However, these numbers can be misleading, since the percentage of internet users overall in those countries is often around 1 percent of the total population (with the exception of Brazil and China), and the only indicators available are of Internet use, which is not the same as women's access to ICT (Gajjala 2002; Osted 2000). Women Internet users in almost all developing countries are not representative of the country as a whole, but make up a small, educated urban elite who have computer and Internet access at their place of work.

This chapter will look at:

- The representation of girls and women in technology education and employment, and strategies to increase their participation
- The use of ICT to support a greater participation of women and girls in education at all levels through distance learning, including e-learning and the use of computers and the Internet for increased educational opportunities
- Costs and benefits of the use of technologies for education
- Recommendations for World Bank projects and policy.

Gender barriers in science, technology, engineering, and mathematics

While very little sex-disaggregated data are collected concerning women's participation in science and technology education and professions, the data we do have indicate consistently low participation by women and girls, with exceptions in some developing countries.

The situation is similar for the participation of women and girls in IT-related university courses and research where, except for the U.S., data on university enrollments and research are sporadic, not collected by a central agency, or subsumed under the larger heading of "Engineering". Research and data in this relatively new area are emerging; however, research on women's participation in science and technology has been ongoing for decades, and provides important insights into and assessments of the representation of women and girls in IT education, research, and employment.

While in some countries the number of women undergraduates in science and technology disciplines is increasing, we also find that the number steadily decreases as we move up the education ladder. Data on women's representation in science and technology courses in universities are not systematically collected in many parts of the world, and it is almost impossible to make comparisons on a national or regional basis. Even so, we do know that:

- In the European Union women hold 11 percent of full professor positions, while they make up just under 50 percent of assistant professors (Laafia and Larsson, 2001).
- A study at the Massachusetts Institute of Technology in the U.S. in 1994 found that only 8 percent of faculty (15 out of 194) in the School of Science were women (MIT, 1999).
- In many Muslim countries, gender-based discrimination coupled with social and cultural barriers limits the access and participation of women in higher education (Hassan, 2000).

- In the U.S. and Canada, the enrollment of women students in first-year science courses is greater in biological and health sciences than in courses such as engineering, where enrollment generally remains below 30 percent.
- In Japan, women make up 6.8 percent of Ph.D. students in physics, and 7.1 percent in engineering (Kuwahara, 2001).
- The Caribbean is the only region where the percentage of women working in science and engineering is over 50 percent — at 59 percent (UNDP, 2002).
- In Senegal, women make up 26 percent of students in medicine, pharmacy, and dentistry, and 15 percent in science and technology disciplines (Der, 2002).
- In Nigeria, women make up 30 percent of all technical and related workers, however only 1 percent of engineers are women (Chinye, 2002).

In general, the overarching trend is that the percentage of girls and women in science and technology decreases steadily as one moves up the educational structure, beginning with the primary level. The “leaky pipeline” is a concept that has been used to refer to this steady attrition of girls and women throughout the formal science and technology system (Barinaga, 1992). The leaks are found at every stage of the process, resulting from barriers that belong to four categories.

Cultural and attitudinal barriers

Cultural and attitudinal barriers, such as perceptions about the role and status of women, exist across countries, despite widely different circumstances. In some societies these barriers are almost insuperable for women. At the pre-primary and primary level, these include parents’ choices to invest in boys’ education at the expense of girls’. Girls are required to help with domestic chores at home for all or part of the school day. The ones who do go to primary school, often are not given the opportunity to attend at secondary and tertiary levels. Preconceptions that women’s

responsibilities confine them to the home, and expectations that married women will not work outside the home, also contribute to restricting girls’ access to education.

Once girls enter school, they are discouraged from learning science and technology either consciously or unconsciously, as a result of parents’ and teachers’ biases. Science and technology are often not considered appropriate for girls and women, for reasons ranging from lack of intellectual ability to expectations that the primary occupation for women is to marry, bear children, and work inside the home. Other cultural reasons include fear of sexual harassment by other pupils or teachers, or inadequate toilet facilities. Education costs — fees, uniforms, and books — often deter parents from sending girls to school when they could be earning money for the family. Additionally, in some cultures the concern is that access to education will in fact make women unsuitable for marriage and motherhood, and make them undesirable to potential husbands. Studies in both industrialized and developing countries show that teachers tend to respond to boys more often than girls in math and science classes and pay more attention to girls in “softer” classes, thereby sending messages about gender capacities. Teaching materials, textbooks, and lectures tend to depict science and technology as male domains.

In countries where it is more socially acceptable for girls and women to pursue independent careers outside the home, other ingrained social attitudes can restrict women’s participation in science and technology. For example, although girls in the OECD countries may have higher rates of enrollment in science courses in primary and secondary schools, their numbers tend to decrease at higher levels of education and research.

Studies indicate that a narrow technology focus in the curriculum, while appealing to boys, can alienate girls, who are more interested in understanding how the technology fits into a larger

social, environmental, or work context (AAUW, 2001; Bissell et al., 2002). There is increasing evidence that girls benefit from science and technology teaching curricula that emphasize hands-on activities and application to everyday life and the environment, reflecting their critical role in health, agroforestry, and natural resource management in most parts of the world.

There are other trends in science education mitigating against the participation of girls and women:

- The World Bank paper, “Women in Higher Education”, notes that science and technology has a strongly masculine image not only because men still dominate the field, but also because they dominate the language and images found in scientific literature (Dundar et al., 1994).
- Lack of women’s visible participation in technology, and a dearth of female role models result from, and perpetuate the sociocultural invisibility of women in this area (Kandaswamy, 2002; Hassan, 2000). The converse is true in the Middle East and North Africa, where higher or equal proportions of women enroll in science and engineering courses in comparison with many Western countries. This is attributed to social acceptance of women in science. For example, in Egypt, a popular weekly television show on science issues is hosted by a woman scientist who is now a national celebrity.

Situational barriers

These include lack of family commitment, lack of partner support, and living in rural or isolated areas. Cost of education, especially higher education, is a major barrier when women do not have independent control of their resources, and because they tend to earn less than men to begin with. In many cultures male partners tend to be unsupportive of women’s higher education, particularly in nontraditional spheres that are considered to be unsuitable for women. It is often difficult for women to travel to attend school for

reasons of time; cost of transportation; safety; and perceptions of the appropriateness of traveling on their own.

A study of the ICT sector in India showed that women were expected to make sacrifices in their careers for their families and their husbands, while men were not (Gajjala, 2002).

Social class is also a factor in women’s access to higher and technical education. Women in higher social classes are more likely to have family support for continuing their education and covering the cost of higher education (Gajjala, 2002; Evans, 1995).

Qualification barriers

Qualification barriers make a difference to girls’ education. Lack of formal math and sciences education or experience in computer programming skills are often perceived as a barrier, both by admissions departments and by the students and teachers. Evidence suggests that lack of previous training in these subjects is less of a barrier than expected: in the Philippines the success of poorly-educated and low-income women in the Cisco Networking Academy Program, and the achievements of young women without computer backgrounds in the Carnegie Mellon University computer science program, demonstrate that women can master the basics of these disciplines quickly and apply them to a higher-level course of training or education.

Evans and Kirkup both refer to the breaks women often make in their professional careers for personal and family reasons (including child rearing). Upon their return to the workforce they often find their skills are outdated, or that they do not have the latest skills and knowledge necessary to continue in their chosen professions. Kirkup notes that women’s “career migration” tends to be to lower levels of the occupational hierarchy and that they tend to migrate across and down rather than across and up (Evans, 1995; Kirkup, 2002).

Institutional barriers

Finally, institutional barriers block women's access to science and technology education. These include the lack of female teachers and the assumptions of male teachers mentioned above; inflexible admission, selection, and entry requirements that do not take into account women's varying educational backgrounds, approaches, and abilities; and heavy attendance requirements for practical skills and laboratory work that are more difficult for women to meet in view of their family responsibilities. Women also do not participate as fully in workplace networks, or "communities of practice."¹

As a result of these barriers, a series of "disjunctions" or mismatches occur between requirements of educational programs and the situations and experiences of women. These disjunctions apply generally to women's participation in education, but particularly to technological education, and occur between:

- Maintenance and achievement of formal entry requirements, and overall level of educational attainment among women
- Domestication of women's labor and their educational or career aspirations
- Educational fees and women's financial dependence and lower incomes
- Traditional curricula and women's experience and approach to knowledge
- Instrumental pedagogies and women's preferred learning modes (Evans, 1995).

In Africa, Williams (1987) has shown that low participation of girls and women in science and technology education is compounded by low enrollment rates in formal education, with the gap between girls and boys widening at higher levels of education. Barriers include:

- Relegation of women to the home
- Parental perceptions of cost-benefits of educating girls, particularly affecting low-income families
- Female seclusion practices and early marriage
- Fear of cultural loss

- Conflicting demands on girls of traditional and school learning
- Discriminatory labor market practices
- Irrelevance of curricula in science and technology to girls' views and experiences of the world
- Masculine image of science projected in text books, media, and popular assumptions
- Poor facilities, including the low number and quality of teachers and equipment
- Nature of science and technology occupations, which are not easily combined with child-rearing and childcare
- Lack of role models and career counseling.

Computer science and IT education

These barriers, disjunctions, and social attitudes are often intensified in relation to computer science courses and technical training. Many studies show that girls are "turned off" early on by the intensely "masculine" nature of technology. They reject computer games as violent, redundant, and tedious; they also reject the nonsocial, technical obsession they see in their fellow male students (AAUW, 2000). As a result, girls are less comfortable with computers.

A study (Ulomata, 1996) of the use of computer games by children in Nigeria found that many children believed that the games are designed for boys who supposedly like violence and action. When asked who played the games most, with almost no exception they believed that boys played them most. Reasons given are listed in order of response:

- Boys are more interested.
- Boys have a lot of time to spare because they have no work to do.
- Girls are always busy in the kitchen or with housework.
- Computer games are designed for boys.
- Boys like action games.
- Boys like violence.
- Boys are more adventurous.
- The games have mostly male characters; only boys and men are heroes of the games.

- Boys understand such things more easily.
- Mostly boys are found in computer clubs; girls are scared of such places.

The fact that masculine language and images dominate scientific literature and culture is especially true for IT and computer science. The notion that only computer “geeks”² can be successful at computer science not only deters young women from entering the field, but skews the perception of behaviors that characterize a successful computer scientist. “The rub for women in computer science is that the dominant computer science culture does not venerate balanced or multiple interests. Instead, the singular and obsessive interest in computing that is common among men is assumed to be the road to success in computing. This model shapes the assumptions of who will succeed and who ‘belong’ in the discipline” (Margolis and Fisher, 2001, 70). As a result, a male computer science high-school teacher can state that he does not see in girls the same “love” of computers as in boys, simply because they do not express it through the same kind of obsessive behavior.

Margolis and Fisher (2001) also found that the technology-focused approach of many computer programs at university level discouraged women. While young men often enrolled in such programs simply because they enjoyed them or had a passion for computers and technology, women chose the discipline for a variety of reasons:

- Enjoyment
- Versatility of computing in relation to other interests
- As a career path for safe and secure employment
- Because of the exciting and changing nature of the field
- Encouragement from parents and teachers.

While the narrow technology focus of computer science courses seems to discourage women, they tend to enroll in larger numbers when courses are introduced that place technology in a larger

context of society, occupation, history, or use (Margolis and Fisher, 2001; Bissell et al, 2002).

In Nigeria both women and men were asked why, in their opinion, there is such a low participation rate for women in IT careers. Some reasons given by the men were that IT and IT-related careers were unsuitable for the female personality; they were too strenuous for women; and that they demanded absolute dedication, perseverance, and consistency, attributes they believed women lacked. Women gave similar responses, with the added element that IT “overexposes” young women to the Western style of life, making them appear too “worldly wise”, and thereby limiting their chances of marriage (Ajayi, 1996).

Nevertheless, in some developing countries, computer science is seen as more appropriate for women. Kandaswamy (2002) noted that in India there is a relatively strong participation of women in the IT and software industry as well as other technology careers. The enrollment of women in technical institutions has increased in the last twenty years from just 5 percent to 45 percent; 90,000 women graduate in the ICT fields from colleges in the four southern states each year, and in fact it is seen as a more “feminine” field than other engineering disciplines. This is in contrast to the U.S. and Canada, where enrollment of women in computer science has been decreasing for several years. The reasons for the increased participation of women in the ICT sector in some developing countries are not entirely clear. Some factors could include sociocultural attitudes which allow or promote women’s participation in science and technology and IT; (in the case of India) a national strategy to promote an IT workforce as well as a national information society; and nature of the national education system.

Strategies to encourage women’s participation in scientific and technical education

In developing countries some general strategies have proven to be effective in encouraging the

continued participation of girls and women in education, such as scholarships based on merit, culturally appropriate facilities, women teachers, alternative schools with flexible schedules, and vocational training. There is a substantial body of research on strategies and approaches to increasing the participation and success rate of women and girls in scientific and technical education. Some of these approaches are:

- Changes in curricula to reflect a gender-neutral, or gender-inclusive image of scientists and the practice of science
- Science education that emphasizes hands-on activities and application to everyday life, society, and the environment
- Female role models and mentors
- Conscious effort by teachers to treat girls and boys as equals in the classroom.

Further strategies would include bridging programs that allow re-entry for women already qualified in technical subjects, conversion programs that provide older women and school dropouts access to technical education, and community-based programs built around issues of direct relevance to the lives of women.

The Carnegie Mellon School of Computer Science increased the proportion of women in its computer science program from 7 percent in 1995 to 42 percent in 2000. In the same period, the percentage of female student graduates increased to almost the same level as that of male students. During this time a series of interventions were made in admissions and curricular requirements that contributed substantially to this change. An introductory course was instituted for those not experienced in programming, using a discovery-based, real-world orientation. Based on research demonstrating that prior experience did not predict future success, the admissions policy was altered to give equal preference to both highly- and less-experienced students. The quality of teaching was improved by putting better, more experienced, and more senior teachers into the earlier courses. A unit on diversity with emphasis on

gender equality was integrated into the training of teaching assistants. Several courses were initiated which placed technology in the real-world context. In addition, peer tutoring and promotion of networking among women staff and students were implemented (Margolis and Fisher, 2001).

The experience of the Open University in the U.K. in attracting women into its computer program is a useful illustration of a bridging and conversion program. It instituted an open access policy to its technology courses in the 1980s in order to attract women into nontraditional subject areas. However this practice was insufficient in itself to attract more women students, who also experienced barriers of cost, confidence in their ability to “handle” the courses, and the burden of family commitments.³ A course for computer “beginners” helped to address one of these concerns. As at Carnegie Mellon, changes in the curriculum that placed technology in a larger context of real-world functionality proved to be more appealing to women. Pedagogical approaches which stressed skills development, reflective practice, and the teaching of technology ideas and concepts, also proved successful in attracting more women students (Bissell et al, 2002).

Training women for the IT workplace

Although women have made some gains in employment in the IT workforce, they are employed predominantly in low-level data processing work in much of the world. Even in the industrialized world, women’s participation in skilled IT employment remains much lower than men’s.

Women generally lack access to technical and skills training that would allow them to move into more technical and cognitive jobs. For example, 42 percent of women in sub-Saharan Africa participate in the labor force, but few have access to skills development: young women make up only 15 to 35 percent of formal training programs. In view of the rapidly changing set of skills required to participate in IT jobs, this lack of training is a serious disadvantage (Hafkin and Taggart, 2001).

Technical and vocational training can redress the inequalities women experience with respect to skills training and IT employment. Such training can provide IT skills to women for IT-based employment, as well as for use in the running of small businesses and other income-generating activities such as food processing and cash-crop agriculture.

The India Technician Education project assists industrially and economically underdeveloped and geographically remote regions in India to improve the quality and efficiency of technical education to meet local needs. The project aims to increase access to technical education and training for some disadvantaged sections of society, including women, scheduled tribes, and rural youth. The eighteen project polytechnics develop close links with local communities to train rural artisans, the educated unemployed, and school dropouts, and help transfer appropriate technologies to villages.

The project covers a total of twelve existing and six new polytechnics in the eight project states, and has the following components: developing and expanding capacity to provide greater access to technical education; improving the quality of education to produce better trained technicians; increasing efficiency through better planning, administration, and use of the system; and making education more responsive to emerging labor market needs.

Key policy and institutional reforms supported by the project include:

- Creating opportunities for technical training of women and tribal communities to increase their earning capacity
- Introducing structural and academic flexibility in all programs offered by the polytechnics to make them responsive to market demands
- Promoting self-employment by developing entrepreneurial and communication skills in students through curricular interventions

- Developing human resources capacity for key areas of economic growth including IT (World Bank, 2000).

Cyberkiosks and telecenters can offer opportunities for acquiring basic computer skills and training for IT employment and income-generating activities. For example, in Kolkata, women researchers and activists have experimented with setting up telecenters that are run by cooperatives of women entrepreneurs in partnership with private sector firms, so that the cooperatives would have a ready clientele for work in medical transcription or data entry (Mitter, 2001).

While these and other types of IT training programs in developing countries provide basic Internet and word processing training for women, the risk is that emphasis on this type of training will reinforce a trend toward the feminization of this kind of labor. It is much more difficult and more important to develop strategies to provide women with higher-level technology skills.

The Cisco Systems Networking Academy is an example of an IT training program that has the potential to reach large numbers of women in developing countries. It consists of a training curriculum that teaches students to design, build, and maintain computer networks, preparing them for industry-standard certification as networking professionals. To increase female enrollment it uses female role models in advertisements and promotional materials; the curriculum also includes a training module on gender equality. Cisco has formed partnerships with international organizations and NGOs to address the gender gap, and has recently completed a project with the United Nations Economic Commission for Africa (ECA). The project is one of several in Africa and Asia that focus on women. The ECA project awarded full scholarships to young women who traveled to Addis Ababa for training in Internet networking technology. The women also received training in management, entrepreneurship, and gender issues.

The knowledge of the trainees increased as a result of the course, as did their self-confidence and self-esteem. Of the twenty-seven women interviewed from the first graduating class, 71 percent said they intended to encourage other women to enter the IT field and to promote women in IT; 41 percent said that they intended to become IT entrepreneurs themselves; and 82 percent said they intended to work in the IT field.

Cisco has found that women often make it to the top percentages of graduating classes, regardless of their previous training or education level. In one recent examination, seventeen of twenty-seven women scored 90 percent or above. In the Philippines, Cisco collaborated with a women's NGO to provide network training to women making less than \$600 a year. The students graduated with grades that were as good as in any other academy in the network (Walsh, 2001; Hafkin, 2002).

The Ericsson European Equal Opportunities Award is a competition among Ericsson branches in Europe. It addresses several of the barriers to women's full participation in IT employment discussed above. The award promotes workplaces that have taken concrete initiatives to improve women's conditions and made the best use of their women workers. The purpose is to encourage organizations to support employees who combine work and home life, recruit and retain talented women as well as men, and motivate young women to choose technical education and technical jobs. "If we show young women that technology is fun and that the industry has beneficial employment conditions (including the possibility to combine family life with a career) more women might choose a technical career." The rationale for this activity is Ericsson's experience that having more women in the company encourages a constructive corporate culture, and "that a good balance between men and women in management and throughout the company facilitates constructive debate." In fact, Ericsson has found that "in many cases, our female employees have been more constructive and less focused on prestige than men,

and they are more receptive to new ways of thinking" (Ericsson, 2001).

Print remains the most common distance education medium in developing countries, both on its own, and in combination with radio, television, video and audio. Telephone, fax, two-way radio and e-mail are used for tutor support. Face-to-face sessions at a public learning center may be used to complement and reinforce these media. According to the Commonwealth of Learning, the use of new ICT for education, such as video and audio conferencing and computer-mediated communication (web, e-mail, and online learning), remains low in the Commonwealth developing countries (Commonwealth of Learning, 2002). Nevertheless, plans and programs are in place to expand the use of ICT and introduce new ICT for distance learning, based on lessons learned and trends identified to date.

Perraton (2002) lists some criteria for assessing the use of technology for basic education:

- Any discussion of the use of ICT for education needs to be set within a framework of national education policy (and often also the national communication policy).
- Technologies must be user-driven. The question is not how to introduce ICT into education, but whether ICT will help achieve already existing goals for basic education and, if so, how. In answering this question, one must look at the whole range of ICT, from radio to print to television and to different uses of computers.
- ICT is not a universal or a simple answer. Application of technology for education must be appropriate to the curriculum, available communications infrastructure, and training capacity.
- The technology should follow, or maintain a distance from the leading edge of technology. Educational projects at the edge often run into difficulties and are rarely sustainable in the long term.

Technologies for basic education

The application of technology to basic education should take into account the recipients of education, purposes, and location. Are the recipients children, adults, or teachers? Is the purpose to widen access to basic education, raise its quality, or even reform educational curriculum? And finally, where will the learning take place — in school, in an alternative structure, at home, or at a cybercafe or some other community technology access point? Table 1 outlines the possible applications.

In-school programs involve delivery of state-developed or state-approved curricula to young children, adolescents, and adults. They can include quality enhancement programs such as Interactive Radio Instruction (IRI), which brings direct teaching and learning exercises to the classroom on a regular basis. The radio lessons, developed on

particular subjects of the national curriculum, are designed to improve the quality of classroom teaching and to support poorly trained classroom teachers in underresourced schools. Children interact with the radio lesson by answering questions, or performing specific tasks during pauses in the radio script. Other approaches include large-scale mass-media projects involving schools, radio, and educational television. In-school programs for adults deliver primary school curricula, or various forms of vocational or community enhancement programs. Models include open schools, study groups, or campaigns based on the use of government or private facilities.

Out-of-school primary education programs have existed for many years. The early programs were essentially correspondence programs, often run by state or federal ministries of education. They can be supplemented by radio and deliver the

Table 1. Some applications of technology to basic education

Audience	Locations		
	In school/college	Alternative school	Out of school
Children	Computers in the classroom Radio including IRI	TV based rural schools, e.g. Telesecundaria Open schools	Radiophonic schools
Adults		Some participation in open schools	Radiophonic schools Nonformal, radio-based programs Individual distance education enrollments Cybercafes for education
Teachers	Computer support for teacher education	Distance education programs for initial teacher training and continuing professional development	Unstructured programs to support teachers

Source: Perraton, 2002

regular school curriculum to children living in isolated communities. Out-of-school programs for adults involve provision of basic education through a range of approaches to distance and open learning, including radio and television, study groups, and mass media campaigns.

A review of the Commonwealth of Learning's distance nonformal education programs in Africa argued that radio learning can be a powerful instrument for change, that it reinforces and is reinforced by print materials, and is a very effective medium for adult basic and nonformal education. Other conclusions were that to be successful, curricula should be relevant to everyday life; there should be a sense of ownership of the technology and the curricula; and it should promote a direct application of knowledge and skills (Siaciwen, 2000). Radio-based programs are well documented, and the use of cybercafes is also being introduced in many areas.

Case Study 1: Radio Education for Afghan Children, Afghanistan

Radio Education for Afghan Children (REACH) uses radio to broadcast educational programs to children who have few opportunities to attend school. A major challenge was to develop programming which would stand alone, with no teaching, tutoring, or print support. While not a substitute for formal education, it broadcasts informative, interesting and thought-provoking programs to children and adults on basic subjects such as science, social studies, mathematics, grammar, and spelling. Programs for adults concentrate on life skills, such as dangers of landmines, adjustment after the civil war, and the role of women in Afghan society.

REACH was never conceived as a substitute for school, but as a dynamic tool designed to respond to children's wider educational needs. Programs are developed based on participatory rural assessment with focus groups made up of men, women, girls, and boys. Program ideas from these meetings are then further developed with experts in

the topics covered, and then sent to the focus groups for feedback.

The role of women and programs focusing on women's concerns are a major part of REACH programming, including sessions on family and children's health, home economics, and women's rights in the family and society (Siddiqi, 2002).

Case Study 2: Prince Hussein Information Technology Community Center, Jordan

The Prince Hussein Information Technology Community Center in Safawi is part of Jordan's national strategy of "transforming Jordanian society into the digital age and eliminating the digital divide". It was funded by UNDP and is managed by a local grassroots organization, the Badia Research and Development Program (BRDP). The Center is equipped with computers, an Internet line, and a printer. It provides an opportunity for Bedouin women to use computers to enroll in distance learning at a university more than 60 miles away. Many women in the community, who are unable to travel on their own, actively use the center. Initially, they avoided crossing the busy street where the center is located. Subsequently, separate training sessions were organized, and women were visited in their own homes in order to determine their information interests. "Slowly the women of Safawai — many with their daughters — began to cross from one side of the town to the other, sign up for classes, check their e-mail and browse Arabic language web sites on health, news, religion, education, poetry and entertainment" (Juma, 2001).

Finally, technologies are used to support teachers, through in-school computer support, distance education programs for initial teacher training, and continuing professional development (Yates and Tilson, 2000; Perraton, 2002).

Out-of-school literacy training

The Commonwealth of Learning implemented programs that used radio-based learning, reinforcing and reinforced by print media and

face-to-face training and discussion sessions. It was found that nonformal education could contribute to a stronger, more integrated and more community-based approach to rural development, especially to meeting the basic needs of the poor.

Initiatives aimed at women included a project in Ghana which used radio to develop functional literacy as well as provide information in local languages on a wide range of topics, including AIDS, teenage pregnancy, nutrition, community empowerment, income-generating activities, food preservation, animal husbandry, child labor, and saving energy. In addition, radio was used to promote literacy outside the classroom.

Although there were some difficulties, such as poor radio infrastructure and inadequate air time to offer literacy programs in fifteen languages, there were real benefits too. Use of the radio strengthened the coverage of the functional and development themes of the literacy program; changed people's attitudes toward issues such as family planning; and contributed to the establishment of income-generating ventures (Siacewena, 2000).

In India the Commonwealth of Learning and the British Department for International Development cofunded projects on literacy, (particularly for women), innovative curriculum design, instructional materials, and appropriate teaching methods. ICT was used as a basis for the delivery of education, information, and training.

Participating groups included the M. S. Swaminathan Research Foundation (MSSRF) and two state resource centers in Jaipur and Indore. Each center was supplied with two computers, one printer, one camera, one television, one VCR, and one audiocassette recorder.

The main project goals were to promote accessibility, interactivity, community ownership, and sustainability. To this end, the project focused on

dialogue and discussions with the community, ensuring that women were active participants, and using participatory rural appraisal techniques. The next step was to demystify the technology, so that the learner could exercise control over its use. It was expected that the community would take responsibility for the on-going use of the technology to serve their own development needs. To this end, capacity-building inputs were provided in the form of computer and multimedia training for the project staff, and audio and video training for both the project staff and village youth and women.

The MSSRF-facilitated center has been more successful than the other state-run centers, primarily because of the involvement of local self-help groups that mediated use and distribution of the technologies. MSSRF encouraged local buy-in by making the family responsible for ensuring that one member became literate, and by focusing on the control of the learners over both the technology and how and why it was to be used for literacy. The Foundation also helped the villagers to use the technology to develop their own material, which reflected local history, language, and other aspects of village life and society. The state-run resource centers tended to be more inflexible, and thus had less response from the local population. The focus at the state-run centers was on the development of literacy skills, which actually discouraged adult participation.

Lessons learned to date about ingredients for success include the need to:

- Select the right partners
- Plan holistically and for sustainability
- Secure community participation and control over use of technology for literacy
- Ensure accessibility and interactivity of technology
- Provide capacity building and on-going resource support
- Change the nature of literacy from traditional literacy to computer literacy, information literacy, and technological literacy

- Acquire and develop a variety of educational programs and materials to cater to the diverse needs of the community (Dighe, 2002).

Computer-mediated education

Computer-based learning is described as the “third generation” of distance learning, building on the first generation of paper-based correspondence courses and the second generation of multiple media systems. A fourth generation is just emerging — “flexible learning” — which uses a combination of multimedia, expanded teaching-learning resources, and computer and Internet supported interactivity (Harry and Khan, 2000).

Computers are used in a variety of ways in schools: as a tool for school administration and management; to teach and learn computer skills; to improve the presentation of classroom work; to teach and learn repetitive tasks as well as intellectual, thinking, and problem solving skills; to stimulate creativity; and for research and communication (Derbyshire, 2003).

A strong argument for the use of computers in education is based on the emerging evidence that computers and the Internet can contribute to increased quality of education and improved experience for both student and teacher. In certain situations, computers in classrooms can increase and improve the value and quality of learning.

Case Study 3: AIDSWEB, Africa

World Links’ AIDSWEB project in secondary schools in Africa used ICT for AIDS education and prevention activities. These included an online AIDS international project, a social action web site design competition, teacher exchange visits, and AIDS educational print-to-electronic material adaptation. Teachers who participated in the project claim that it has raised awareness of AIDS issues among their students, improved research skills, helped the integration of AIDS education into school curricula, and emphasized the role of the teacher as a facilitator (Bloome, 2002).

Case Study 4: Conexiones, Colombia

Conexiones is a project of EAFIT University and the Pontificia Bolivariana University in Medellin, Colombia. Conexiones is an approach to developing computer-supported learning environments for improved quality of and equal access to education. In addition to the regular educational curricula, computers are used to support collaborative learning which helps students identify problems in their community and work as a team to design and propose solutions. The collaboration works not only among students but also among teachers of different subject areas, both within a school and among different schools.

The project is an example of how computers can enrich education, and at the same time build social and cultural awareness and empowerment. Conexiones has helped to improve the institutional climate within schools; ushered changes in roles, attitudes, and valuations; encouraged the participation and recognition of the work of all students; and as a result increased the self-esteem of both students and teachers. “The children are very sensitive to their cultural surroundings — in [Colombia’s] case, the conditions of poverty, intolerance, violence, insecurity, and corruption affect them very deeply. The conviction that collaborative construction and sharing of knowledge are means to face such problems turns ICT into an important opportunity to integrate school, community, and life.”⁶

Computers in schools: ensuring that girls benefit

The use of computers in primary and secondary schools is particularly important for girls in developing countries: they are less likely to have access to computers outside of school, and they are less likely to move on to higher-level science and technology courses. Evidence that primary school students can acquire keyboard, word-processing and spreadsheet skills as quickly as secondary school students, supports the view that it may be important for girls to have access to

computer training early on. (Hafkin and Taggart, 2001; Derbyshire, 2002; Cawthera, 2000).

Very little gender-differentiated research exists on the effects and benefits of technologies for education. As Shafika Isaacs, Executive Director of Schoolnet Africa states, "There is a dearth of research, information, and codified knowledge on women and the educational use of ICTs in education (2002)." Nevertheless, a few studies have emerged recently, which indicate that gender imbalances in access and use of computers do exist, and which point to areas where further research and action would be most effective.

Case Study 5: Schoolnet, Africa

In the experience of Schoolnet Africa, gender integration has been extremely limited in programs that introduce computers in schools. Where girls have access to and use ICT effectively, it is largely by chance rather than through programs that make technology attractive to girls and women. Examples where girls and women were targeted include Schoolnet Uganda, which worked with girls-only schools; Schoolnet Africa, which set up an Educators' Network targeting women who now make up 51 percent of the network; and Schoolnet Mozambique, which along with Schoolnet Uganda set up collaborative learning projects on issues affecting girls and women (Isaacs, 2002b).

A recent study by World Links on computers in schools in four countries of Africa (Ghana, Mauritania, Senegal, and Uganda) found that a high student-to-computer ratio and first-come-first-serve computer policies put girls at a disadvantage. In Uganda, where computers were set up in a separate lab, girls used computers less than boys because it was considered unsuitable for them to run. The boys arrived first and were unwilling to limit their time at the computers to allow the girls to use them. Other socio-cultural factors affecting girls' access included their domestic chores and early curfews at boarding schools, as well as lack of confidence in using computers.

On the other hand, the study also found that when girls had access to computers, they would use them more for academic research and communication with friends and family, increasing their reasoning and communication skills. They also used Internet access to obtain information on issues such as reproduction and sexuality, information not available from their families or communities. Boys tended to use the computers for sports and music and received little academic benefit. When girls did have equal access to computers, their self-confidence improved. One participant in Senegal said, "We are no longer dependent on boys. We feel capable of solving our problems with great autonomy" (Gadio, 2001).

Schoolnet Uganda also implemented a program to increase the number of women teachers in the project, based on the rationale that the gender divide among teachers is often transmitted to the students. The World Links–Schoolnet Uganda program offered a five-day technical training program for twenty women teachers involved in the e-learning course. The objective was to increase the confidence and competence of women teachers with computers, so that they could act as role models for girl children in schools. The participants took apart and reassembled computers to understand how they work, as well as how to use them to support their teaching.

Case Study 6: Sarvodaya Ashram Resource Center, India

The Sarvodaya Ashram Resource Center (SARC) IT initiative is located at a residential school for girls called Udaan (meaning "flight") in Hardoi, India. It is an example of how the integration of computer technology with girls' education can improve student learning, teacher training, and pedagogy skills, and strengthen institutional capacities. The project is established in a remote rural setting, where villagers have had little exposure to technology.

One hundred girls were trained to use computers and experiment with basic computer programming.

Teachers at the school also received computer training, and were involved in the development of one of the software programs. Classroom instruction was designed to integrate self-instruction and group learning activities. Although most of the girls were initially intimidated by the computers, the learning process enabled them to overcome their fears.

The specific objectives of the SARC project are to:

- Utilize computer technology as a medium to deliver to rural children (primarily girls) innovative and complementary education that integrates self-instruction with more traditional group-learning methods
- Improve CARE India's ability to identify, create, manage, and share development knowledge effectively among various projects and sectors (including health, agriculture, and emergency relief)
- Document the lessons learned in order to contribute to the body of knowledge on computer-assisted education and to ensure the replicability of the project in other areas.

Future plans include developing additional software programs for use in the classroom, and adapting existing technological resources to improve community programs in agriculture, health, and microenterprise. In addition, the interactive CDs that are developed will be shared with other schools in the region that lack high-quality learning materials in Hindi (CARE India, 2001).

Distance learning, another use of ICT

Distance education through ICT provides a great opportunity for women and girls. Studies indicate that distance education provides women with a means to overcome many obstacles. The flexibility of access and study times and the potential to reach women in rural areas make this a very positive educational approach for women.

Interviews with women in Asia demonstrated that women used distance education to find a

career that would enable them to support their families and send their children to the university; improve their performance in their current work; increase their self-confidence; and learn new skills. Most had to overcome strong opposition from family members, which often dissipated when the benefits to the family as a whole became evident (Kanwar and Taplin, 2001). A study in Barbados reveals that the use of ICT for distance learning is helping to encourage young women to study science and technology (Commonwealth of Learning, 1999).

Learning from the Internet: e-learning

E-learning generally refers to teaching and learning that takes place through the Internet. It has been defined as "the use of network technology to design, deliver, select, administer, and extend learning." E-learning strategies are most pertinent at higher levels of education, and where dependable and affordable Internet access is available.

Studies show that women enthusiastically and successfully take advantage of e-learning opportunities. Studies of distance education in North America have found that women outnumber men in enrollments in distance courses, ranging from 61 percent to 78 percent in selected universities, although enrollment of women in other parts of the world varies considerably. A 1992 study found that women outnumbered men in distance learning courses in New Zealand and Israel, but that the opposite pattern existed in Britain, Germany, and Spain. According to a more recent study, enrollment for women in some of the larger distance education institutions varied from 50 percent at the Open University in the U.K., to 27.4 percent at FernUniversität, Germany, 54.7 percent at UNED, Spain, and 38 percent at the Open University, Netherlands. Developing country statistics appear to be available primarily from South and Southeast Asia. Women make up 26 percent of students at the Indira Gandhi National Open University, India; and 40 percent of students in secondary education at the Bangladesh Open University. Interestingly, women also make up 60

percent of students on the merit list (Trivedi, 1989; Evans, 1995; Kanwar and Taplin, 2001; Thompson, 1998; Commonwealth of Learning, 1999).

A study of ICT-based lectures at the FH-Joanneum in Austria found that female students prefer the privacy of virtual education, with no pressure or fear of appearing stupid in front of male students. A survey of students at the Open University in the U.K. revealed that female students appreciate the use of computer conferencing for contact with other students, course directors, and tutors, suggesting that women may experience more support in an on-line environment (Gferer and Pauschenwein, 2002; Bissell et al, 2002).

Case Study 7: Ewha, South Korea

The Ewha experience that follows is closely based on David Cohen's account (Cohen, 2001).

Ewha is part of a national initiative in South Korea to create fifteen virtual institutions, partnerships between sixty-five universities and five companies, each operating within an existing university system. These institutions have developed new educational programs using various ICT, such as satellite broadcasting, videoconferencing, video on demand, and the Internet. They have made available to the nation's students everything from single Internet courses to retraining opportunities, and complex projects that make innovative use of new technologies. Ewha offers 152 full-credit virtual courses to 8,799 female students across South Korea, including poor women from the hinterlands, housewives, and mothers in Seoul.

A new "lifelong education" law, which came into effect this year, has inspired the creation of nine South Korean cyberuniversities that focus on continuing education, including worker training. Ewha believes that women will reap the greatest benefit from the push toward higher education. In 1996, South Korea officially became a member of the Paris-based Organization for Economic Cooperation and Development (OECD), and began aggressively pursuing strategies to broaden

IT education. Today, 35 percent of high-level IT positions in corporate South Korea are held by women.

Challenges to e-learning for women

Challenges to e-learning include the high cost of online access in much of the world, combined with increased costs of higher education in general. In order to reach women and groups in other socioeconomic levels, alternative access strategies need to be investigated. The Women into Technology Project at the Open University, U.K. initiated a variety of actions to increase the rate of women's enrollment including:

- Providing a course on updating skills and technical expertise to help women engineers reenter the workforce
- Offering bursaries
- Using publicity appealing directly to women
- Building confidence and group identity through small groups led by women who had completed the course successfully
- Providing a supportive network of peers
- Offering first-year courses which provide "catch-up" instruction and holistic views of technology in social and historical contexts
- Providing computer-aided learning packages and "key skills" for certain courses
- Using computer conferencing, the web, and television (Evans, 1995; Bissell et al, 2002).

The experience of the African Virtual University (AVU) demonstrates that online teaching institutions based in developing countries cannot depend on the same telecommunications infrastructure available to the Open University in the U.K. and must carefully examine available infrastructure and technology cost to determine the feasibility of this kind of initiative. The AVU has shifted its focus to become a technology and content resource broker and advisor for developing country institutions. It provides support for the development, delivery, and maintenance of on-line and distance learning programs, and digital library services. In 2002, 40 percent of its 23,000 students were women (Wolff, 2002).

Other challenges include:

- Complex and time-consuming implementation and a shortage of high-quality course content
- Limited course offerings mostly targeting the larger-sized corporate markets
- Widespread use of English as the language of the courses
- Lack of content for groups with lower levels of literacy
- Unavailability of courses targeted to the training needs of micro and small businesses
- Continually changing nature of the technology raising cost and maintenance concerns
- Need for major changes in student behavior and in the approach of teachers to e-learning (Capper, 2001).

Teacher training

Research data are more widely available on distance education for teacher training. In general, technologies can provide high quality teacher development strategies, with benefits beyond those found in traditional face-to-face approaches. Online or distance education for teacher training provides an important opportunity for women, since when properly implemented, it is a useful approach for women for reasons of flexibility of time, lower cost, and method of learning. This is important, since in OECD countries and probably in many other parts of the world, women make up the majority of teachers at the pre-primary, primary, and lower-secondary levels of education (OECD, 2001).

Distance learning:

- Gives teachers access to learning any time, any place
- Provides teachers with opportunities to view numerous instances of teaching practice, and to engage in reflective and analytic learning activities and discussions
- Allows teachers to access the instructional products such as student work, and teachers' lesson plans and assessment instruments
- Provides access to a broad array of teaching

and learning resources across subject areas

- Allows teachers to participate in learning communities, to share ideas and resources with their peers and other experts anywhere in the world
- Provides sustained, ongoing opportunities for teacher development
- Can involve a range of individuals and groups with different types of expertise that can contribute to teacher development, such as university faculty, subject experts, researchers, curriculum specialists, and members of professional subject associations
- Provides uniform training quality with the flexibility of local customization
- Can be tailored to specific needs and curricula of an education system (Capper, 2002).

Case Study 8: Canadian International Development Agency, Guyana

In Guyana the Canadian International Development Agency (CIDA) has funded a project to train teachers in remote areas through distance education. The teachers are young women aged between sixteen and twenty-four, with only primary education. The women travel often by foot for two to three days to reach the training center, where they are taught using a combination of print materials and teacher support.

Over three years, 1000 teachers have completed the three-year course in a region where there is no other form of teacher training or support.

The women often travel with their young children. Travel at any time of the year is difficult, and during the rainy season particularly so. To address this problem, the use of audio and video cassettes is planned to be introduced, to allow the women to learn at home (Sproule, 2002).

Costs and benefits of technologies for distance learning

Despite the potential to improve access for women to education and encourage their participation in the knowledge economy, the costs and

efficiency of distance learning models must be carefully assessed, both in terms of the technology and the content.

A technology-dominated system of education can be established more economically than conventional education *only if*:

- A greater part of the curriculum can be delivered through ICT
- An adequate communication infrastructure is in place
- Capacity and resources to train teachers already exist
- The cost of learning per hour is below that of conventional education (Perraton, 2002; Cawthera, 2002)

Perraton (2002) comments, "No matter which rationale dominates, the use of computers in the classroom presents significant demands to ministries of education." Costs are not restricted to hardware and software. In the case of Jordan, personnel and training costs themselves constitute two-thirds of the total investment, involving changing the attitudes of teachers, training in the use of computers to accelerate learning, and basic training in computer and Internet use (Perraton, 2002; Berry, 2002). The total cost of education goes up when technology is used to support or improve the work of teachers. Only in out-of-school programs can certain technologies reduce costs, where they replace the teacher or make it possible to employ less qualified staff. Radio and television have the potential to be cost-effective, but generally on economies of scale. Telesecundario in Mexico, a television-based project, and Telecurso in Brazil indicate that large countries can implement such projects economically. Radio and television projects in China, Brazil, and Mexico will be more cost-effective than similar projects in countries of 500,000 or a few million (Perraton, 2002; Rumble, 2002).

Here are some factors to keep in mind when implementing distance education programs:

- Sequential use of predecessor tools can be

very effective. Some of the most successful examples of distance education exist in China, where it began with paper correspondence and gradually moved up the technology scale to radio and television, to CD-ROM, to the Internet, and finally to the web.

- Virtual education requires a long gestation period. Commitment, effort, investment, and implementation must be sustained over a long period of time in order to adequately judge results and potential.
- Invest more in people than in technology. Learners not only require adequate infrastructure, they also need to be comfortable and acquainted with the technologies in order to reap the greatest benefit from their use.
- Beware of hidden physical costs. These include renovation and upgrading of buildings housing computers, heating and cooling, electrical capacity, and security.
- Software can be very expensive. Alternatives such as open source software may be appropriate.
- Replacement costs for parts and the computers themselves should also be considered.

Recommendations

It is evident that not enough research has been done on the feasibility, efficiency, and reach of various strategies for using ICT for education, particularly with respect to gendered distribution of benefits. Therefore, sex-disaggregated data needs to be collected at every level of implementation.

Support and encouragement for increased participation of women and girls need to be present at every level of scientific and technical education to motivate them to continue their education past primary levels and increase the recruitment and retention of girls at higher levels. More women teachers and role models, alternative schools with flexible schedules, and culturally appropriate facilities are some of the ingredients for success.

It is important to generate curricula which address

the interests and perspectives of women and girls, and do not include gender stereotypes. In this area, the Bank could work with clients and operational colleagues to expand the focus of its technology curriculum to include science education that emphasizes hands-on activities and application to everyday life, society, and the environment.

Programs to introduce computers in schools should take into account differences in access between girls and boys. To make sure that both girls and boys benefit equally, computer access should be structured and monitored; the issue of girls' domestic obligations should be addressed; and training in the use of computers should be designed to ensure that girls feel comfortable using them.

Distance learning programs using ICT should involve women in setting up and implementing projects that target men and women equally.

To increase the successful participation of women in the IT workforce, education must help to demystify technology, while carrying on the task of training and retraining.

Costs of ICT in education should be carefully assessed. Although there is no substitute for school in basic education, the new technologies, when properly implemented in a larger national strategy, with resources for ongoing project support, can contribute substantially to the quality of learning and teaching at all levels, and for men and women equally.

ICT in education and the World Bank

Supporting the education of girls and women through ICT, and using ICT to support women's technical education are key aspects of several World Bank sector strategies.

The Education Strategy (1999) stated: "Adult education, literacy, and lifelong learning must be combined with the fundamental recognition that

education of women and girls is central to development." It also referred to the importance of ensuring the quality of learning and teaching. Unquestionably, ICT represents an opportunity to ensure equal access to quality education, but to succeed it is necessary to be aware of gender-differentiated needs. All components of the strategy therefore have gender implications. Those with particular relevance to education and ICT include:

- Equal access to basic education. Girls will not automatically have equal access to computers and other technologies introduced into the classroom. Specific actions must be taken to ensure they can benefit equally with boys.
- Development of curricula in keeping with technological change. This will be an important element in increasing the participation of women and girls in the knowledge economy.
- Effective teacher training and supervision in a flexible environment that women feel comfortable with, such as distance learning.
- Facilitating the inclusion of women in an educated and skilled population through targeted education programs, skills training, on-the-job training for advancement, and Internet community access for women.

A review of Technology in World Bank Education Projects from 1997 to 2000 (Georgiadis, 2001) found that funding tended to be focused on putting computers in primary rather than secondary or tertiary classrooms. While in some respects this may be of particular benefit for girls who are less likely to go on to secondary and tertiary education, the question has been raised as to whether it is more efficient to provide computers at higher school levels, where there are generally better infrastructure and support, larger budgets, and more chances of the students, including girls, entering the workforce (Cawthera, 2000).

A short checklist to ensure that girls benefit from these projects would include the following:

- Are there measures in place to ensure equal access for girls, such as computer access

schedules to accommodate girls when they are free from domestic chores, and steps to increase their comfort and confidence in using computers?

- Do teachers and computer laboratory instructors understand how the use of computers can affect and improve learning? Are they involved in decisions on the use and development of curricula? Are there distance learning programs they can take advantage of?
- Are there enough trained women teachers to motivate and mentor girl students exposed to computers in the classroom?
- Will computers be made available to the community after school hours, and are women's groups involved in setting up access programs?

A review of Bank-funded technical and vocational training in Africa found that women continued to be an overlooked target group for skills development, despite their substantial participation in the workforce (Johanson, 2002). ICT can provide innovative ways for women to obtain and update skills for equal participation in the knowledge economy. The experience of the Cisco Networking Academies and other initiatives indicate that women successfully take advantage of opportunities for high-level technical education. Such experiences are incentive for the Bank to support initiatives which target women for training and provide flexibility and easy access to technically advanced and cognitive work.

Notes

1. A community of practice is a "group/network of people engaged in a joint enterprise, interacting with each other and learning as they do." Members generate and build on a "shared repertoire of skills, discourses and artifacts (Kirkup, 2002, 3)."
2. The popular conception of a "geek" or "computer bum" is the "compulsive programmer", generally a young white male, whom MIT computer

scientist Joseph Weizenbaum famously described as "transfixed" at the computer, working twenty to thirty hours at a stretch, eating take-out food and drinking Coca-Cola for the caffeine and sugar. Uncaring about his appearance, he is generally unwashed and unshaven, with rumpled clothes and uncombed hair. (Weizenbaum cited in Margolis and Fisher, 2002, 66).

3. The university also found gender differences in how men and women valued certain elements of ICT-mediated teaching: 82 percent of women appreciated computer conferencing, compared to 58 percent of men; 91 percent of women used web resources, compared to 50 percent of men; and 32 percent of women used television resources compared to 18 percent of men.
4. The CD-ROM for Women Entrepreneurs developed at the Nakaseke Telecenter in Uganda is an example of the use of ICT for training in small enterprise development at the rural level. See Mijumbi, 2002.
5. http://www.digitaldividend.org/knwlodge_bank/knwlodge_bank_02_conexiones.htm

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6

Gender Focus in National ICT Policies

The purpose of this review is to assess the extent to which existing national ICT policies have taken gender into account, and if so, to what extent these policies have impacted employment, entrepreneurial opportunities, and political participation of women. Engendered national ICT policies can provide women with more employment in ICT and related industries; more opportunities to set up micro and cottage enterprises utilizing e-commerce; more access to social services in health, education, and communication; and higher political participation and economic empowerment.

In developing countries, given the low penetration of telephones and the Internet and the relatively higher penetration of television, radio, and cable, it is these other technologies that have a larger potential to address gender concerns. Many people believe this potential is not being recognized and that there is an overemphasis on the Internet at the expense of these other technologies in the ICT policy dialog.¹ Many policymakers are concerned with the negative social fallout of the expanding reach of these other technologies.

There are efforts in many Asian and Middle Eastern countries to regulate the content of electronic media to reduce what is perceived as the negative influence of western culture on the younger generations in these societies.²

Policies relating to this broader definition of ICT are difficult to review and evaluate for their gender focus because the policy pronouncements on these varied technologies do not come in a comprehensive document issued by a single department or ministry. Some countries are grappling with the issue of restructuring their departments and ministries to take a holistic view of these media, even as the technologies move toward convergence.³ The biggest lacuna in developing countries exists between policy pronouncement and legislative and administrative actions. Often because of weak implementation, policy initiatives remain confined to paper.⁴

This chapter reviews the national ICT policies and labor policies of eleven countries in an effort to assess the awareness of gender in these policies

and to identify the policy initiatives taken by national governments to address gender concerns. It also reviews studies that illustrate effective policy initiatives that have resulted in widening the horizon for women. Findings from these two sources would help suggest actionable policies that can be part of World Bank proposals to client countries. The final section presents conclusions on the current status of gender in ICT policies and makes some recommendations on possible ways to introduce gender concerns in national policymaking.

Review of national ICT policies and gender focus

While advocates for gender equality in ICT gained their first international foothold at the fourth World Conference on Women in Beijing in 1995, the issue of gender in ICT policy has been on the international scene since 1998 (Hafkin, 2002). A year earlier, Goetz (1997) noted in the broader context of gender and development that despite improvements in the rhetoric, the outcomes of many programs have failed to “alter the asymmetrical distribution of resources and social values which contribute to the social construction of gender inequality and differences.” Analysis of ICT policies of eleven countries five years later (see Appendix 1) confirms Goetz’s conclusion.

Since there is very little information published on gender issues in ICT policies, any developing country for which a reasonable amount of information was available was included. ICT policies can be put into three major categories: infrastructural, vertical, and horizontal policies. Infrastructural policies deal with the development of national infrastructure and are closely linked with telecommunication. Horizontal information policies deal with impact on the broader aspects of society such as freedom of information, and also tariffs and pricing, privacy, and security. Vertical information policies address sectoral needs such as education, health, tourism, and industry. The policies reviewed here deal with all of these issues but they lack any mention

of gender. Table 1 summarizes the conclusions from the profiles of eleven countries. In most of these countries the ICT policies deal with problems of deregulation of telecommunication and ISPs, and promoting growth of the software sector.

In some countries such as India and South Africa, there is a focus on access and infrastructure for both rural and urban poor. The South African ICT policy finds a place for gender issues but there are conflicting reports on how effective such policies are once they are implemented. The South African Department of Communications was featured as a role model for the development of gender policy. The department has established telecenters that are owned and managed by women. However, Gillwald (2000) noted that while the legislation for the telecommunications sector is enabling and empowering for women, the implementation process and strategies have not had any significant impact. In Israel ICT policies seem to be gender neutral. As a result the participation of women in the ICT labor market is high. In general, there seems to be a large gap between policy pronouncements and implementation in most countries.

Other reports also indicate that by and large the focus on gender issues is not pronounced in ICT policies and projects. An expert group meeting organized by the Economic and Social Commission for Asia and the Pacific (ESCAP) to review ICT policies from a gender perspective in December 2001 discussed the policies of Australia, India, Japan, Korea, Malaysia, and the Philippines. Most of these policies focus on the growth of the ICT sector and the need for providing access to the masses. The mention of gender issues is marginal (Garcia and Villanueva, 2001). The only exception was in Korea, where the blueprint for a campaign on the Cyber 21 Plan advocated that all Koreans regardless of age, sex, region, and income should have the opportunity to use computers and the Internet. Korea is also considering a legislation for affirmative action to ensure that

Table 1. Countries: Gender focus in ICT Policies: Conclusions

Brazil	ICT policy does not address gender concerns. Shrinking of the ICT-related labor market has affected women more adversely than men. In spite of a constitutional provision of gender neutrality, the ground realities at the workplace, including the ICT-related sector, are not women-friendly.
El Salvador	Women NGOs are concerned about education, gender equality, and violence against women. However, so far this concern has not led to specific policies to promote increasing presence of women at different job levels in the ICT sector.
Hungary	No mention of gender issues in ICT policy documents. Women had a significant presence among university degree holders in 1996, though it was not so marked for ICT-related disciplines. Women’s Internet use has grown from 37 percent in 1998 to 47 percent in 2002 – a noteworthy increase.
India	ICT policies have been oriented to the growth of the software sector and have only recently begun to emphasize the role of IT applications. There is no mention of gender issues in policy documents. Telecommunication sector was deregulated in 1994. It appears that much more is said than done about ICT for the masses. Internet penetration is still very low and confined to urban areas. Women’s employment in the IT-enabled services is significant at 37 percent.
Israel	ICT policy has emphasized growth of the ICT sector. The education policy has worked toward extensive computerization in schools. High percentage of women can be found at university degree level (56.6 percent) and in ICT-related degree courses (47.6 percent). In 1997 women held 51 percent of jobs in the electronic component sector.
Malaysia	Adequate infrastructure in telecommunications, increasing capability in IT, and a satisfactory level of supply of tertiary-educated IT skills to make productive use of ICT in networking and promote teleworking. However, the existing level of teleworking is relatively low.
Philippines	Participation of women in the labor market is high in all sectors, including ICT. National gender policies encourage women’s participation but there is no specific mention of gender in the ICT policies.
Romania	There seems to be a women-friendly gender policy in place, although not explicitly as a part of the ICT policy. Romanian women enjoy high literacy rates, constitute 56 percent of all employees in professional and technical careers, but in reality women seem to experience discriminatory treatment in recruitment and wages.
Russia	Traditionally women have enjoyed high literacy rates, and their participation in the labor market has been considerable. However with inadequate telecommunication infrastructure and a lack of consistent government policies, the ICT sector works far below its potential. No data found on current participation of women in the ICT sector.
South Africa	National ICT policies recognize the need to address gender issues. Many NGOs are also working toward expanding training facilities for women in the ICT sector. However, the net impact on the participation of women in the labor market or education in ICT sector is not significant.
United Arab Emirates	There is great emphasis on women’s education, and their participation in degree courses including presumably the ICT-related disciplines is improving. Yet due to local socio-cultural forces, and little economic compulsion, their presence in the ICT sector is limited. No hard data are available.

women occupy 10 percent of the jobs in scientific institutions. In Malaysia, although increasing numbers of women are participating in the ICT workforce of an export-oriented economy, this has still to advance the lot of the majority of women workers in the country (Sim, 1999). In a study of four countries that were considered leaders in ICT policymaking — Mozambique, Senegal, South Africa, and Uganda — it was found that ICT policies either ignored social issues completely or focused on rural needs ignoring the specific needs of women.⁵ The only exception was South Africa, which did focus on gender issues confirming the overall assessment presented in this report.

Since telephony has been around for a much longer period, it was hoped that a review of telecommunications policies might indicate a greater degree of engendering. Up to 1998, there did not seem to be a large amount of research on gender issues in this sector. The ITU site on gender issues hosts several papers that are of a general nature. Those connected with the telecommunications sector identify the key issues but limited research is reported to test specific hypotheses that would aid policymakers. A notable exception is the work by Sonia Jorge (Jorge, 2000), which is extensively cited including in other sections of this chapter. A special session on gender issues at the World Telecommunication Development Conference (WTDC-98) noted, “As far as the telecommunications sector is concerned, we feel that there is much to be done to further enhance the position of women as users, as well as providers of telecommunication facilities and services. These services are to be made accessible for all women, meaning at affordable prices.”⁶

A number of suggestions were made as to how the ITU program might be engendered. These include areas such as: rural telecommunication networks, universal access, broadcasting, telecommunication as a social service, development of telecenters, telemedicine, tele-education, telecommunication and trade, telecommunication and the environment. The conference recommended that data collection for

the telecommunications indicator series should provide gender-disaggregated statistics. Another recommendation concerned a program of action to increase the number of women who are employed in the telecommunications sector at varying levels of responsibility. The special session heard evidence that in a majority of telecommunication organizations, women were underrepresented at professional and technical levels.

ITU noted that telephones could enable working women in developing countries to manage their multiple roles.⁷ It is well known that most men from rural areas go to the city for work, while the women stay behind in the villages to run and manage small businesses, or work in the farms. Availability of a telephone would make it easier for them to contact spouses and children in major towns.

A review of the Indian telecommunication policy indicates that it specially recognizes the importance of providing telephone access to the rural population and the urban poor, but women have been completely ignored.

Hafkin and Taggart (2001) have also reviewed the extent to which ICT policies have been engendered. Their review indicates that to date developing countries have implemented few concrete policies to promote gender equality in the use of IT. Most countries centered on competition and investment policy, technology regulation, and rural access. They argue that gender-neutral policies can have negative gender impacts upon implementation unless monitoring mechanisms are put in place. The review enunciates several gender concerns in ICT policy. Some of these are included in this chapter. Perhaps the most important observation is that gender needs to be taken into account not only in the content of ICT policy but also in the process of policy elaboration, implementation, and evaluation.

Review of Case Studies

Of the world’s 960 million illiterates, 66 percent

are women. Literacy limits women's access to computer applications. One way to increase access of women to technologies is to develop interfaces which are icon-based. For example, in an experiment in India, an icon-based interface facilitates auxiliary nurse midwives' (ANM) use of hand-held personal digital assistants.⁸ In another interesting experiment, technology is being used to improve literacy through the medium of television. A transcript is provided in the local language of the film songs being played on the television. Since film songs are extremely popular in India, newly literate men and women watching the programs tend to associate the spoken words with the written script, enhancing their retention of what they learn (Kothari, 2000). Evaluation studies have measured the improvement in literacy, and the program is being scaled up from a pilot version.

Creating local access points that are easy for them to reach can reduce the cost of access to communication technology for women. The actual cost of service can be minimized through cross subsidies (as is done in the case of GrameenPhone),⁹ or by direct subsidies (as is being done in north-west India), or by opening telecenters with free access. Monitoring of universal service obligations, and nominating representatives of women's advocacy groups in the telecommunication advisory council can also help in improving access.

A combination of new and old technology can prove effective. In Kothmale, Sri Lanka, the outcome of an Internet search for content relevant for rural population and triggered by a query from one of the citizens is broadcast on the radio.¹⁰ Volunteers help in the process of search and broadcast. In another experiment by the M. S. Swaminathan Foundation, data on weather patterns is downloaded from the U.S. National Aeronautics and Space Agency (NASA) web sites and broadcast through loudspeakers so that local fishermen can be informed.¹¹ Policies are required that support community radio, encourage research and development for linking technologies, and

promote the adoption of these technologies through subsidies.

NGOs working together with women activists can influence the content of the electronic medium, particularly when it comes to the negative portrayal of women. To make the content more relevant to the needs of women requires greater participation of women in developing the content and providing feedback. In different experiments in Andhra Pradesh, India, use of community radio, video, and audiotapes with socially relevant content, has been quite successful.¹² For ICT to be an effective tool for development, local government and advocacy groups need to ensure that women are included in their programs. For content to be relevant, policies need to be devised to mandate the participation of women in watchdog institutions such as media advisory groups and consumer councils.

Addressing women's issues in national ICT policies

Most countries do not mention gender concerns in their national ICT policies. It is also true that the ICT policy is not always the most important hindrance to the creation of an egalitarian information society. In fact the growth of an e-society in itself may create opportunities for women's empowerment.¹³ Whether engendering of policy is a necessary precondition to addressing the key gender issues should be seen in the specific context of a country and the degree of development of the ICT sector. The rest of this section explores some avenues of engendering ICT policies to align them to specific gender concerns.

Ensure gender neutrality if ICT policies have a development focus

It is now widely acknowledged that ICT has a major role to play in development by

- Improving economic efficiency and competitiveness through information flows, wider access to wider markets and market information, and human resource development

- Increasing efficiency and effectiveness in delivery of services such as education and health through greater information dissemination and distance learning
- Improving public administration and governance through creation of possibilities for efficient management, improved decisionmaking based on accurate information, improved coordination between departments and agencies involved in development, and increased accountability to beneficiaries
- Increasing opportunities for poor communities through improved access to services
- Empowering marginalized groups through increased voice and global support for people's movements
- Creating opportunities to increase social capital through better communication between groups, entertainment, and increased public participation in political, administrative, and institutional activities.¹⁴

If any of these objectives were to be achieved, as is the intent of some ICT policies, women would also stand to benefit, provided the implementation ensures that there is no discrimination against women in employment, training, or access to technology.

Labor market participation

The argument to include gender analysis in ICT policy is built on the following premises:

- There is no explicit attention paid to gender in policymaking.
- Gender issues are not considered in the implementation of ICT.

By and large, ICT policies are concerned with the growth of the ICT sector. There is hardly any mention of gender concerns in the policies reviewed in this chapter. Countries such as India and Brazil where large numbers are employed in the ICT sector demonstrate that the influence of ICT policies on the rate of labor market participation of women can at best be marginal. On the other hand, there are examples of national industrial

policies and labor policies that have a much greater impact on the labor market across all sectors including the ICT sector. For example in the textile industry in Malaysia, Sri Lanka, and Bangladesh, policymakers made deliberate efforts to attract multinational capital by offering the incentive of cheap female labor (Banerjee, 1999). Women's participation in the work force in modern industries in these countries, however exploitative, was a departure from traditional gender roles and was prompted by this industrial policy initiative. Similarly, education policies can have a significant impact on preparedness of women to enter the ICT labor market.

This is why the causal link presumed between the two premises needs to be investigated further. One way to do that would be to examine empirically whether countries that include gender in their ICT policies have done well. Any quantitative analysis is difficult as the number of countries that include gender in their ICT policies is very small, and the policies themselves appear to have little impact on labor market participation in these countries. On the other hand there are examples of countries such as India where women in large numbers (37 percent — significant when compared to similarly paid jobs in other sectors) are employed in IT-enabled services purely because of market forces, and without any explicit engendering of ICT policies.

Although it will do not harm to include labor market participation goals in the ICT policies, other instruments may be more effective in increasing women's participation in the ICT labor market. For example, employment opportunities are largely determined by the hiring policies and practices of the private sector. Unless gender discrimination is an issue (which is not the case in countries with a large ICT market in the low level jobs, for example), the impact of government policy is marginal.

It is important to sensitize industry associations to create awareness of gender-friendly work

practices. For example in India NASSCOM, the software industry association, has lobbied with the labor ministry to relax the rules regarding fixed work hours for women to allow more women to participate in the IT-enabled services sector. This also suggests an alternative approach to gender analysis. Instead of defining ideal goals in all spheres of policy, analysis can look for specific policy impediments that need to be removed.

Efforts to increase labor market participation of women will be worthwhile in countries where the ICT sector is a significant employer. In many countries where the sector is small, engendering will only have an insignificant impact. Gender sensitization of policymakers in several domains (labor, investment, ICT) is important so that policies can be modified to take advantage of opportunities that may arise with the growth of the ICT industry. Some constructive ideas for engendering such policies are listed in Table 2.

Increasing educational opportunities

Many countries adopt proactive policies to promote participation of weaker sections of society in a variety of political, economic, and social spheres that often include affirmative action. Although ICT policies have few examples of prescribing affirmative action, there are education policies which have promoted the employment of women in the ICT sector. For example, the Andhra Pradesh government in India has mandated a quota of 33 percent seats for women in engineering colleges (see Appendix 1). This figure is significantly higher than the actual enrollment in engineering colleges in the rest of the country.

Expanding access to ICT

ICT policies have the potential to significantly increase the access to ICT by poor and rural populations, thereby increasing access to women. As indicated earlier, increasing rural access has been incorporated as a goal in the ICT policies of several countries. The short-term impact has been marginal because of the poor economic viability of rural telecommunication expansion. In the long

run (three to five years) policies can begin to influence rural access as is happening in India.¹⁵

Enhancing services through electronic delivery

Most of the e-government applications for service delivery have been developed through departmental initiatives. Although departments of education and health have a very significant interface with women and any effort to introduce electronic service delivery can benefit women, current applications concentrate in the regulatory sector and tax collection.¹⁶ Even so, there are areas such as choice of location of access (for the Internet, telecommunication, e-government service center, or training class) where specific policy guidelines can make a difference for women.

Goals for engendered policies in different domains

More research is needed to show where it would be most effective to address gender concerns in ICT policy. On the basis of the limited evidence presented in this chapter, a variety of gender concerns have been identified that can be incorporated into national ICT policies, labor and employment policies, industrial policies, and education policies. These are pulled together in Table 2. Hafkin (2002) presented a similar but more elaborate table including twenty ICT policy issues and literally hundreds of gender aspects related to these issues. An attempt has been made to include those gender aspects that have already been included in some way by a country in its ICT, labor, and education policies. The table draws from the work of Jorge (2001) in providing gender-aware guidelines for policymaking in the telecommunications sector. As Marcelle (2000) has argued in the context of Africa, integrating gender considerations in national ICT policy formulation and implementation requires strong national political leadership and coordination mechanisms. The need for a coordinating agency is greater in countries where policies related to ICT are formulated in several departments and ministries.

Table 2. Factoring gender aspects in ICT policy issues

ICT/Education/Labor policy component	Gender aspect
General	<ul style="list-style-type: none"> •Sensitize policymakers to gender issues, and gender advocates to ICT issues. •Establish gender unit within a ministry, department, or regulatory agency. Revise regulations, circulars, procedures of all departments to remove gender bias. •Develop and establish systems to gather gender statistics. •Mandate participation of women in watchdog institutions. •Provide incentives to develop e-commerce platforms for women-owned enterprises. •Provide tax breaks, subsidies, and funding assistance for developing technologies for the illiterate and newly literate.
Infrastructure	<ul style="list-style-type: none"> •Is the infrastructure to be deployed in areas where women predominate? •Are the locations chosen convenient for women? •Do women own and manage these facilities in equal proportions? •Is data gathered on women's use? •Is feedback taken from women if their use is low?
Regulatory frameworks	<ul style="list-style-type: none"> •Reduce licensing fees, spectrum prices, and interconnection charges, to provide affordable tariff in rural and urban areas. •Make universal service mandatory for telecommunication operators. •Develop and deploy technologies that promote penetration of telephone and the Internet in rural areas. •Provide incentives to develop and deploy technologies that would facilitate use by rural women.
Engendered labor policy	<ul style="list-style-type: none"> •Equal hiring opportunities for women and men. •No wage disparity between men and women. •Campaigns to attract women professionals to technical and management positions. •Nondiscriminatory working conditions, employee privileges, flexible timing. •Tough measures on sexual harassment at the workplace. •Commissions empowered to swiftly redress complaints of discrimination.
Engendered education policy	<ul style="list-style-type: none"> •Equal access to training opportunities. •Gender-awareness training for all. •Technical and management programs to train women professionals and internship programs with educational institutions. •Free education, subsidized fee, reserved quotas in technical education for girls. •Scholarships and grants for women in science and technology. •Training programs to establish ICT-related business, such as e-commerce, telecenters, public call office
Licensing	<ul style="list-style-type: none"> •A gender-neutral licensing policy can allocate a certain number of telecommunication licences to women-owned businesses; waive license fees for communication businesses run by women entrepreneurs or those that provide services to underserved areas. •Licensing procedures should be transparent so that women applicants can have ready access to the information. Community radios run by women's groups have proved effective in involving women in community affairs.
E-government	<ul style="list-style-type: none"> •Women can benefit from many e-government services especially in delivering health and education. They profit from online availability of services that would otherwise require travel to the capital city.

An important aspect of engendering policymaking is understanding the nature of the impact of policy content and implementation. When itemized bills were introduced in the U.K. by the regulators, some NGOs argued that itemizing a bill should not be made the default option because battered women needed to be protected from their abusers at home, who could easily find out if the women were seeking help through a scrutiny of itemized bills. On the other hand, the benefit for women of the service that provides caller identity was quickly recognized.

Some gender experts, while working with government policymakers and regulators, find that using statistics or case study data can demonstrate the gender effects of a policy and or regulatory decisions. In this context, knowing which questions to ask about a proposed action or policy can be an important change agent. It often makes it easier to integrate gender into implementation without necessarily changing the policymaker's gender position.¹⁷

Therefore, as Hafkin has emphasized, incorporating gender issues into ICT policy should proceed on at least two fronts: sensitizing policymakers to gender issues, and sensitizing gender advocates to IT issues (Hafkin, 2002). Very few policymakers are trained to think from a gender perspective and unless they are educated on how to do so at all steps of the process, we simply will not get gender integrated into policy.

Sensitizing women's organizations and civil society in general to the gender impact of ICT policy issues may pay greater dividends, in terms of awareness raising of a large segment of society to the social implications of the national technology policy.

The goals enumerated in Table 2 can also be applied to engendering projects funded by multilateral agencies. A single-minded application of gender analysis of projects can lead to positive outcomes. For example, the Canadian International

Development Agency's (CIDA) dogged insistence on focus on gender issues prompted the Centre for Telecom Policy Studies at the Indian Institute of Management to conduct two special studies where gender profiles of telephone users were collected and analyzed.¹⁸ Such studies would not have been undertaken without an active follow up by CIDA.

Notes

1. Discussions in the Workshop on ICT and Development organized by UNDP to prepare its five-year ICT plan noted the lack of emphasis on these technologies in development dialog, and specifically identified the neglect of community radio as a tool for empowering women. India does not permit the operation of a private radio except for entertainment purposes in urban areas. <http://www.undp.org.in/MEDIA/MISC/4nov2002.htm>

2. Censorship in explicit forms exists in many Muslim countries and is exercised in milder forms in countries like India. See censorship on the small screen. <http://www.thehindu.com/2002/08/16/stories/2002081600190800.htm>

3. Erwin Lemuel G. Oliva, "Philippines lags behind neighbors in ICT", 2002. INQ7.net http://www.inq7.net/inf/2002/nov/28/inf_5-1.htm

4. At a training session of intermediaries bridging the digital divide (Regional Development Dialog, Jan 2003, United Nations Centre for Regional Development, Tokyo) Devyani Mani noted that these policies may be well drafted, but the challenges are translating them into practice through identification of programs and projects using ICT for development, and the incorporation of ICT in ongoing programs and projects for local development. The causes of policy failure related to uses of ICT in development are generally, insufficient vision, low motivation to use new technologies that may upset entrenched interests, insufficient incentives, and inadequate skills at the local level.

5. Gillian Marcelle, "Gender Equality and ICT Policy," presentation at World Bank Digital Divide Seminar Series, 2002, Washington, D.C. <http://www.worldbank.org/gender/digitaldivide/worldbankpresentation.ppt>

6. Ali Habsou, "Women and Telecommunication Development," Niger, World Telecommunication Development Conference (WTDC-98), 1998, Document 40.

7. K.S. Maluki, "Gender Issues in Telecommunications," World Telecommunication Development Conference (WTDC-98), 1998, Documents 79 and 142.

8. For more information on ANMs, please see: <http://www.worldbank.org/wbi/documents/sn37160/FrontMatter.pdf>
<http://wbln0018.worldbank.org/ict/projects.nsf/OurFunded?OpenView>
<http://www.infodev.org/library/OR/qr301.pdf>
<http://www.who.int/bulletin/pdf/2001/issue9/bu1338.pdf>

http://hdr.undp.org/docs/publications/background_papers/chandrasedkhar.doc
http://www.baramatiinitiatives.com/presentations/IHC_Tech%20.ppt

9. For further information on GrameenPhone please refer to Don Richardson, Ricardo Ramirez, and Moinul Haq, "Grameen Telecom's Village Phone Programme in Rural Bangladesh: a Multi-Media Case Study," TeleCommons Development Group (TDG), Canada, March 2000.

<http://www.telecommons.com/villagephone/>

10. <http://www.kothmale.net>

11. <http://www.weekender.co.jp/LatestEdition/000421/coverstory.html> <http://www.mssrf.org>.

A. D. Sood, Guide to ICT for Development, 2002, 44-45.

12. See www.andhranews.net/districts/egodavari.htm

13. Louise Chamberlain, "Consideration of gender advocacy vis-a-vis ICT policy and strategy." <http://www.un.org/womenwatch/daw/egm/ict2002>

[reports/Paper%20by%20Chamberlain.PDF](http://www.un.org/womenwatch/daw/egm/ict2002/reports/Paper%20by%20Chamberlain.PDF)

14. *The Network Revolution and the Developing World* Final Report for World Bank and infoDev, 00-216, 3 August 2000. <http://www.infodev.org/projects/internet/400networkingrevolution/400.pdf>

15. In 2003 there has been a drastic reduction in cellular prices, and Reliance has announced an ambitious scheme to increase the penetration of cellular phones in rural areas through innovative financing schemes. <http://www.indiabandwidth.com/>

16. Subhash Bhatnagar, "Egovernment from

vision to implementation," 2001.

<http://www1.worldbank.org/publicsector/egov/lweek/Bhatnagar.pdf>

17. Anita Anand and Mahesh Uppal, "Engendering management and regulation of ICT: narrowing the digital divide for women." UN/INSTRAW Virtual Seminar Series on gender and ICT. Seminar Three: Engineering Management and Regulation of ICT, 29 July – 9 August 2002. <http://www.un-instraw.org/docs/Anand.doc>.

18. Center for Telecom Policy Studies. <http://www.iimahd.ernet.in/ctps/>

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APPENDIX 1

Country Profiles

Brazil

Education differentials

Available figures indicate that Brazil has attained a high female literacy rate, and 52 percent of the total tertiary school enrollments are girls. Yet as in many other developing countries, the presence of female students is reduced to 34 percent in the natural sciences which include engineering and computer sciences, the disciplines for pursuing a career in IT. Some Brazilian schools have begun offering computer classes at primary and secondary levels (UNESCO, 1999; Media Metrix, 2000).

- 85.4 percent of adult women are literate.
- 67 percent of students enrolled in secondary schools are girls.
- 52 percent of tertiary students are girls.
- 34 percent of tertiary students in natural sciences are girls.
- 38 percent of the teaching staff at the tertiary level are women.
- 37 percent of administrative and managerial positions are held by women.
- 43.3 percent of Brazil's total Internet users are women.

Internet use

Although women constitute over 43 percent of total Internet users, Brazil lacks the resources and skills to provide similar opportunities for poor women especially in the rural areas. At the same time, growing competition among the Internet service providers have brought down accessibility costs to \$18 a month — the lowest in all Latin America.

Labor market participation of women

In the last fifteen years the share of Brazilian women in the labor market has significantly increased, a

trend that is evident in a majority of Latin American countries. In 1997, women accounted for 40 percent of the workforce in Brazil. Most of them are employed in the service sector. As no data are available, it is hard to say how many of the 37 percent administrative and management positions held by women are in ICT-related jobs. Despite a national policy that guarantees a gender-equal environment in the workplace, women face discrimination in Brazil. Reports on female participation in the labor market in Brazil have concluded that there is less scope for promotion for women, and they risk losing their jobs during pregnancy.

Labor market participation of women in the ICT sector

In the entire Brazilian ICT sector women make up just around 20 percent of software industry workers, and fewer numbers are involved in the hardware industry. According to ILO's World Employment Report 2001, firms involved in manufacturing information and communication goods slashed their workforce size in the 1990s. In previous years, Brazil's IT industry had seen a jump from 43,000 jobs in 1984 to 74,000 jobs in 1989. Over 35,700 jobs were cut between 1989 and 1999, accounting for a 48.1 percent reduction in the total number of jobs within the sector. The country was left with just 38,400 jobs in the sector in 1999, which is even lower than the number recorded in 1984. Women accounted for 27.9 percent of the wage labor jobs in 1989 and 27.7 percent in 1999 in the fifty largest manufacturers of IT goods in Brazil. But the reduction in jobs during the decade had a similar effect on men and women workers. About 25,700 male workers and 10,000 female workers lost their jobs, indicating a reduction of 48 percent in the male work force and 48.5 percent in the female work force in the ICT sector.

Wage differentials

A 1994 Brazilian government report suggests that even when they had the same qualifications as their male colleagues, women got only 54 percent

of what men received as wages. In a 2000 report on gender in Brazil, the World Bank found that Brazil has “one of the widest gender wage gaps in Latin America”. The interviews with Cisco Networking Academy instructors in Brazil also indicated that this was quite standard.¹ Maternity leave policies can also be considered to be one of the reasons behind employers’ reluctance to hire women on a payscale on par with men.

Government policy on gender

The Brazilian government has approved a policy framework that guarantees gender equality in the workplace. For instance, the constitution of Brazil “prohibits differentiation in salary levels on the basis of sex, establishes incentives for encouraging the participation of women in the workforce, and provides paid maternity leave of 120 days and paternity leave for five days.” Research indicates that these policies are commonly not enforced and women are denied equal treatment (Hafkin and Taggart, 2001).

Sociocultural factors

Socially, women are not considered suitable for IT-related jobs. This, in turn, influences women’s interests and goals, and they do not always seek jobs in the ICT sector.

ICT policy

In the past several decades, the Brazilian ICT policy has focused on the growth of the domestic ICT sector. In 1999 the government launched an “information society program” to create a development impact through ICT. The program focuses on universal access, business competitiveness, and e-government.² Through the universal access plan, post offices in two large cities provide free Internet access to the communities.³ Thousands of community access centers are also being opened. There is however no special emphasis on gender.

Conclusions

The ICT policy does not address gender concerns. The shrinking of the ICT-related labor market has

affected women more adversely than it has affected men. There is a marked wage differential between men and women. Though the constitution prohibits such discrimination, as in most developing countries, the ground realities at the workplace, including in the ICT related sector, are not women-friendly.

El Salvador

Education differentials

The female literacy rate is 74.2 percent, yet only 36.7 percent of girls enroll in secondary school. The low enrollment and high drop-out rate are common problems among girls and boys. Fewer than 30 percent of girl students enroll for natural sciences classes at the tertiary level, compared to 34 percent in Brazil (UNESCO, 1999; UNDP, 1999).

- 74.2 percent of the women are literate.
- 52 percent of total number of secondary school students are girls.
- 36.7 percent of girls enroll in secondary schools.
- 37 percent of boys enroll in secondary schools.
- 51 percent of tertiary level students are girls.
- 28.7 percent of female tertiary students study natural sciences.
- 29 percent of the staff at the tertiary level are women.

Internet use

Women’s access to ICT is quite limited in El Salvador where just 1 percent of the country’s total population has access to the Internet and 1 percent to hand-held devices. Around 60 percent of the population live in rural areas, where there are inadequate infrastructure facilities. Most of them are women who are responsible for the children and the elderly, and therefore are unable to move to the urban areas where men go for work.

Labor market participation of women

According to 1997 statistics women account for 37 percent of the total work force in El Salvador. They are mostly employed in agriculture, industry, and service sectors. *Maquiladoras*, foreign-

owned factories where low-paid workers assemble imported parts into products for export, have remained the biggest growth area in the country's economy, and about 78 percent of its labor force are women.

Women constitute 29 percent of El Salvador's administrative and managerial positions in the labor force, which indicates a significant progression from 13 percent in the 1980s. It is also better than the Mexican figure of 20 percent.

Labor market participation of women in the ICT sector

No data were available on women's participation in the ICT sector.

Government policy on ICT

Several international telecommunication firms, such as Telefonica, Millicom, and France Telecom have entered the domestic market, as El Salvador's telecommunications industry is "regulation free". El Salvador has one of the most competitive telecommunication structures in the world where long distance and local phone calls are quite economical.⁴ This should encourage ICT access by marginalized groups including women, as access, cost, and infrastructure are the major barriers to ICT in most developing countries.

Government policy on gender

CEDAW was validated with reservations in El Salvador in 1981. The El Salvadorian government passed a law to form a national body called *Instituto Salvadoreño para el Desarrollo de la Mujer* (the Salvadorian Institute for Women's Development — ISDM) after the Beijing conference in 1995. ISDM provides the framework for public policies for gender equality.

The National Secretariat for the Family, connected to the President's office, created the "women's system" in 1989, to include gender awareness in government institutions in the agriculture sector and change discriminatory legislation. In 1993, the Ministry for Economic and Social Development,

Planning, and Coordination also began a project to introduce gender awareness in development projects within the ministry.

Sociocultural factors

Along with the recent natural calamities, the country is suffering from an economic crisis. About 52 percent of the total population live below the poverty line today, a majority of them women. Before the series of natural calamities in the past three years, the country's economic growth was satisfactory; but poverty, violence against women, and poor education remain the primary barriers for a majority of girls and women of El Salvador.

Conclusions

In the two previous decades a stable political and economic atmosphere and an active women's movement had helped to change women's socio-economic roles. In the 1980s, women's NGOs started a national movement, which accelerated after the Peace Agreements in 1992. It influenced the shaping of government policies on gender issues, and was concerned especially with equal opportunities for women in education and jobs, and violence against women. So far there are no specific policies to promote increasing presence of women at different job levels in the ICT sector (Hafkin and Taggart, 2001).

Hungary

Education differentials

Percentage of women among university degree holders, 1996 (UNESCO, 1999):

All fields	58.4
Agriculture	43.4
Commerce	61.7
Education	84.1
Engineering	22.0
Humanities and arts	66.2
Law	50.9
Natural science	45.3
Medicine	68.0
Social and behavioral sciences	49.2

Internet use

As of July 2002, 47 percent of Hungary's total Internet users are women. In 1998, the figure was 37 percent. It is expected that the number of Internet users will double in the next few years.⁴

Labor market participation of women

Women hold a total share of 44.8 percent in employment among all occupations. Women account for 35.3 percent of managers (including legislators and senior government officials), 57.2 percent of professionals, and 55.2 percent of service industry workers in the country. Around 27 percent of skilled agricultural workers, 55 percent of unskilled workers, and about 21 percent of craft and trade workers are women. Women also form 7.5 percent of the Hungarian armed forces. Women are employed in 92.5 percent of the total number of clerical jobs. Among technicians 63 percent are women. Women are also employed as plant and machine operators, where they hold a share of 23.7 percent. No direct information on the country's ICT sector was available.⁵

ICT policy

The Szechenyi Plan is a medium-term economic plan that includes a component on information society and information economy development. The program emphasizes electronic government, infrastructure development, and social policy. There is a special mention of small, disadvantaged towns and disadvantaged groups such as prisoners and minorities who need special attention; but gender concerns find no mention in the document.⁶

Conclusions

Hungarian women had a significant presence among the university degree holders in 1996, though it was not so marked in ICT-related disciplines. Women's Internet use has grown further in the last few years. Data on women's participation in the ICT sector were not readily available, yet extrapolating from their participation in the labor market, it can be surmised that women

would be present in larger numbers at the lower-level jobs, such as operators, and their presence would be less at managerial levels. As noted earlier there is no mention of gender issues in the ICT policy documents.

India**Education differentials**

- 51.4 percent of adult women are literate.
- 74.5 percent of adult men are literate.
- 48 percent of girls are enrolled in secondary schools.
- 36 percent of students at the tertiary level are female.
- 30.4 percent of girl students at the tertiary level study natural sciences.
- 19 percent of teachers at the tertiary level are women.
- 23 percent of Internet users are women.

Government policy on ICT

India has incorporated measures to increase the number of trained professionals and encourage the growth of the ICT sector in the country. A National Task Force was set up in 1998 by the government to look after the growth prospects in IT and the software development industry. The Information Technology Bill 2000, based on the recommendations of the Task Force, emphasized the implementation of a legislative mechanism for extended IT applications. It was expected to act as a catalyst in promoting IT throughout the country. The Information Technology Act 2000 focused on planning the whole ICT sector. For employment opportunities in the sector, accessibility is a major problem that needs to be addressed. To that end a Working Group on IT for the Masses was created in May 2000. However, the recommendations of this group lacked specific emphasis on women. The suggestions were on access, education, and increasing awareness about advantages and uses of IT, which will also be useful for women after implementation. Yet no specific agenda on access and skill development for women was discussed.

Some of the state governments such as Andhra Pradesh have also started developing their own IT infrastructure and pool of skilled professionals. According to the Ministry of Information Technology, the central and state governments have initiated steps to promote computer use in disadvantaged areas, for instance setting up information kiosks with computers run by local entrepreneurs in rural areas. Some other states such as Uttar Pradesh are also taking interest in the sector.

Earlier in 1988, the central government established a World Market Policy focusing on software development for export, change (reform) in the telecommunications policy, privatization in the telecommunication and mobile phone sector and a more comprehensive approach toward ICT. The government also introduced the Software Technology Parks (STP) of India scheme.

Government policy on gender

The Indian government has taken certain steps to promote women's status and overcome the problems they face in society. The education ministry has both formal and nonformal education programs for girls, the latter in collaboration with NGOs. The Department of Women and Child Development formulates strategies, policies, and programs, enacts or amends legislation, guides and supports work done by other government or nongovernmental bodies for improving the status of women and children. The department has initiated training programs for employment, awareness building, and gender sensitization. It has also established hostels for working women. The impact of such initiatives, however, is not known because of the lack of any documentation.

An important education policy from women's perspective has been observed in the state of Andhra Pradesh where one-third of all places in institutes for higher education are reserved for women. It is possible that such a policy may increase the number of women opting for IT and related fields at higher levels of education.

Conclusions

ICT policies have focused on the growth of the software sector and have only recently begun to emphasize the role of IT applications in making the industry more competitive and government more efficient in its service delivery. The telecommunications sector was deregulated in 1994. Increasing competition from several private operators is pushing the penetration in urban areas and lowering the prices. Rural areas are yet to benefit from this change. It appears that much more is said than done about ICT for the masses. Internet penetration is still very low and confined to urban areas. There is no mention of gender concern in policy documents. Women's employment in the IT-enabled services is significant at 37 percent.

Israel

Education differentials

Women comprise 56.6 percent of recipients of university degrees.

Percentage of women among university degree holders, 1997 (UNESCO, 1999):

All fields	56.6
Agriculture	48.8
Commerce	40.9
Education	88.1
Engineering	19.0
Humanities and arts	73.4
Law	47.9
Natural science	47.6
Medicine	68.0
Social and behavioral sciences	60.1

Labor market participation of women

The unemployment rate in the country was 7.7 percent between 1994 and 1997. The labor force participation rate was 37.4 percent in 1997 (ILO, 2001). Women's participation in the work force increased from 33.7 percent in 1980 to 44.2 percent in 1998.

In 1998, 44.2 percent of the total workforce in

Israel were women. Of clerical staff, 73.5 percent are women, while 59.3 percent of technicians are also women. Women constitute 53.6 percent of workers in the service industry, 45.5 percent of professionals, and hold about 22.4 percent of managerial positions (including legislators and senior government officials). Women also hold 44.1 percent of unskilled occupations. Their share among skilled agricultural workers is 13.2 percent and 11 percent among craft and trade workers.

Labor market participation of women in the ICT sector

According to 1997 figures from 194 firms, more than 51 percent of a total of over 14,300 employees in Israel’s electronic component sector were women.

ICT policy

Israel’s ICT policy has focused on telecommunication regulation, e-government and innovative incubation schemes for start-ups.⁷ In 2001, Israel’s software exports reached \$2.6 billion.⁸ The education department had an ambitious program of school computerization. In the documents reviewed, there was no specific mention of gender concerns although the labor market participation of women in the electronics industry is high.

Conclusions

The ICT policy has emphasized growth of the ICT sector. The education policy has worked toward extensive computerization in schools. The labor market participation of women is increasing in Israel. The high percentage of women at the university degree level (56.6 percent) seems to be a contributing factor. Their presence in ICT-related degree courses (47.6 percent) is noticeable. As a result, in 1997 women had 51 percent participation in the Israeli electronic component sector. No data were readily available on women’s participation in other ICT-related fields.

Malaysia

Education differentials

Adult literacy rate (%) (www.adb.org/statistics)

1980		1990		1999	
Female	Male	Female	Male	Female	Male
60	80	74	87	83	91

Gross secondary school enrollment ratio (%)

1980		1990		1997	
Female	Male	Female	Male	Female	Male
46	50	58	55	69	59

Labor market participation of women

An integrated report by the UNU Institute for New Technologies (UNU-INTECH), UNDP, and Malaysian Institute of Microelectronic Systems, indicated that in 1997, the country’s labor force participation rate was 65.6 percent. For women the rate was 46 percent, while for men it was 84.3 percent.

Percentage of the labor force by educational level

	1997		1990	
	Male	Female	Male	Female
No education	4.7	9.8	6.2	15.7
Primary	26.6	22.1	36.3	29.3
Secondary	57.0	52.6	52.2	49.0
Tertiary	11.7	15.5	5.3	6.0

According to the report, the total Malaysian workforce consisted of 8.7 million people in 1997 and 34.1 percent were women. The report had the following findings:

- The labor force participation rate for women did not go above the mid-40 percent mark.
- Almost 60 percent of unemployed women had at least upper secondary education, and in rural areas above 50 percent women fell in the same category.
- Many women preferred to retire after 45 years of age (life expectancy for women in Malaysia is 70+), including those with tertiary education. There is an “in-out” pattern in

women's labor market participation in Malaysia, a high number at the beginning is replaced by severe decline, which is followed by an insignificant increase that retards steadily from 45+ onwards. As the report shows, in 1997, below 40 percent of women workers between the ages of 50 and 54 continued to work, in contrast with 94 percent of men workers. Housework was the major cause behind the low labor force participation rate among women.

- Women's share in the labor market was lower than that of men; still it was proportional to other industrialized countries and a little over the global average.

Recent figures from the ILO World Employment Report (2001) suggest that almost 70 percent of the 3.3 million outside the labor force in Malaysia are women; and around 50 percent of them have completed secondary and tertiary education, indicating that almost 1 million women in Malaysia have the potential to be employed.

Labor market participation of women in the ICT sector

Malaysia's *Country Paper on Human Resource Development in Malaysia in Response to Advancement of ICT* shows that there were 108,000 workers in the Malaysian ICT sector. At an annual average growth rate of 11 percent, this number is expected to reach more than 300,000 by 2010. The Malaysian ICT workforce includes offshore data workers, software programmers, system analysts, and teleworkers. About 30 percent of IT professionals in the Malaysian software industry are women.⁹

The UNDP *Human Development Report* (1997) indicates that there were 45 percent females among the total technical and professional workers in 1990. Gothoskar (1995) has mentioned that 70 percent of Malaysian telecommunications employees were female in the mid-1990s. However, there are little data available from 2000 on.

Between January 1998 and May 1999, there was a 26 percent cut in the workforce in the Malaysian electronics sector, of which women accounted for 65 percent. Companies with foreign investment eliminated about 75 percent of the total number of workers.¹⁰

Government policy on ICT

The Malaysian government launched "Vision 2020" in 1996 for a fully developed knowledge-based society by the year 2020. The telecommunications sector was privatized in 1987, and after the rolling out of the National Telecommunications Policy (NTP) in 1994, the market is now completely liberalized. The government is investing substantially for building an ICT-friendly environment.

The Demonstrator Application Grant Scheme (DAGS) aims at improving social and economic status through ICT use, and provides grants to citizens for ICT related development. The government has encouraged e-commerce activities and technology use among agricultural communities as well (Appanna, 2002).

Government policy on gender

Gender equality appears to be a priority for the Malaysian government as is evidenced by a UNDP Gender Development Index rating of 0.78, among the highest in the region and in the global high human development category. Local and global demands have resulted in an affirmation of the laws for improving and protecting women's status and position. In 2001, the parliament made a modification in the constitution to ensure the legal structure required for complete implementation of laws related to gender equality (Hafkin and Taggart, 2001). The favorable policies have resulted in women occupying high-skilled and managerial positions in Malaysia.

Sociocultural factors

Despite the government's efforts, women workers in Malaysia work under difficult conditions. During the economic crisis women suffered more,

because they were hired in large numbers in export industries in unskilled or low-skilled jobs. Women also face problems within the household. As in several other countries, Malaysia has many households run by women alone, where they have to not only look after the domestic work but also act as the sole breadwinners of the family. However, the fieldwork done by UNU-INTECH in Malaysia found that women employed in the ICT sector jobs seldom belong to disadvantaged families.

Crimes related to women have also increased during the last decade. Thus physical safety is another serious challenge for the working women in Malaysia. Telework is considered one of the better options for women as it not only provides the convenience of working from home, but also minimizes the risks associated with safety at the workplace.

Malaysia is probably among the better examples of globalized, export-led economies, involved in frequent and growing utilization of ICT. There are still potential women workers in the country, however, who can be employed in the IT industry.

Conclusions

Overall, Malaysia has an adequate infrastructure in telecommunications, an increasing capability in IT, a satisfactory supply of tertiary level IT skills, a less satisfactory supply of middle level technical skills, and a well-educated labor force, with substantial numbers of well-educated women outside the labor force. The narrow requirements for more sophisticated and productive use of ICT in networking and teleworking are present, but the existing level of teleworking is relatively low.

The Philippines

Education differentials

- 94.3 percent of adult women are literate.
- 99.9 percent of girls are enrolled in primary schools.

- 78.5 percent of girls are enrolled in secondary schools.
- 62 percent of the tertiary level students are girls.

The education level of women is undoubtedly the best in Asia and higher than most of the other budding market economies. However, the enrollment ratio varies within academic fields, for instance in science and technology female students account for about 35 percent, whereas they account for around 79 percent in the health sciences (UNESCO, 1999; UNDP, 1999).

Internet use

As of 2000, there were 2 million Internet users in the Philippines, and 1 million of them were women (Hafkin and Taggart, 2001). At the same time, in certain parts of the country there were no telephone lines at all. According to Cecile Reyes, Assistant Secretary for IT, Department of Transportation and Communications, the government has established telecenters for Internet education and access for rural people. The telecenters are equipped with phone, fax, and computers, along with CD-ROMs that provide basic information about using computers, and the Internet.

In the Philippines a majority of the 500,000 teachers are women. Often students are more proficient in IT than their teachers who need upgrading of their IT skills to participate effectively in the knowledge economy.

Labor market participation of women

Women constitute 39 percent of the total labor force in the country. They are ahead of men in some occupations, such as professional and technical (64 percent), clerical (57 percent), sales (67 percent), and services (56 percent). About 47 percent of research and development personnel, 53 percent of scientists and engineers, 23 percent of technicians, and 40 percent of auxiliary personnel are women. Overall, they enjoy a considerable share in areas such as medical sciences, biotechnology, and natural and social sciences,

while men are in the majority in technology-related areas. In administrative, executive, and management jobs, women hold about 32 percent of the positions.

Labor market participation of women in the ICT sector

Women account for 65 percent of the total professional and technical workers in Philippines. They play a significant role in the service industries including information processing, banking, insurance, printing and publishing, where the skill requisites are often superior to those in manufacturing. The new ICT sector offers employment for women mainly in information processing, especially data entry. The largest number of women are employed in remote data entry. No further information on women's participation in the sector was available.

Wage differentials

The hourly rate for data entry in the Philippines was \$4 before 2002, while in Jamaica the rate was as low as \$1. No gender-disaggregated information was available on wage differentials in the Philippines.

Government policy on ICT

Government policies are encouraging the growth of the telecommunications industry by improving access and inviting more foreign investment in the domestic market. Significant measures are also being taken to support IT education and skill development. The government has collaborated with Cisco, Hewlett Packard, Microsoft and others in developing IT training centers. Today the Philippines has one of the best training infrastructures for IT in Asia.

The Schools of the Future program was established in 1997 under the same agenda of promoting IT for better teaching, learning, and educational management in basic education. The Science and Technology Intervention Program for the Poor, Vulnerable, and Disabled is an initiative to use technology to fulfill the basic needs of the poor,

by providing technology-based interventions to promote microenterprises for the underprivileged, establish a network of organizations to support technology for the poor, and create an exclusive technology program for the physically challenged.

In July 2000 a Government Information System Plan was put in place to promote e-government. The plan appears to be gender-blind and totally devoid of any attempt to address gender gaps in education, government service, and political process. In fact during interviews, most government agencies questioned if gender had anything to do with e-government projects (Taggart, 2002).

Government policy on gender

There are a number of policies that promote women's participation in economy and politics in Philippines. For instance, there are laws giving women equal chances in military school education; laws against sexual harassment at places of employment, education, or training; and a Women's Studies Consortium for higher education.¹¹

Sociocultural factors

Besides constituting a majority among Internet users, Philippine women are ahead of other Asian women in their involvement in the ICT sector. They have a good share in professional and technical jobs. The country's GDI rank is 65 among 174 countries, indicating that women are better off than in most other developing countries (Hafkin and Taggart, 2001). Yet, according to Cisco sources, networking remains one area where men are still considered more suitable employees. The conventionally set roles for men and women are largely responsible in deciding their careers, thus men tend to join the IT workforce, and women are more likely to work in the education sector.

Romania

Education differentials

- 96 percent of adult women are literate.
- 74 percent of girls enroll for secondary school.

- 49 percent of all the secondary school students are girls.
- 50 percent of tertiary students are girls.
- 33.6 percent of tertiary students in natural sciences are girls.
- 35 percent of teaching staff at the tertiary level are women.

(UNDP,1999; UNESCO,1999)

The level of female adult literacy and secondary school enrollment demonstrates the high standard of education among Romanian women. The gender balance is maintained at the tertiary level, but women’s participation in IT-related fields such as computer science and engineering is lower — 33.6 percent (Hafkin and Taggart, 2001).

Percentage of women among university degree holders, 1997 (UNESCO, 1999):

All fields	54.4
Agriculture	42.9
Commerce	59.9
Education	60.6
Engineering	28.4
Humanities and arts	66.1
Law	55.2
Natural science	58.4
Medicine	67.4
Social and behavioral sciences	70.1

Internet use

Currently 18.3 million people in Romania are above 15 years of age, and of them 12 percent, or 2.1 million, have access to the Internet. The users account for 16 percent of the total number of men and just about 8 percent of the total number of women (Hafkin and Taggart, 2001).

Labor market participation of women

Currently, 45.2 percent of the total workforce and 56 percent of all employees in the professional and technical careers are women; of these, 26 percent are in managerial positions.

Labor market participation of women in the ICT sector

The Romanian ICT sector employed just about 0.2 percent of the total workforce in the country in 1996. Among those working in the ICT sector, 13 percent were employed in software companies. Information on employment of women in the ICT sector was not available.

Wage differentials

The labor code of the country recommends equal pay for equal work. But gender discrimination exists, especially in the case of less-educated women. Women facing economic discrimination also suffer from lack of infrastructure. According to the U.S. State Department Human Rights Report on Romania, 1999, despite laws promoting equality, more women than men are unemployed in the country. Women hold few influential positions in the private sector and on average earn lower wages .

Romania’s IT workers, more men than women, are now migrating from a cash-strapped economy to other European countries and the U.S. in the hope of better opportunities.

Government policy on ICT

In the past, the Communist government actively supported the ICT sector, not just in terms of financial inputs but also in capacity building. It had emphasized software development and after its fall in 1989 there was no dearth of skilled software professionals. Romania is often compared to India and Ireland because of its potential in the software industry. Today more official support is required in training and education. This seems quite a task as the country is facing continuous economic challenges after the change in government. The new government formed a National Commission for Informatics (NCI) to look after the IT policy from 1990 onwards. The initiatives taken by NCI along with the Ministries of Research and Technology and Telecommunications and Education supported specific activities such as IT research and development.

In 1992, the government initiated a National Strategy for the Information Society that was incorporated into a law in 1997. This law emphasizes vital public and private sector alliances, development of IT standards, development of infrastructure, and investment for research and development in IT. The telecommunications sector remains in the hands of the state-owned Romtelecom, but the service is often undependable outside Bucharest. There is some hope for the ICT sector, as at the beginning of 2001, Romtelecom was implementing changes such as slashing the daytime dial-up Internet access rates by 50 percent. This was done to encourage Internet use during the day.

Government policy on gender

The constitution and CEDAW guarantee the protection of women's equal rights in the country, but women's issues often do not get sufficient attention or support from the authorities.

In 1996 the government created a section under the Ministry of Labor and Social Protection with the purpose of promoting women's interests and family policies. The department coordinates programs for women, suggests new laws, monitors the legislation for sexual prejudices, and supports women's training for skill-building, especially in villages. However, the department does not seem to have made much impact on women's presence in the labor market.

Sociocultural factors

The high level of education and significant participation in the country's labor force provide cause for optimism for Romanian women in the ICT sector. Unfortunately, no data were available for this sector.

Conclusions

Although Romanian women enjoy high literacy rates, constitute 56 percent of all employees in professional and technical careers, and have a supportive, women-friendly gender policy in place, in reality they continue to experience discriminatory treatment in recruitment and wages.

No information was available on women's participation specifically in the ICT labor market.

Russia

Education differentials

Percentage of women among university degree holders, 1995 (UNESCO, 1999):

All fields	52.8
Agriculture	49.1
Commerce	70.7
Education	84.2
Engineering	26.9
Humanities and arts	77.6
Law	47.6
Natural science	54.8
Medicine	68.7
Social and behavioral sciences	67.5

Some more figures given below show that Russian women are well educated and have a healthy share among students in academic programs for science and technology careers as in other newly independent states. In all, 34.3 percent of female tertiary students are in natural sciences.¹²

- 98.8 percent of adult females are literate.
- 90.7 percent of girls enroll for secondary school.
- 57 percent of all secondary school students are female.
- 53 percent of all tertiary students are female.
- 34.3 percent of tertiary students in natural sciences are female.

(UNESCO, 1999; UNDP, 1999)

Internet use

The U.S.-based Soros Foundation's Open Society Institute has been instrumental in providing Internet connectivity by establishing Internet Centers at secondary schools and universities in Russia. The *Russian Internet Market Review* of June 2000 indicated that 38 percent of Russia's Internet users were women.

The number of women employed in the ICT sector is limited by available access to ICT, which is

low because of the poor telecommunications structure. Internet penetration among the country's adult population ranges from 2.4 percent to 5 percent, compared with 35 percent in Western Europe. A majority of users access the Internet from work or a general access terminal, as few people have computers at home.

Labor market participation of women

Women have a significant presence in the labor market and hold almost two-thirds of professional jobs. According to 1998 figures, women occupy about 47.3 percent of all jobs in Russia. Among the managers (including legislators and senior government officials) 38 percent are women. They also account for 60.7 percent of the country's total professionals.

In contrast to other countries studied so far, Russia has 70.5 percent women technicians. Just 12 percent of plant and machine operators are women. About 89 percent of clerical staff, 65.5 percent of service sector workers, 45.5 percent of skilled agricultural workers, and 23 percent of craft and trade workers are women. Women also make up 51 percent of unskilled workers.

Women are employed in large numbers in public health services (85 percent), education (81 percent), credit and finance (78 percent), and information and accounting services (75 percent).

Labor market participation of women in the ICT sector

Data on women's share in employment in the ICT sector were not available.

Government policy on ICT

The *Russian Internet Market Review* (June 2000) suggests that telecommunication infrastructure is poor in Russia. The government policies appear to be unpredictable and the political system unstable after the fall of the Soviet Union. This prevented Russia from emerging as an ICT giant, despite its huge pool of cheap labor in the high technology field.

The laws under consideration in the Duma (Russia's lower parliamentary house) had a definite bias toward a state-owned communication structure. The picture is changing gradually, as recent government policies appear to encourage domestic and foreign investment in the telecommunications sector.

Government policy on gender

Russian policies support economic and social equality for women, just as the majority of Eastern European countries that were united in the Soviet era. The current Russian constitution was created post 1991. Article 19 states: "Men and women have equal rights and freedoms and equal opportunities to realize them." The successful implementation of such a policy is evident in both education and employment.

Sociocultural factors

On the one hand, Russian women have the advantage of a sound educational background along with a history of official encouragement to work in nontraditional fields such as science and technology. On the other, Russia is considered by many to be unstable politically and economically, and assailed by corruption and crime, all of which pose a major threat to the country's great potential in the ICT sector.

One of the results of political transformation in Russia is the lack of childcare services that has contributed to the problems of working women. At the same time employers do not like hiring women, as they fear that their household duties will divert their attention from the job at hand. Many employers are reluctant to hire childless young women; they would rather avoid having to give a female employee the three-year paid maternity leave endorsed by the constitution of the country.

Conclusions

Russia is a country where traditionally women have enjoyed high literacy rates, and their participation in the labor market has been considerable.

However because of inadequate telecommunication infrastructure and a lack of consistent government policies, the ICT sector has worked far below its potential. No data on the current participation of women in the ICT sector were available. It is hoped that as the ICT sector expands, women too will find avenues for employment.

South Africa

Education differentials

The Southern African Research and Documentation Centre (SARDC) and the University of Western Cape (UWC) have stated that almost every white adult in South Africa is literate, while about 25 percent of black adults are illiterate. This is an outcome of earlier lack of education opportunities for blacks. In fact, 20 percent of women and 14 percent of men among the blacks were deprived of formal education at school. Only about 6 percent of African women and men above the age of twenty have completed their tertiary education.

Today schooling is mandatory for every child from the age of seven to fifteen. Yet, out of 9 million children eligible for schooling, over 1.6 million black children do not have access to education, while for white children education is easily available.

- 77 percent of black women are literate.
- 51 percent of girls enroll in secondary education.
- 12 percent of girls go through matriculation.
- 9 percent of engineering graduates are women.
- 32 percent of permanent staff in Technikons and universities are women.
- 51 percent of Internet users are women.

The share of secondary school enrollment and an adult literacy rate of 77 percent among black women place South African women well ahead of their contemporaries in most other developing countries. At the secondary level girls outnumber boys, but the number of girls drops dramatically at the tertiary level. Girls are not

even one-tenth of the total number of students in engineering, and the low participation of women in the ICT sector comes as no surprise.

Internet use

Just around 3 percent of South Africans use the Internet, with a majority of the users being white. By 2000 figures, around 51 percent of the total number of Internet users in South Africa are women — a higher percentage than in any other African country and most of the developing nations.

The role of women in the ICT sector is largely defined by the extent of their access to ICT. In 1996, just about 10 percent of secondary schools had computers and only 2000 schools, accounting for 7.5 percent of the total schools in South Africa, had overall infrastructure, including telephone lines, electricity, and computers to promote the use of ICT and its applications. Girls have a higher share among secondary school students, yet because of insufficient infrastructure, the otherwise better indicators of female education in South Africa seem irrelevant here. Usually the schools that have adequate infrastructure and access are the ones white children attend. Even though there are initiatives to improve ICT facilities in schools, creating more opportunities specifically for girls seems unlikely at this point.

Labor market participation of women

There has been a uniform growth in female participation in the South African economy during the last four decades. The available figures suggest that in 1960 women constituted 23 percent of the total labor force; this share increased to 36 percent in 1985 and 38 percent in 1999. However, the unemployment rate among women was higher in 1999 — 27.8 percent as against 19.8 percent for men. The 1999 data also indicated that around 10.2 percent of the total workforce accounting for 2.7 million people worked in the informal sector, and women accounted for 48 percent of these workers. The same year, 22 percent of all managers were found to be women, with half of them black.

Interestingly, only 2 percent of the total employed women workers in South Africa were managers in 1999 (ILO, 1999).

Wage differentials

The developments in the last three to four decades have not improved the situation of women workers to a great extent. Even today, compared to women, men have better salaries and better jobs. At the same time, a white woman generally gets a better salary than a black man. The following table provides a picture of wage differentials in the South African labor market.

Income by race, sex, and education as percent of income of white men with similar education, 1991:

Education	Black		White	
	Men	Women	Men	Women
5-6 years	10	25	75	100
7-8 years	10	10	40	100
9-10 years	5	20	40	100
Diploma	35	45	55	100
Degree	-	65	45	100

Labor market participation of women in the ICT sector

While there is hardly any information available on women’s participation in the South African ICT sector, it is evident that women do not have an equal share in the sector and their access to ICT is less than men’s. White men and women form the majority of workers in the sector.¹³ Fifty-five percent of workers in the ICT sector are men (Household Survey, 1997)¹⁴

Women are mostly employed in IT education, training, and development where they account for 39.2 percent of the total. In IT sales and marketing they have a 36.1 percent share, and in end-user computing they constitute 36.4 percent of all workers. In data communication and networking women have a low share of 18.7 percent, followed by an 18.4 percent share in information systems and IT management. Women’s participation in hardware and computer architecture is

even lower, at just 13.6 percent. However, in spite of less than 10 percent women opting for engineering at the tertiary level, a fair number of women are employed in the ICT sector. Evidently, not all of these employees come from an engineering background.

Wage differentials in the ICT sector

Data on wage differentials in the ICT sector were not available. Some gender-disaggregated data on income in the ICT sector were gathered during the SAITIS Household Survey. There is a clear indication of discrimination in the average annual salary: for male IT employees the average annual income was \$17,261, while for female employees the figure was \$13,711.

Government policy on ICT

The South African government officially promotes equality and is committed to improving the status of women and other disadvantaged minorities. The initial step toward developing the country’s telecommunications human resource base was taken by the Department of Communications through the 1995 *Green Paper on Telecommunications Policy* and the 1996 *White Paper on Telecommunications Policy*, ultimately followed by the 1996 Telecommunications Act, which was based on these two papers.

Chapter 8 of the *White Paper*, “Human Resources for the Sector”, focuses on the requirement of skill-building for attaining gender equality: “The Ministry supports affirmative action as a conscious strategy to correct the social and gender imbalances in our society. The Ministry believes the human resources strategy should be based on the principles of democracy, non-racism, non-sexism, and equity. Therefore the upliftment of people in the sector should be achieved by purposely redressing imbalances in the work force at all levels. This would require pro-active recruitment and training of people from previously disadvantaged groups, particularly in areas where the network is being ‘rolled out.’”

Table 1. IT skills domains by race and gender (%) ¹⁵

IT Domain	African	Asian	Colored	White	Female	Male	Total
Computer Operations	17.3	9.9	10.3	62.4	24.7	75.3	100
Data Communication and Networking	17.5	5.7	11.1	65.6	18.6	81.3	100
End User Computing	15.4	9.5	8.5	66.7	36.4	63.6	100
Hardware and Computer Architecture	16.2	7.3	8.5	67.9	13.7	86.3	100
IS and IT Management	11.5	7.4	6.2	74.9	18.4	81.6	100
IT Education, Training and Development	7.7	4.0	2.5	85.8	39.2	60.8	100
IT Sales and Marketing	9.4	13.6	7.4	69.6	36.1	63.9	100
Other	17.5	8.9	11.3	62.3	47.1	52.9	100
System Development	10.2	8.2	7.0	74.5	26.5	73.5	100
Total	13.4	8.3	8.1	70.2	27.2	72.8	100

Although the Telecommunications Act continued to give priority to skills-development and training in the ICT sector, it did not carry with it a clear “gender” perspective. Even so, the Department of Communications has continued to focus on underprivileged groups, including women.

Info.com 2025 provides education and encourages skills development with the help of telecommunication technologies. The program also supports the establishment of community information centers, public information terminals, and Internet facilities in schools along with teachers’ training initiatives.

Technology Enhanced Learning Initiative (TELI) promotes the use of technology for education. The projects under this initiative focus on development of course content and technology-related inputs beginning at the eighth grade, providing vocational education, and developing a curriculum for IT literacy in schools, community centers, and industrial training locations.

SchoolNet South Africa is involved in propagating Internet use among South African schools.

SchoolNet SA is one among the 25 SchoolNets across the African continent. It is funded by the Department of Education and by private firms, such as Microsoft, Cisco, Nortel, Sun, 3Com, and Internet Solution. Internet connectivity, human resources development, management and development of content and curricula, and advocacy and marketing are some of its primary functions.

Government policy on gender

Steps taken by the government to bridge the gender gap include the formation of the Commission on Gender Equality, the National Gender Forum at the Department of Justice, and the Office on the Status of Women at the Office of the Presidency.

A “gendered” approach to telecommunication is visible in the basic goal of the Department of Communications’ Gender, Youth, and Disability Desk: “to integrate gender, youth and disability sensitive perspective in all departmental programs and policies.... The Department will also ensure that empowerment strategies, policies and legislation designed to ensure more meaningful participation of historically disadvantaged citizens are sensitive to biases which exclude equal participation

in the communications sector of the economy.”

In 1993, South Africa signed CEDAW. CEDAW took effect in 1995, and a maiden CEDAW report based on reports by various departments was presented in 1997. The government has signed various other global conventions ensuring gender equality, such as the Convention on the Political Rights of Women (1953); the Convention on the Nationality of Married Women (1957); the Convention on Consent to Marriage, Minimum Age for Marriage, and Registration of Marriages (1962).

The new labor legislation has contributed to improving the workers' security and provided better scope for the black community and women. The Labor Relations Act prohibits any discrimination based on race, gender, and other such factors at the workplace. The Employment Equity Act keeps a check on firms with more than fifty workers or a turnover exceeding the given limit by mandating an equal opportunities plan and the submission of a periodic report to the government categorized by race, gender, and disability. The constitution has allowed the existence of trade unions, but in October 1995 just 35 percent of men and 29 percent of women workers belonged to a trade union.

The Basic Conditions for Employment Act assures job security for pregnant, lactating, and disabled women, and includes provisions such as a 12-week maternity leave with 45 percent of current pay.

Sociocultural factors

In South Africa, poor black Africans are deprived of facilities that may be easily available to people from other ethnic backgrounds. Unhygienic surroundings, crowded households, scarcity of drinking water, poor sanitation, and faulty electric supply are still the lot of the disadvantaged. Although a great deal of effort is being put into development work, in many parts of the country women still walk long distances to fetch drinking water. The United Nations'

social indicators for 2000 maintain that 90 percent urban and 80 percent rural population have access to safe drinking water.

With increasing number of initiatives from the government, things are now changing. In 1994, people of both genders and from every ethnic background in South Africa became eligible to vote. Women held a share of over 29 percent in the South African Parliament in 1999.

Contemporary South African society is full of community-based organizations and NGOs, which offer training and education to girls. There are also institutions such as SA-WISE (South African Women in Science and Engineering) that not only promote women scientists and engineers, but also attempt to find out the difficulties faced by them. The conventional mindset, however, still seems to guide females toward “soft” careers and males toward technical jobs. This mental barrier needs to come down before women in South Africa can take full advantage of the opportunities offered by ICT.

United Arab Emirates

Education differentials

It was only in 1955 that girls were first allowed to attend primary and secondary schools. These schools were established for girl students only, and had women teachers. The government took up education as a prime concern and encouraged initiatives for educating women after the union of the Emirates in 1971. As a result, the illiteracy rate among women dropped from 77.6 percent in 1980 to 11.3 percent in 1995.

- 76.8 percent of women are literate.
 - 79.9 percent of girls enroll in secondary schools.
 - 72 percent of tertiary students are girls (1997).
 - 42.3 percent of tertiary students in natural sciences are girls.
 - 14 percent of teachers at the tertiary level are women (1992).
- (UNESCO, 1999)

In 1977, the first university in UAE was set up with separate campuses for boys and girls. This initiative enabled women to acquire higher degrees. Earlier, women had no access to higher education in the country, and it was not easy for them to go abroad for higher studies. Today girl students constitute 72 percent of the total tertiary level students in colleges and universities.

Though a number of women opt for engineering and science, medicine and education are the conventional disciplines for women in UAE.

Internet use

UAE was the first country in the region to permit cybercafes meant for men as well as women. There are 400,000 Internet users among a population of 2.7 million according to March 2000 data (ILO, 2001). The UAE has 15 percent penetration of the Internet, which is higher than other Arab countries (5.7 percent in Lebanon and 6.1 percent in Qatar).

Women access the Internet mostly from colleges, universities, or home. According to the UNESCO Statistical Yearbook (1999) only 6 percent of Internet users in Arab states were women. Considering the excellent educational opportunities for women in UAE, the share of women among Internet users may be higher than the other countries in the region. No data on female Internet users in the country were available.

Labor market participation of women

In UAE, females were just about 19.4 percent of the total workforce in 1995. Large numbers of women opt for higher studies, yet a majority of them do not join the workforce after getting their degree. Teaching and medicine remain the most likely career options for women. Female teachers account for about 100 percent in nursery schools, 55 percent in primary schools, and 65 percent in intermediate and secondary schools according to government statistics. Around one-third of the total number of doctors and 81 percent of the nursing staff are women. Almost 40 percent of

government workers are women. Both women and men like to be employed by the government because of the benefits and flexible work schedules. The UAE Federal Government invites women to be a part of the workforce, promising employment in government for every applicant.

Labor market participation of women in the ICT sector

Citizens in UAE account for only 25 percent of the total population, and they prefer to work in the government or run family businesses. Immigrants belonging to various countries usually work in private firms. Immigrants, especially those from India and Pakistan, constitute a major part of the IT labor force. According to Cisco sources, presently men outnumber women in the IT workforce. But this trend is likely to change as young educated women are showing interest in computers and networking. Even in the ICT sector women prefer to work for the government.

Wage differentials

No data were available on wage differentials in the country's ICT sector.

Government policy on ICT

The country has led the region in promoting censorship on the Internet. The Emirates Telecommunications Corporation (Etisalat), which was set up by the government, is the sole Internet service provider in the country. In UAE, dial-up users cannot access the Internet directly; instead they dial a proxy server that is maintained by Etisalat. Access is denied to a website if the requested URL is listed as a banned site. The UAE government has adopted such censorship to prevent access to pornographic web sites.

The Shaikh Mohammed bin Rashid Al Maktoum Secondary School Information Technology Project was initiated in 2000 by the Ministry of Education and Youth to provide Internet access and skills training. As part of this project, IT classrooms with computers and network connections to enhance a computer curriculum are

being developed at the secondary schools in Dubai. The program will be extended to all secondary schools in the country.

Government policy on gender

The government encourages positive policies and laws for women, but the country's constitution places women and their rights and roles within the context of the family, which is considered to be the foundation of the society. Thus, government policies tend to preserve women's rights and provide them with appropriate income and employment opportunities in accordance with their traditional roles. The Social Affairs section of the Ministry of Labor and Social Affairs and the UAE Women's Federation are the two main government bodies dealing with women's issues. The UAE Women's Federation addresses issues on women's working conditions and education, and also advocates changes in personal law.

Human rights reports by external agencies state that at work women remain deprived of equal benefits such as housing and promotion. To overcome these hurdles, in 1995 the UAE Cabinet temporarily extended the paid maternity leave for UAE women citizens working in the private sector to three months with full pay, from forty-five days up to one year with half pay, and a second year's leave with quarter pay. In 1996, an associated declaration approved the ILO General Conference Equal Remuneration Convention of 1951. A conference was held in 1996 to promote women's rights in the workforce. The participants demanded certain special rights, such as removing the requirement of the husband's permission before employing a woman.

The UAE government allows women's organizations to provide social welfare services, but so far none of these groups are found to be involved in activities such as technology-related training.

Sociocultural factors

UAE is among the world's wealthiest and technologically advanced countries. It is also the

"most wired state in the Arab world". The low share of women in the labor market is a result of a number of cultural constraints, such as objection by husband or family, or the inconvenience of pursuing a career while having to run a household. A married woman needs a permit from her husband before taking a job. There is no economic compulsion for women to work, as there is no dearth of resources or wealth in the country.

Conclusions

There is great emphasis on women's education and their participation in degree courses including presumably the ICT-related disciplines. Yet because of local sociocultural forces, women are not encouraged to participate in the labor market, and there are no economic compulsions for women to do so. Their presence in the ICT sector is therefore likely to be limited.

Notes

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2. Creating a Development Dynamic — final report of the Digital Opportunity Initiative <http://www.opt-init.org/framework/pages/2.3.1.html>
3. <http://www.opt-init.org/framework/pages/appendix3Case1.html>
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13. "Women in ICT Workshop," presented by MTA and AMI consulting in South Africa. A Survey of the IT Industry and Related Jobs and Skills in South Africa (SAITIS), Johannesburg, 2000.
14. The 1997 Household Survey was conducted among 994 respondents. The IT web survey in 1998 (www.itweb.co.za) had a bigger sample of 1,199 but it was not based on a structured sample and thus may be less accurate. SAITIS, 2000b (June 10th). Working Draft 4.6.
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7

From a Gender Perspective: Review of World Bank ICT Sectoral Projects

This chapter examines a broad sample of World Bank projects from the ICT sector as well as those with ICT components from other sectors to determine the extent to which they included gender issues. The rationale for undertaking this exercise lies in an examination of the relationship of gender to development efforts.

Methodology

The study was based on publicly available documentation of active World Bank lending projects with ICT components.¹ A sample frame of 176 projects was constructed. The sample purposely includes a large number of education projects because of the World Bank's growing support of using technology, especially computers, to improve educational outcomes.

The ICT major sector projects included projects in communications sector reform and privatization, development of national ICT policy, expansion of Internet access, using IT to empower rural communities, establishment of public ICT access centers, national ICT diffusion, and promotion of ICT

sector growth. ICT components in projects of other major sectors included IT training in schools and for employment, IT training for the development of the knowledge economy, distance education, IT-assisted education, computerization of many kinds of institutions and enterprises, using ICT to promote microenterprise development, information systems development in virtually all development sectors, Geographic Information Systems, information and communication services, and database development.

To analyze incorporation of gender issues in Bank ongoing and pipeline projects a form was constructed based on the GenderNet Criteria for Identifying Good Practice for incorporating gender issues in lending operations.² The project documentation was assessed according to whether gender issues were incorporated with regard to:

- Analysis and rationale of the project
- Operational actions
- Implementation mechanisms
- Monitoring
- Anticipated outcomes.

Gender analysis

Five separate judgments regarding gender were made based on this documentation. Each of these areas was rated as “yes” or “no”.

Analysis and rationale of the project

The first question considered whether project design included an analysis of gender roles in the concerned population and / or a stated realization that there were gender differentials in barriers, constraints, opportunities, access to resources, and decisionmaking. There was a tremendous range in the extent to which these areas were covered in project analysis. Sometimes the gender analysis consisted of only a simple statement such as “Country X has a considerable gender gap in education.” In other cases, the gender differentials in various project areas were examined in detail. If the issue of gender appeared in any way in the project analysis and rationale, however, the project was rated “yes” on this variable.

Operational actions

For the question on operational actions, evidence was sought as to whether the project advocated policy measures to equalize opportunities and access, undertook actions that targeted women, established and strengthened institutions that improved delivery of services to women, or built partnerships which increased outreach and access.

Implementation mechanisms

In consideration of implementation mechanisms, evidence was sought as to whether the project promoted gender-equal access to information, services, resources, and decisionmaking; whether both men and women were included in consultation with key stakeholders; and whether there was collaboration with both men and women in planning, executing, and monitoring project activities and components.

Monitoring

To answer the question whether gender was considered in monitoring, evidence was especially

sought of use of sex-disaggregated data as well as the possibility of readjustment of the project in course to correct any gender-based omissions that were discovered in implementation.

Anticipated outcomes

The question on outcomes asked whether in project documentation there was anticipation of gender-positive outcomes.

Tabulation by keywords

The World Bank projects’ database indexing by keywords was not yet standard enough to be utilized for classifying IT areas with major sectors or regions. There was a wide variation in the keywords used to describe comparable projects. For example, different combinations of the following keywords were used to identify similar projects in education using IT: computerization, computers in education, computer-assisted education, IT, educational technology, education for the knowledge economy, and technical education.

Geographic distribution

The projects were distributed across all the World Bank regions, with the largest number examined coming from Africa (31.3 percent), followed by Latin America and the Caribbean (22.2 percent), and East and Central Asia (17.0 percent). These three are regions of major concern for the diffusion of ICT as a tool to accelerate economic and social development.

Countries and regions

Projects from 81 countries and one region (OECS) were examined. Those countries with more than two projects were Algeria, Bangladesh, Brazil, Burkina Faso, China, Cote d’Ivoire, Dominican Republic, Ghana, India, Mauritania, Morocco, Mexico, Mozambique, Nicaragua, Nigeria, Senegal, Tunisia, Turkey, and Vietnam.

Major sectors

The cases studied covered World Bank projects from sixteen major sectors. As detailed above, the

largest representation was in Education, with 54, or 30.7 percent of those examined. After Education, the most heavily represented sectors were Agriculture (23 projects or 13.1 percent); Private sector development (17 projects or 9.7 percent); Information and communications (16 or 9.1 percent); Health, nutrition, and population (15 projects or 8.5 percent); and Law and justice and public administration (11 projects or 6.3 percent).

Analysis of results

The analysis of the inclusion of gender issues in the project cycle for the 176 projects reviewed showed the following.

Analysis and rationale of the project: Nearly half of the projects (92 projects or 47.7 percent) considered gender as an element in the rationale for the project. This was the highest gender-positive percentage result from the five questions posed to determine the inclusion of gender elements in project documentation. However, it is also the easiest to incorporate. A simple mention of gender, or description of the varying social roles of men and women, would rate a positive score on this item. Thus, many positive scores on the item derived from mere lip service to the inclusion of gender aspects in the overall project.

Operational actions: In contrast to the first question where nearly half of the projects said that they considered gender, only one third (59 projects or 33.5 percent) of the projects included any action that targeted women or strengthened institutions that were likely to target women.

Implementation mechanisms: With regard to whether the project would undertake actions that promoted gender-equal access to resources, the number was almost the same as that found on the previous question: 58 projects or 33 percent.

Monitoring: About the same number again (56 or 31.8 percent) said that they intended to provide sex-disaggregated project monitoring data.

Anticipated outcomes: A larger number of projects (65 or 36.9 percent) anticipated outcomes that would increase gender equality than the number of projects that undertook project actions related to gender. The fact that more projects said that they expected gender-positive outcomes without having undertaken any interventions to result in such outcomes, seems to indicate either a firm belief in the gender-neutrality of information technology (that it will naturally impact men and women equally), or that project leaders want to claim gender-positive results (“women will benefit”) without making any gender-related project investments.

Gender issue scores – ignoring gender was the mode

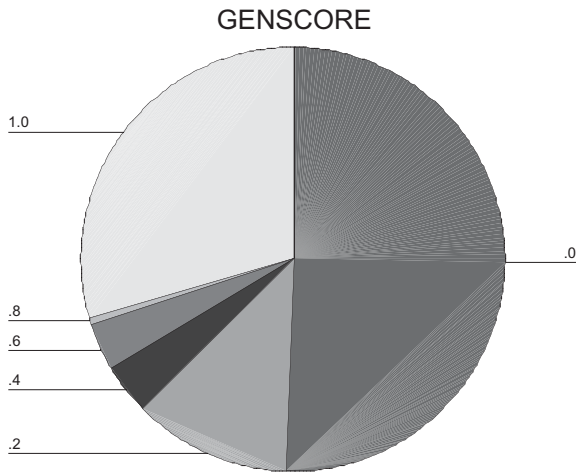
An unweighted composite “gender issue score” was compiled by adding up the responses to the five questions on the data collection form. Five “yes’s” resulted in a score of one; one “yes” was rated at 0.2, five “nos” were rated as “0”, and so on. The results were as shown in Table 1.

Table 1. Analysis of gender issue scores of projects

“Yes” responses	Score	Frequency	Percent	Valid percent
None	0.0	89	50.6	50.6
One	0.2	21	11.9	11.9
Two	0.4	7	4.0	4.0
Three	0.6	6	3.4	3.4
Four	0.8	1	0.6	0.6
Five	1.0	52	29.5	29.5
Total		176	100.0	100.0

Despite the fact that the project sample was more heavily weighted to social projects than the Bank’s investment projects as a whole, slightly more than half of the 176 projects (89 or 50.6 percent) paid no attention to gender issues whatsoever. On the other hand, nearly one-third of all projects ran the full gamut of gender analysis, incorporating all five identified aspects (considering gender issues in analysis, operations, implementation, monitoring, and outcomes). The fact that 80 percent of the projects fall at either end of the scale

Figure 1: Distribution of Gender Issue Scores

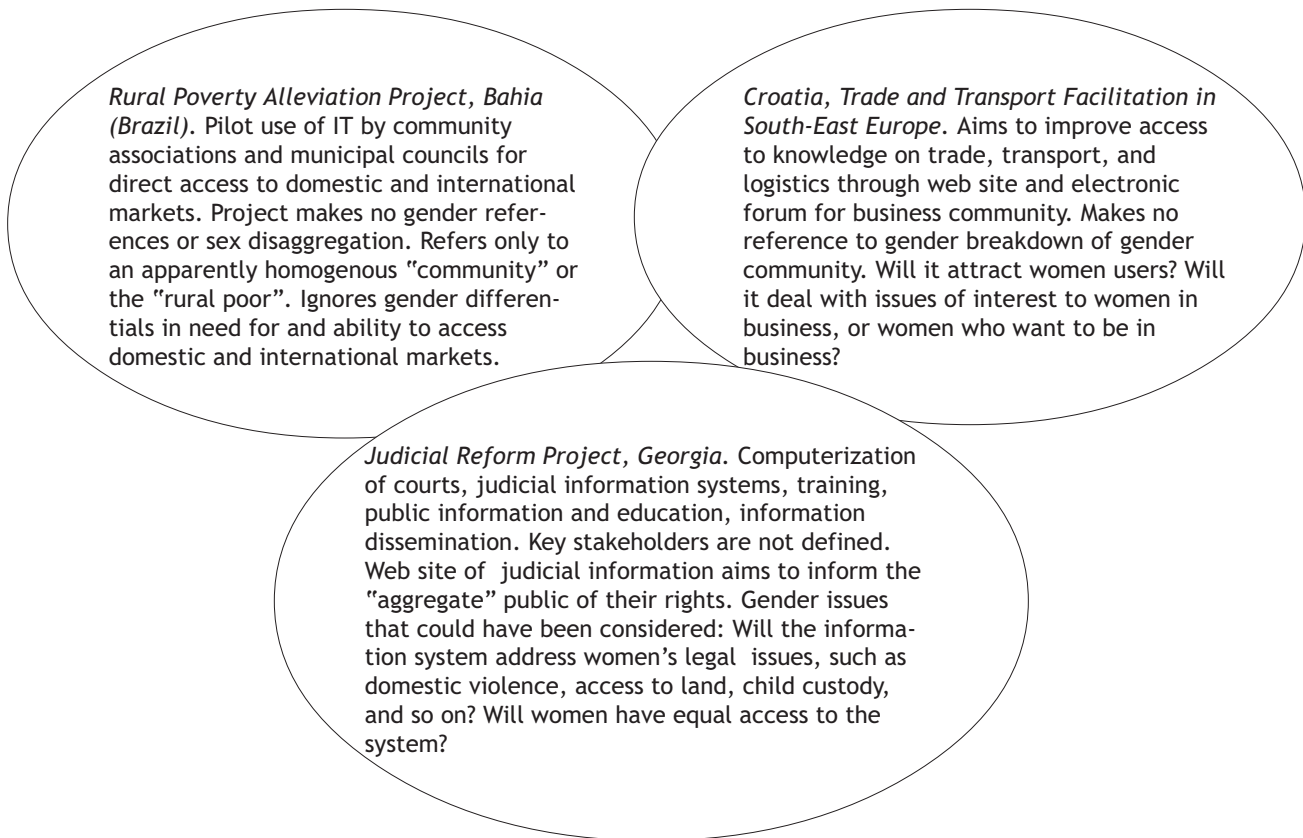


(either none at all or all of the above), as illustrated by the Figure 1, seems to indicate that gender analysis is either given full consideration in projects or is ignored. Given that the modal gender issue scores was 0.0, ignoring gender was the most common behavior. The mean gender issue score was 0.36 (out of a possible 1.0).

Low gender scores

The following are examples of projects that were either devoid of gender issues or that made at most a brief reference to the situation of women in the target community. Some of the areas of the projects that could benefit from a gender-aware approach are noted in Figure 2.

Figure 2: Projects without gender issues



gender-sensitive implementation activity would have been relevant are given in Table 2.

Sectors with high gender issue score

High gender issues scores were defined as 0.6 or above — three or more “yes’s” to the five questions regarding the incorporation of gender issues in the project. The sectors that received the highest

gender issue scores — with nearly half or more of the projects in this category — were Social protection, Energy and mining (perhaps surprisingly), Agriculture, Environment, Urban development, and Education (Table 3). In terms of showing awareness of gender issues in ICT to date, the performance of projects with Information and communications as the major sector, at

Table 2. Potential gender issues in projects

Project	Basic elements	Areas where gender issues could have been included
Argentina-Sustainable Fisheries Management Project	Information and communications systems will be developed, supported by improved hardware/software infrastructure. Project will focus on fisheries processing cooperative workers, which include a high percentage of women heads of household.	Women are involved in the fishing industry, as workers, and as marketers. Need to ensure that the information needs of women working in fishing (including marketing) are assessed and provided for and that women’s access to the information system is assured.
Indonesia Bengkulu Regional Development Project	Project recognizes that women play a significant role in rural economy but no special efforts are made to reach women at Agricultural Information Centers, to include their indigenous knowledge, or to encourage them in content development.	Cannot assume that women will have adequate access to the information they need for their businesses unless the project tries to reach them directly. Farmers will learn information management techniques—will women farmers be targeted? Included? Will women’s indigenous knowledge be captured and credited appropriately?
Senegal Agricultural Export Promotion Project	Central referral data information service for Producers/Exporters Associations, including market prices. Gender analysis was: “Women and children suffer from inadequate access to education and other social services.” Said social analysis “not applicable.”	Will referral data information service be accessible to women producers/exporters?
Tunisia Education Quality Improvement Program	Involves use of ICT to enhance learning outcomes. Project will bring IT into the classrooms as a subject, a work tool and a learning aid. The project notes that girls are underrepresented in math and technical subjects, but no corrective measures were introduced.	Project actions are needed to ensure representation of girls in math and technical subjects as well as IT.
Venezuela Millennium Science Initiative Project	No special efforts are made to attract larger numbers of girl students to study science. Says that girls have higher rates of education than boys through secondary school. But this is not the case in science and technology.	Special actions are needed in the project to increase the number of girls studying science. Starting point would be study of the reasons for lower enrollment of girls in this subject area.

Table 3. High gender issue scores by major sectors

Sector	No. of projects scoring over 0.6	Total no. of projects	% projects with high gender issues scores
Social protection	3	4	75.0
Energy and mining	2	3	66.7
Agriculture	14	23	60.9
Environment	2	4	50.0
Urban development	1	2	50.0
Education	26	54	48.1
Health, nutrition and population	4	15	26.7
Law and justice and public administration	2	11	18.2
Private sector development	3	17	17.6
Transport	1	6	16.7
Economic policy	1	9	11.1
Finance	0	5	0.0
Industry	0	1	0.0
Information and communications	0	16	0.0
Multi-sector	0	2	0.0
Water, sanitation and flood protection	0	4	0.0
Total	59	176	

0.0 percent of projects with high gender issues scores, was not impressive. This seems to indicate that there is need for greater gender awareness in ICT sector projects at the Bank, particularly for any project to be looked at through the lens of gender analysis.

Surprisingly, sectors where one would expect gender to be addressed performed poorly: Health, Law, Private sector, Transport, Industry, and Water and sanitation. Some examples of projects with high gender issues scores in the sectors that were frequently represented included:

Agriculture

- **Cote d'Ivoire. National Agricultural Services Support Program Project.** The focus on women farmers will increase their productivity and income. Project includes training for agricultural staff in gender issues, with emphasis on reaching women through agricultural extension services. However, there is no mention of outreach to women with the use of ICT in the project (for example, rural radio, dissemination of market

prices). The project received a gender issue score of 1.0, but none of the gender issues appeared in the ICT components of the project.

Energy

- **Uganda. Energy for Rural Transformation.** A long-term program to develop Uganda's rural energy and ICT sectors for rural transformation. The first phase objective is to put in place an enabling environment and capacity for private sector service delivery of rural energy and ICT, including high awareness of gender issues in poverty, health, and energy. Positive outcomes for women are expected. However, gender awareness does not carry over to ICT, even though the ICT areas — accelerated rural access to basic telephone services, spread of Internet to district capitals, and telecenters in deep rural areas — have highly relevant gender concerns. Gender issues score: 0.6.

Environment

- **Slovenia. Real Estate Registration Modernization Project.** Project set up computerized local

land book offices with an IT management system. Women are interested stakeholders as both land and apartment owners. However, a full social assessment was not done during the project although a social impact assessment will be part of project monitoring. Gender issues score: 0.6.

Education

- **Guinea. Education for All.** Aims to ensure that girls and boys both have equal access to a high-quality education system. Involves the training of teachers in computer technologies, Internet in secondary schools, computers in math teaching, computer networks, computers in library, computers for better administration, and a computerized information system for library. The project features mainstreaming of girls’ education, but there is no mention of gender issues in ICT, computers, computer education. Gender issues score: 1.0.

Social protection

- **Senegal Social Development Fund Project.** The project aims at better access of the poor to social services, including telecommunications and new technology. It includes an Information, Education and Communication (IEC) program, especially for women, in view of their high rates of illiteracy, on reproductive health. There is also a campaign to encourage girls’ education, and women are targeted as clients for microfinance. The project is generally very gender aware, but there is no mention of gender issues in relation to IT. Gender issues score: 1.0.

Urban development

- **Nicaragua. Natural Disaster Vulnerability Reduction Project.** The project demonstrates awareness of gender differentials in the impact of and reaction to natural disasters and the need to develop a communication strategy that reaches both men and women. One of five components of the project is an information system. There is also a web page for the secretariat and training for use and management of computerized information systems. Despite the high level of gender awareness, there are no references to gender issues

in relation to the ICT components of the project. Gender issues score: 1.0.

Gender issue scores by region

The Africa region (AFR) had the largest percentage of projects with high gender issues scores, with more than a third of all projects falling into this category (35.6 percent). Second was the Latin America and Caribbean region (LCR) with 22 percent receiving gender issue scores of .60 or higher. These two regions were the only areas that either approximated or fell above the mean gender issue score of 0.36 (Table 4).

Table 4. Projects with high gender issue scores by region

Region	No. projects with scores >=0.6	% projects with high gender issues
AFR	21	35.6
LCR	13	22.0
SAR	11	18.6
MNA	6	10.2
ECA	6	10.2
EAP	2	03.4
Total	59	100.0

Examples of these projects with high gender issues scores from the most frequently represented regions were:

Africa (AFR)

Ghana Road Sector

Ghana Road Sector Development Program Project. Included awareness of improving transport for women, gender equality in development of transport network and services, socioeconomic impact of road maintenance. The project aims to maximize gender participation in decisionmaking and shows training needs of men and women in road agencies. Data are to be disaggregated by sex. However, gender was not mentioned in ICT aspects of computerization and information systems.

Latin America and the Caribbean (LCR) Honduras Health Sector

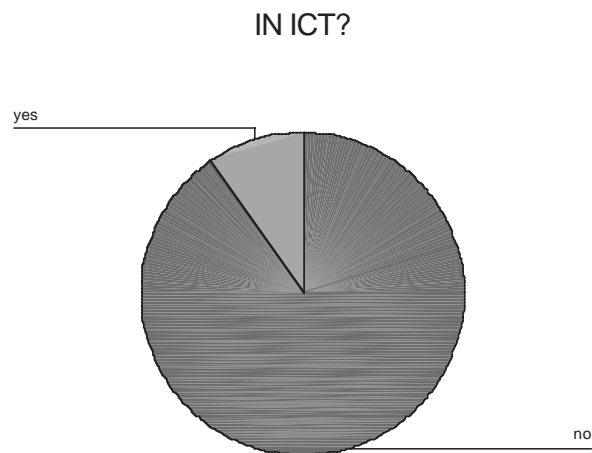
Health System Reform Project. The overall aim of the project is poverty alleviation and improved health status of the population, especially women. There is a high degree of attention to gender and social issues, including domestic violence toward women, maternal mortality, high female mortality from AIDS, and low age of marriage for women. That women and children will benefit from the targeted interventions is the expected project outcome. IT aspects are computerization of Ministry of Health, development of health information systems, and training in their use. There was no attention to gender issues in the IT component of the project.

Gender and ICT

As seen above, many projects incorporated gender issues, often in all five of the above categories. However, the gender analysis rarely carried over to the ICT component of the project (Figure 3). More than a third of the projects showed an awareness of gender roles in the concerned population, actions that targeted women, consultation with both men and women, sex-disaggregated data, and anticipation of gender-positive outcomes. Yet when it came to the ICT components, there was usually no mention of any of these concerns. The tendency was to treat the ICT component as a technical part of the project that had no social impact or that was impervious to gender impact differentials that appear in virtually every aspect of human endeavor.

In view of this frequent absence of concern with gender in ICT components, all project documentation was revisited to pose an additional question on the incorporation of gender issues: did the project consider any gender issues in regard to the use of ICT? The results of this analysis showed that *only sixteen projects (9.1 percent) of 176 considered gender issues in the information technology component of the project*. Not surprisingly, 94 percent (fifteen projects) of the projects that considered gender issues in ICT were projects that had

Figure 3: Gender issues in ICT projects/ components



the highest (1.0) gender issue score in the non-ICT components. There was only one case with gender awareness in the ICT component that did not carry over to gender analysis in the project as a whole. Thus, while roughly one-third of all the projects, all of which had ICT components, incorporated gender issues in a significant manner, fewer than ten percent of them looked at gender issues with regard to ICT. Only one-quarter (fifteen of 59 or 25.4 percent) of gender-sensitive projects carried over gender sensitivity to the ICT components of the project.

Projects most likely to have gender in ICT

Although the number of projects that had gender awareness regarding ICT issues was very small, it is possible to make certain observations about them.

How do these findings compare?

We can compare the findings of this study to other Bank studies that have tried to measure the extent to which gender issues are considered in World Bank projects. As of 2000, some 40 percent of Bank investment projects considered gender issues, while between 1988 and 1999, only 38 percent of such projects had any meaningful reference to gender issues (Long, 2003, iv). In the ICT components of the projects under study, only

Table 5. Projects with gender issues in ICT by region

Region	No. with gender in ICT	No. of projects in all	Region's projects as % of all projects	Region's projects as % of all with gender in ICT
LCR	6	39	22.2	37.5
AFR	5	55	31.3	31.2
ECA	4	30	17.0	25.0
SAR	1	19	10.8	6.3
MNA	0	19	10.8	0.0
EAP	0	14	8.0	0.0
Totals	16	176	100.0	100.0

9.1 percent had any consideration of gender issues whatsoever. That falls way below the norm of World Bank projects.

By region: best showing – LCR

In examining those sixteen projects that did incorporate gender issues in ICT (Table 5), the largest

numbers were found in Latin America and the Caribbean, followed by the Africa Region, with LCR having a significantly higher percentage than would be expected from the region's representation in projects in the study population (37.5 percent of all projects with gender in ICT, but only 22.2 percent of all projects). Of the five projects from Africa, two were from the same country — Mozambique. A major factor in this is the importance of gender to the Government of Mozambique and consequently to the donors as well. Two regions had no projects at all with gender sensitivity in the ICT component: East Asia and the Pacific and the Middle East and North Africa (MNA).

Most likely to have gender in ICT by major sector

As seen in Table 6, the sectors that had the largest number of ICT and gender-aware projects were Education (five) and Agriculture (four). Both of these sectors had a higher percentage of the projects with gender issues in their ICT components than in the study as a whole. The showing of Agriculture was particularly strong, as

Table 6. Major sector of projects with gender in ICT

Major sector	No. of projects with gender in ICT	No. of projects overall	% of all projects	% of all projects with gender in ICT
Education	5	54	30.7	31.2
Agriculture	4	23	13.1	23.5
Private sector development	2	17	9.7	11.8
Social Protection	2	4	2.3	11.8
Energy and mining	1	3	1.7	
Environment	1	4	2.3	
Information and communications	1	16	9.1	
Economic policy	0	9	5.1	0.0
Finance	0	5	2.8	0.0
Health, nutrition and population	0	15	8.5	0.0
Industry	0	1	0.6	0.0
Law and justice and public administration	0	11	6.3	0.0
Multisector	0	2	1.1	0.0
Transport	0	6	3.4	0.0
Urban Development	0	2	1.1	0.0
Water, sanitation & flood protection	0	4	2.3	0.0
Total	16	176	100.0	100.0

Table 7. Gender issues in projects with high gender issues scores and gender in ICT³

Region	Country	Project Title	Gender issues/gender awareness features
LCR	Argentina	Buenos Aires Secondary Education	Training in information technology, computers integrated into curriculum for 200 Buenos Aires high schools, with emphasis on equity and equality for children from poor families.
ECA	Azerbaijan	Agricultural Development and Credit Project	Involves establishment of rural information and advisory services, MIS for credit cooperatives. The project recognizes the importance of focusing on specific problems of women in rural areas. One concern is the information needs of rural women about land titles.
ECA	Bulgaria	Registration and Cadastre	GIS information system to be established in 28 cadastre offices to store large amount of geographic information on property tax in a regional information system. The project recognizes the gender issue of women's access to registration, land registration and GIS information.
AFR	Cameroon	Public/Private Partnership Growth and Poverty Reduction Project	Aims to improve business environment and competitiveness to increase private investment and strengthen the poverty alleviation focus in government's economic management. High awareness of gender aspects of poverty. IT component is computerization and development of poverty information system using gender indicators and web site, with awareness of gender issues and access of both men and women to information. Emphasizes participatory approach to include women and gender sensitivity in all project indicators.
LCA	Chile	Lifelong Learning and Training Project	Computers for national and regional training and employment services. Communication and dissemination strategy for project has gender disaggregated targets. Efforts to ensure that women working in SMEs benefit from training, including training in four proactive learning and training management information systems.
AFR	Ghana	Agricultural Services	Aim of project is IT diffusion, strengthening information systems. Involves increasing number of extension agents, gender training of extension agents, diffusion of information to women farmers. Project will establish a sex-disaggregated database of food and agricultural statistics to support gender responsive training.
SAR	India	Third Technician Education Project	Project is to train personnel for key areas of economic growth, with focus on IT. Women are the majority of students in technical schools and are represented in technical work force in higher numbers. Technician education project gives them an opportunity to study in their own state. Provides hostels and scholarships for women.
ECA	Macedonia	Children and Youth Development Project (LIL)	IT training for youths at risk from different socio-cultural backgrounds. Aims to improve situation of girls from minority ethnic groups who are underrepresented in education.
LCR	Mexico	Gender Equity	Project has an information system with a gender focus. A major aim is the sex disaggregation of statistics.

Region	Country	Project Title	Gender issues/ gender awareness features
LCR	Mexico	Southeast Regional Development Learning and Innovation Project	Project features delivery of ICT services to micro-businesses to increase their access and access new markets to increase income. Funds allocated for training of women to ensure their widespread participation in project activities. Additional services to be designed to deal with gender.
AFR	Mozambique	Higher Education Project	A major aim of project is to improve gender equitable access to higher education. Includes use of information and communications technology in delivery and teaching of higher education. Internet access for higher education institutions in Mozambique. Aim to develop ICT capacities. High awareness of gender inequity in Mozambique higher education and need to develop gender access to education through use of technology.
AFR	Mozambique	Mineral Resources Management Capacity Building Project	Project designed to provide information systems for geology, including GIS, to have better geoscientific and natural resources information for investors. Awareness of the heavy involvement of women and children in mining, the project addresses gender issues in artisanal mining. The Ministry of Mines is setting up a social and economic studies section at the Ministry of mines to undertake gender studies. Consultative approach included gender analysis. Women miners are participating in implementation of the project, including identification of information to go into the information systems.
LCR	Peru	Agricultural Research and extension Project	Involves technology development and transfer, access of farmers to technology, improved market information systems. Project developing manual to ensure participation of women in all activities. Concerned with developing methods to reach rural women. Women to be adequately represented as extension agents (using information technology) and beneficiaries. IT service providers will be selected in part on basis of their capability to work with women.
AFR	Tanzania	National Agricultural Extension Program (NAEP) (02)	Providing communication support for decentralized information management, the project established Zonal Communication Centers and units accessible and with outreach to rural women. Women's issues were included in training at Zonal Communication Centers, and 30 percent of places were reserved for women.
ECA	Turkey	Basic Education Project (02)	ICT education for teachers to improve basic skills and assist in using ICT to improve instruction. High awareness of gender gap in education, ensuring basic education for girls. Computer literacy to be part of basic education curriculum. Increased numbers of girls in ICT-assisted basic education; female teachers to be trained.

its ratio of projects with gender in ICT was nearly double that of its representation in the study. Information and communication had only one such project. However, Social protection showed the highest percentage of gender in ICT projects in relation to the number of projects from this sector in the study. The two projects in Social protection that considered gender issues represent a percentage five times that sector's share in the project population as a whole.

Nine major sectors had *no* projects that recognized gender issues in ICT: these were Economic policy; Finance; Health, nutrition, and population; Industry; Law and justice and public administration; Multisector; Transport; Urban development; and Water, sanitation, and flood protection (Table 6). These are areas that should be given priority in the identification of gender issues in ICT and the sensitization of project officers to them, to the importance of including them in project design and implementation, and to the methods of doing so.

Projects that incorporated gender issues throughout, including in their ICT components

The projects that incorporated gender issues throughout the project, including in the ICT components, are enumerated in Table 7.

More recent more likely

Is gender awareness in ICT a recent phenomenon? Most of the projects that incorporated gender issues in ICT components were approved by the Bank's Board in 2000 and later — 70 percent as compared to 55 percent of the projects in the study overall that were approved during this period. Thus, it does seem that there is a recent tendency toward greater awareness of gender issues in ICT. Nevertheless, the number of such projects has not increased each year, but rather peaked in 2000 (Table 8). None of the fourteen year 2002 pipeline projects showed evidence of gender awareness with respect to ICT. However, as documentation on pipeline projects tends to be scanty, it is difficult

to make definitive judgments about the gender and ICT content of these projects. The awareness may be there, but may not be detailed in the documentation. In all, though, the number of projects with gender components in ICT is too small to make any meaningful statements about time trends.

Determinants of the inclusion of gender in ICT components

Open-ended e-mail questionnaires were sent to Bank team leaders of the sixteen projects that incorporated gender issues in the ICT components of projects in order to elicit their views on how this had come about. Six responses were received. Among the factors they cited were the importance of gender issues to the host government, the team leader's awareness of gender issues in the geographic area of the project, gender awareness on the part of the national project preparation team, guidance of World Bank regional gender units, and gender awareness of the Bank team on sectoral issues that then carried over to ICT. They also stressed the importance of gender awareness on supervision missions.

Absence of social analysis

The World Bank project preparation format takes into account the importance of social analysis in project development. One of the required parts of the PAD format is the summary of project analysis, which includes seven areas, one of which is social analysis. Analysis of popular participation

Table 8: Projects incorporating gender issues in ICT by year of approval

Approval year	Projects with gender in ICT	All projects that year	% of all with gender in ICT
1996	1	1	5.9
1998	1	23	5.9
1999	2	24	8.3
2000	5	41	29.4
2001	4	33	23.5
2002	3	22	17.6
Total	16	176	100.0

is also solicited. Unfortunately, a number of projects with ICT components did not respond to this solicitation and identified both social analysis and population participation as “not applicable.”

While a significant number of IT projects or projects with ICT components undertook social impact analysis or otherwise exhibited awareness of the social context of the project, many did not. An examination of selected projects, organized by sector and subject, illustrates the possible social and gender issues that could have been incorporated, with a resultant better chance of achieving the goals of the project. This is in line with the 1997 World Bank study that showed that projects with gender-related actions were more likely to have satisfactory outcomes and to reach their objectives than projects without such actions (Murphy, 1997). The following review looks at social and gender issues in ICT projects in distance education, in education in general, small-scale enterprises, information systems, and telecommunications reform and regulatory projects.

Gender and other social issues in ICT projects

Distance learning projects

A number of Distance learning projects examined

were surprisingly devoid of social awareness or gender analysis. Distance learning projects test comparative learning outcomes, cost and cost-effectiveness, and the sustainability of several different distance learning approaches in various developing countries.

The PADs of several Distance learning projects stated that they did not see social analysis as a necessary aspect of the project. These included projects in the Dominican Republic, Senegal, Cote d’Ivoire, and Ethiopia. Others showed considerable awareness of the social context in which the network would operate, but almost none discussed gender issues.

The basic gender issue in distance learning is equal access. This is particularly important to women because distance learning is designed to bring education to the underserved, among whom women form the majority in developing countries. Distance learning is particularly attractive to women who, due to multiple roles and responsibilities, are often unable to enroll in standard educational programs. The possibility of flexibility in scheduling and location is particularly attractive to women. Table 9 shows some possible gender concerns in distance learning projects.

Table 9. Gender issues in distance learning projects

<p>Is data on students/users disaggregated by sex (to show possible gender differentials in users)?</p> <p>Are the information needs of both men and women considered in designing programs?</p> <p>Is the content of programs relevant to both men and women?</p> <p>Are there constraints to women participating in the courses (for example, courses for civil servants and government officials – are they delivered at times that are convenient to women workers)?</p> <p>Does the distance learning incorporate flexibility in scheduling and location to accommodate both men and women?</p> <p>Are there any social or cultural problems with mixed-sex instruction at the distance learning sites?</p> <p>Are there differences in subject and technical skill levels by gender requiring remediation or accommodation?</p> <p>Are there differences in foreign language abilities by sex among the targeted recipients (for example, if courses are in English, are women less likely than men to have a mastery of English)?</p> <p>Does the course content recognize gender issues in the substantive material for the course (for example, in public administration)?</p>

Education projects

Training in IT is essential for women and girls to participate equally in the information age. Increased education is probably the single most important factor in increasing the access of women in developing countries to ICT. Thus, the absence of gender awareness in IT education projects is a particularly striking omission. Some of these areas of omission in active World Bank ICT and education projects are highlighted in Table 10.

ICT for small-scale enterprise development

Women entrepreneurs are most commonly found

in small-scale enterprises in developing countries, and comprise the majority in informal economy enterprises. Thus, both social and gender analysis would be expected to be part of projects in this area. In at least three cases, illustrated in Table 11, they were not.

However, not all microenterprise development projects were devoid of gender analysis. The Mexico South East Regional Development Learning and Innovation Project, dealing with small-scale enterprise, had a high gender issue rating. It showed gender sensitivity in designing services

Table 10. Gender issues in education projects

Country	Project Title	Some project aspects	Gender omissions
Gaza and West Bank	Emergency Services Support Project	Training teachers in computer use, providing computer labs. No social assessment done.	Gender issues – access of female teachers to computer training, access of female students to labs.
Lebanon	General Education Project	Introduction of new technologies for teaching and learning, computer literacy.	Issues of possible gender differential in access is not raised.
Lithuania	Education Improvement Project	Approved in 2002. “Communities will be involved in the consultation process.”	No awareness of gender differentials within communities. No women’s organizations among the major stakeholders consulted.
Russia	Education Reform Project	Courses for new professions, vocational education – IT. New teaching methodologies using IT into schools.	No gender analysis at all in an area where the need to encourage girls and women is well documented.
Thailand	Rural Information Empowerment Project	The project aims to bridge rural-urban digital divide in Thailand, with emphasis on local IT skills acquisition and Thai language content development.	No mention of gender divide, or of any gender issues in ICT.
Vietnam	Higher Education Project (tertiary education)	Emphasis on IT development at universities. Statement: “The project has no direct impact on poverty alleviation or improving gender equality.”	Are women among those trained? Project ignores recognized need to provide incentives to encourage women to enter scientific and technological fields.

to increase access to ICT-based business development, particularly for microbusinesses.

Information systems projects (computers, automation, MIS, GIS)

A number of World Bank ICT projects deal with computerization, notably of government institutions; with automation; and with the development of various kinds of information systems in health, finance, and land records, among other areas. Even these highly technical projects need not be gender-blind. Nearly every one of these projects has gender issues whose consideration can lead to better project results.

A general question that applies to all information systems is whether the information systems are capturing sex-disaggregated data and knowledge that may be gender-based. When indigenous knowledge is included, does it include the relevant knowledge that women have? Some examples of potential gender issues in information

systems projects are given in Table 12.

Telecommunications and regulatory projects

The ICT sector projects found most frequently in the study were telecommunications projects that involved liberalization of the sector, including privatization and introduction of competition, award of licenses — particularly for cell phones, and promoting dissemination of ICT-based services (including telecenters and cybercafes). Some also included training in computer skills in conjunction with information systems. Many, but not all of these projects, had a high degree of awareness of the importance of the project for promoting social inclusion.

Of the ICT sector projects examined in the study, almost none mentioned gender issues. Table 13 presents a sampling of projects and outlines gender issues that might have been considered, but were not.

Table 11. Gender issues in small-scale enterprise projects

Country	Project Title	Some project aspects	Gender omissions
Armenia	Enterprise Incubator (LIL)-Industry/small-scale enterprise	No social analysis in IT for enterprise development area.	Knowing the gender breakdown of the target population would have been significant in planning the project.
Comoros	Small Enterprise Development Project	To strengthen legal information center, provide market information, establish information systems on work opportunities for job seekers. Business development, telecoms and informatics.	No references to gender, women, girls. A gender equity approach would call for ensuring that the information systems and legal information center attracted both men and women users. Efforts could be made to attract women entrepreneurs to telecoms and informatics business development.
Nicaragua	Competitiveness Learning and Innovation Loan Project	IT-based business development services for small-scale enterprises.	No mention of women among small-scale entrepreneurs, despite their prevalence in this area in Nicaragua. Proactive delivery of business development services to women entrepreneurs would evidence gender awareness.

There are many potential gender issues in telecommunications reform and regulatory projects. In Table 14 the left column identifies issues that are frequently found in World Bank information and communication major sector projects dealing with telecommunications modernization, liberalization, and regulatory reform. The right column attempts to identify the gender aspect of the issue.

Among the major gender issues in this area are

increased access to service for women, who (where statistics are available) are most numerous among the underserved. In many developing countries, women are the majority in the rural areas that tend to have much less availability of service than urban areas. Affordable service pricing is also a major concern, as women's incomes, particularly those of female-headed households, are generally far below those of men. Technology choice is another major issue with gender implications. If the technology chosen is difficult to use and with

Table 12. Information systems projects that ignored gender

Project Title	Project Aspects	Potential gender issues
Water Sector Modernization Projects	Installation of water sector management information systems	Access of women to training, jobs relating to newly arrived, installed computers.
Health Sector Loan Projects	Including health information systems	Indicators of health care system's performance (sex-disaggregated). Objective for services to become more accessible to patients (men and women).
Computerized Court Management Information Systems	Improved performance of legal system through development of information systems, improved use of IT in courts	Access of women to judicial and commercial information, access of women judicial employees to computer skills training.
Financial Sector Management Project	National Bank payment system reform, public procurement	Equal access for men and women to computer skills training and use of the new systems.
Public sector management technical assistance	Public information systems and e-government	Inclusion of public information important to women. Equitable access of women to public information. Sex disaggregation of statistics. Performance monitoring of public information systems for social development outcomes.
Geographic Information Systems (GIS)	Development of GIS	GIS information content including soil management and agriculture, land ownership, fishing, weather and climate, environmental management or desertification are issues of interest to women in their productive roles. Have attempts been made to make the information accessible to women? Have their information needs been ascertained in designing the system? Have attempts been made to incorporate their indigenous knowledge?

Table 13. Gender-blind information and communication sector projects

Country	Project title	Comment	Possible areas of gender action, gender issues
Algeria	Telecom and Postal Sector Reform Project	Promotes open access to communication services through competition, with GSM licenses to be awarded. Objective is to encourage businesses to use more IT services.	Women-owned communication firms should be aware of competition for licenses. Women entrepreneurs should be targeted for increased awareness about IT services.
Gabon	Privatization and Regulatory Capacity Building Project	Assists country with privatization of post and telecoms. Communication campaign will be mounted to publicize benefits of privatization.	Although they should have parity among users, women or women's groups are not identified among stakeholders of the project or its communication campaign. They need to be targeted. Analysis is needed to ensure that benefits of privatization will reach the majority of women.
India	Telecom Sector Reform Technical Assistance Project	Project will encourage IT competition, entrepreneurship and innovation. No social issues identified in the implementation of this project.	Women-owned businesses could be identified for participation. Cost and delivery aspects of radio-based telephone for Internet access in rural areas need to be analyzed for affordability and access by women who are the majority of the population in rural areas.
Madagascar	Private Sector Development Project	Includes telecom reform (liberalization). Users discussed but are not disaggregated by gender.	In order to increase telephone and Internet usage among women, constraints to their access and utilization need to be analyzed and targeted.
Mozambique	Communications Sector Reform Project	Assists country with development of regulatory framework, telecoms policy and promoting ICT development through enabling legislation. Also included rural communications strategy.	No mention of women as stakeholders in this national effort. Only gender breakdown given is for primary school enrolments. The concerns of women users should be central to efforts to increase telephone density in rural areas, in identifying community access points. Telecoms policy should include affordability.
Nepal	Telecommunications Sector Reform Project	Project targeted "all Nepalese." Rural targets were low income, disadvantaged people, but gender was not mentioned.	Sex disaggregation is needed to identify and reach low income, rural disadvantaged women since government recognizes the importance of telecoms as a key factor in social inclusion.
Nicaragua	Telecom Sector Reform	States that "the project will benefit all telecom users in Nicaragua by increasing the availability of telephone lines and increasing service."	Many studies have shown that women do not benefit unless their particular needs are identified and targeted. The needs of "all users" are not uniform.
Rwanda	Competitiveness and Enterprise Development	Aims to reduce costs and increase efficiency of telecoms, with a diversity of services to be offered to consumers, including Internet.	Need for analysis to determine gender impact of services to be offered in terms of cost, accessibility, and relevance.
Uruguay	Public Services Modernization Technical Assistance Project	Aim is to promote greater access to public services, telecom for individuals, particularly the poor. Positive social impacts are expected.	Women do not automatically benefit from efforts aimed at the poor unless their particular needs are identified and accommodated.

Table 14. Potential gender issues in information and communication projects

ICT issues	Gender aspect
Network modernization	Does the proposed modernization provide infrastructure that is affordable to most women?
Network architecture	Equipment and service providers can offer cost-effective and appropriate solutions for the majority of women.
Network deployment	<p>Choices of network infrastructure can be made that cater for the majority, focusing on universal access to ICT and not on expensive high-capacity specialized access.</p> <p>Affordable and forward-looking technology such as wireless alternatives that ensure low cost and affordable access can be used.</p> <p>When new technologies are implemented, ensure that women are included in training.</p> <p>The location of infrastructure should facilitate access for women.</p>
Infrastructure	<p>Is the infrastructure to be deployed throughout the country in the areas where women are in the majority? Are there provisions for high technology applications in areas where many women live outside of the capital and major cities?</p> <p>Women may be restricted from accessing ICT even when they are available in their communities as a result of social, economic, cultural or technological constraints. Gender awareness is thus essential in planning and implementing infrastructure.</p>
Technology choice	<p>The affordability of service is a key issue to women. Limiting technology choice can militate against new players and new technology in the market that might bring down costs – many developing countries ban Wi-Fi Internet⁴ and VOIP (Voice Over Internet Protocol) telephony.</p> <p>While limitation on the choice of mobile standards (such as GSM or CDMA) can prevent fragmentation of markets in initial stages, continued insistence on standards can block the entry of mobile technologies that are cheap and effective for underserved areas.</p> <p>Assessments should be undertaken to determine appropriate technology choice – who will use it and for what purpose.</p> <p>User-friendly technology, particularly in the context of low literacy levels, should be supported and promoted.</p>
Sector liberalization	While monopoly system operators dispute this, opening the ICT sector to competition can bring in needed investment and force down end-user prices to make access more affordable, notably to women.
Tariff policy	<p>This covers both import duties and taxes on computer equipment and pricing schemes for communications services. High customs duties on mobile telephones and computer equipment as well as high prices for telephone service are deterrents to women users.</p> <p>In preparation for competition in the telecommunications sector, many countries are rebalancing international and domestic tariffs to eliminate existing subsidies, most frequently on local service. This rebalancing has meant higher rates for local calls in many places, which hit the poor, the majority of whom are women, the hardest. Although it is expected that competition will lower prices in the long run, in the interim many users cannot afford local service. Among the ways to compensate for rebalancing costs are basing tariffs on forward-looking costs and establishing regional (such as rural versus urban) tariffs.</p>
Regulation	Regulation is a vital area for advocates of gender equality in ICT. Regulators do not set policy but rather help in its implementation. Regulation produces a set of rules for market behavior – who can provide what service and under what conditions – and sets the framework for achieving desirable outcomes established by national policy, particularly in the two areas of greatest interest for ICT and the empowerment of women: universal access and affordable services. It is an area that gender proponents should focus on.
Independent regulators	An independent regulator can compel profit-driven private sector players to deliver on

	<p>social and gender policy objectives such as universal access (see below). In return for granting licenses, regulators can compel service providers to provide service to underserved areas where women are a majority. As regulators have the authority to set service priorities, gender-equality advocates need to lobby to ensure that service to poor women in rural areas is a priority. Regulators can provide funds for research, development, and testing of technology that will serve women. Those that secure licenses, particularly for cellular phones, are often required to fulfill community service obligations. Elements to ensure gender equality could be written into these obligations.</p>
<p>Regulatory frameworks</p>	<p>Regulatory frameworks can permit the resale of mobile phone services, which are often profitable businesses for women to establish. Regulatory frameworks can reduce licensing fees, spectrum prices, and interconnection charges that can make ICT more accessible to women.</p>
<p>Licensing⁵</p>	<p>If fees for telecommunications, ISP and mobile service licenses are high, they will be passed on to users, limiting the affordability to the women and the poor. High fees increase the cost of telephony and ICT services, discouraging the establishment of women-owned communications businesses including telecenters, phone-fax-Internet shops and mobile telephony. A certain number of telecommunications licenses should be allocated to women-owned businesses or businesses with women in management positions. A gender-conscious licensing policy could waive license fees for communications businesses run by women entrepreneurs or those that provide services to underserved areas, particularly where women are concentrated. Fees could be reduced for operators with gender-equal and pro-handicapped employment policies. Licenses can obligate providers to provide discounted service to certain customers such as poor women in rural areas. Licensing procedures should be transparent so that women applicants can have ready access to the information. License awards can contain certain conditions that promote gender analysis and mainstreaming for the particular company.</p>
<p>Universal access</p>	<p>Universal access concerns the establishment of telecommunications development funds and other programs, funded by carrier fees and other revenues collected by regulators, to facilitate the expansion of access to the underserved. It is the avenue for gender <i>par excellence</i> that has real possibilities of positively affecting the lives of the mass of women. As telecommunications development funds reflect extremely important policy and set the rules for implementation of ICT projects in underserved areas, they deserve great attention from gender advocates. Gender-aware universal access policies can be developed that stress public access points as an alternative to more capital-intensive choices (one line/home) and ensure that locations of public access points are gender-sensitive (for example not in bars or auto shops).</p>
<p>Universal service obligations</p>	<p>Universal service is a specific obligation that regulators require of operators in return for licenses to contribute to universal service goals. Under universal service obligations, regulators can mandate the provision of telecenters in underserved areas. Telecenter plans need to take into account the different needs of men and women in the concerned communities. Gender advocates could lobby for incorporating gender-based issues in universal service rules. In most places this has not happened yet because women's groups have not pushed for it. Demands could include that service to underserved areas be delivered reflecting male-female distribution in the population, that priority be given to disadvantaged women such</p>

	<p>as single mothers, widows, and handicapped women. Service providers could be mandated to offer telephone subsidies or price packages targeted at rural women, the handicapped, and the aged.</p>
Radio frequency spectrum	<p>This issue also involves fees and licenses. Lower fees will encourage applicants to provide services to new markets, including new women subscribers. Licenses should be equitably and transparently distributed, so that women-owned business and businesses that serve women have a chance to secure licenses. In several African countries where government maintains a monopoly on radio frequencies, public/private access to radio frequency is still an issue. In a number of places women-run community radio stations have obtained licenses.</p>
Research and development and innovation	<p>Are there incentives directed at encouraging women in ICT research and innovation? Is research being done on capturing women's indigenous knowledge? Are tools and software being developed using local languages? Is there research and development on developing technologies for the illiterate and newly literate? Research efforts and programs that promote women innovators can be subsidized. Scholarships and grant programs for women in science and technology can be created. Technology programs should promote and accept women's participation. Create and support technical programs at universities by providing grants or scholarships for women students and researchers.</p>
Systems for learning and training	<p>Do women have equal access to technical training? Programs to train women in ICT technical and management programs, followed by internships, could be supported.</p>
Software and applications	<p>Do women have a say in what applications are being promoted? Are they ones that are usable or accessible to many women? Does the policy support open-source software and Linux operating systems that can make software available to communities with limited budgets?</p>
Building technological capacity	<p>Are opportunities extended to women as well as men? Are there mechanisms for women to enter these fields and training programs, or to develop role models for young girls, or stem the brain drain? Are training opportunities available not only for technology professionals but for nonprofessionals to use ICT?</p>
ICT industry development and labor policies	<p>Encouragement and incentives must be given to motivate women to enter all segments of the ICT labor force, not just the menial electronic assembly jobs they have dominated in the past. Enabling policy can encourage the establishment of teleworking that has provided jobs for many women.</p>
ICT business development and e-commerce	<p>Enabling legislation for e-commerce should encourage women entrepreneurs. SME ICT and communications businesses, with possibilities for ownership by women and women's groups, should be encouraged. Telecenters can provide economic opportunities for women; they should be promoted for business development, with consideration for women owners. A number of telecommunications licenses should be allocated to women-owned businesses. Carriers could be obligated to do a certain percentage of business with women-owned businesses. Training programs could be promoted to establish ICT-related business opportunities (such as e-commerce, telecenters, and wireless company ownership).</p>
E-government	<p>Women could benefit from many e-government services especially land and voter registration and license applications. They would especially profit from online availability of services that would otherwise require travel to the capital city.</p>

features of interest only to the well educated and well-to-do, the number of women users is likely to be low. Similarly, subsidized public telephones or kiosks in places where women will be unwilling to use them would be noninclusive of gender in project design. Training is also an issue; given gaps in skills, more women users than men need training to be able to use telecommunications technology effectively. Telecommunications policy can promote choices in all these areas that will lead to equal access to the technology by men and women, but only if gender aspects are included up front in project design.

Conclusions: ICT as the gender perspective frontier

The review of World Bank ICT projects and projects with ICT components indicates that increased consciousness of gender and ICT issues is required in World Bank project design. More than half of the projects examined, regardless of major sector, paid no attention to gender issues whatsoever. Even more noteworthy is the near total absence of gender issues in ICT sector projects. These two findings together bear out the observation that ICT is the last frontier of development activity to open itself to a gender perspective. ICT projects and components in projects are still treated as technical areas largely devoid of social concerns that may be considered in other project components.

This research is not an isolated undertaking but rather part of the overall effort to integrate gender issues into the work of the World Bank in a coherent and consistent manner. The Bank has devoted considerable efforts to this objective since the mid-1990s. The results of this study indicate that the near total absence of gender issues in its ICT projects and components are a cause for concern for the success of the projects, for the goals of alleviation of poverty, and the achievement of gender equality.

World Bank ICT projects and projects with ICT components all take root in a societal context that

must be taken account of in project design and implementation. The view that no technology is gender-neutral has been well accepted by social science for decades. However, the idea that there are differentials in the way that technologies impact men and women has not yet permeated ICT development activity. If gender issues are not considered in ICT projects, the projects are less likely to reach their development objectives. Most programs and projects that do not consider gender as an important component in program and project design consequently fail to include both men and women equally. In order to achieve development objectives there is a need to sensitize World Bank project team leaders, both in the ICT sector and from other sectors with ICT components in their projects, to the potential gender issues in these projects.

Some of the most conspicuous findings of this study were:

- While a large number of projects paid some attention to gender, in most cases this was not done in a meaningful way, but rather as a form of lip service. Assurances of gender consideration or mentions of gender were not matched by project actions.
- Overall, ignoring gender was the norm in all the projects considered.
- Only a miniscule number (fewer than 10 percent) of ICT projects or ICT components of projects considered gender issues.
- No stand-alone ICT sector project had good overall results on the integration of gender issues.
- Despite a mandate to include social analysis in all project preparation documents, there were many cases where social analysis was relevant but not applied.

How to ensure women's opportunity to benefit equally from the new technologies: the basics

Gender equality concerns need to be part of virtually every ICT development effort. Bank research has shown that better project results are

obtained when gender issues are integrated (World Bank, 2002, 29). The process needs to start with project rationale and design, continue through participatory consultations with project stakeholders, to project implementation and monitoring, and evaluation of outcomes with statistics and indicators that differentiate impact by sex.

Unless special interventions are undertaken, it is highly unlikely that the majority of women will have access to them. In addition, outreach efforts are essential to ensure that women are aware of project services and opportunities. These efforts must consider the appropriate channels in communicating with women (which, for example, may not be Internet-based or e-mail-based, but rather a poster in schools or women's support organizations), and must try to provide women with the necessary conditions to participate in project activities (such as daycare assistance or schedules that consider women's multiple work responsibilities). Content needs to reflect women's needs and interests.

Information technology, as with all other technologies, impacts men and women differentially. Technologies are not gender-neutral.

ICT projects wanting to involve women as well as men should see that:

- Both men and women are involved in the design and implementation of projects
- Projects target men and women equally (establishing separate access and training strategies if necessary)
- Content is locally appropriate and of value to women as well as men
- Account is taken of the social division of labor, by which most domestic responsibilities fall upon women.

How to ensure that World Bank ICT projects incorporate gender concerns

The Bank has been working hard since 1994 to promote gender equality, but procedures were not in place for operationalizing this effort. The

Bank's 1994 gender policy (Operational Policy 4.20) did not detail procedures that the staff were expected to follow; consequently, the policy was not applied systematically. The Operational Policy on Gender and Development, issued in March 2003 (OP_4.20), focuses primarily on the Country Gender Assessments (CGA) as the key component of the Bank's gender mainstreaming strategy. As there are generally only a handful of ICT projects per country, it is unlikely that CGAs will deal with this sector. The mandate of the Bank's Gender and Development Board is to set an overall approach to promoting gender concerns. The Board's work, however, usually does not reach down to the level of project design, although individual Board Members may be working on projects that involve ICT components.

Presently there are no incentives to encourage Bank staff to formulate projects that mainstream gender. Staff already feel burdened with having to incorporate mandatory concerns. While it is mandatory to take into account the environmental, indigenous people, and involuntary resettlement safeguards, the same is not true for gender concerns. Moreover, although social analysis is mandatory in project development, it is often overlooked without any sanction. Consequently, it will be harder to ensure that they incorporate gender, especially because there has been no widespread training in gender issues.

The crux of the problem of integrating gender concerns into ICT projects is how to bring gender awareness to the project level. This is in line with the Bank's Operations Evaluation Department recommendation that gender be integrated into the design of Bank-supported projects as a way to increase the gender dimension of Bank assistance (World Bank, 2002, 30). The OED report, however, made no recommendations on how this should be done.

The OED evaluation also identified the lack of gender training as one of the main reasons that gender issues have not been mainstreamed

(World Bank 2002). Earlier versions of the Bank's gender policy also advocated significant training for Bank staff throughout the organization, and the gender mainstreaming strategy notes that providing support to Bank staff and clients in the form of training and operational tools is central. According to Long, progress to date has been the result of the efforts of individual staff members who are committed and aware. She observed that "the promotion of gender equality in Bank project and policy initiatives has been largely dependent on individual initiative by gender specialists," and thus "successful mainstreaming will depend in large measure on the ability of gender advocates within the Bank to persuade their colleagues to embrace this plan ..." (Long, 2003,8,12).

Based on the findings of this study and given the limitation of World Bank mandates and resources on gender, the following are recommendations for incorporating gender issues into ICT projects and ICT components of projects:

1. Task Team leaders should use tools and good practice examples, such as those examples illustrated in this study and the accompanying toolkit, to ensure that gender and ICT are taken into account in the initial stages of project preparation.

2. Both stand-alone ICT sector projects and projects with ICT components should be reviewed for consideration of gender issues in ICT prior to any appraisal package being approved. While the results of the review would only be advisory, they should help to bring an awareness of gender issues in ICT to Task Team leaders who might otherwise be unaware of them.

3. Resources should be assigned to provide training on gender issues for all World Bank staff involved in ICT project design and formulation and ICT components in other projects.

It is hoped that these suggestions will lead to progress in incorporating gender issues into a significant number of World Bank investment projects.

Notes

1. After the PID and PAD which were generally available for nearly all projects, most commonly found documentation was the Staff Assessment and Environmental Assessment. Resettlement Plans were found infrequently. All the documentation on the web site was reviewed for each project.

2. http://www.worldbank.org/gender/projects_programs/guidenan.htm

3. One additional project incorporated gender issues in the ICT component of the project but not in the other aspects of the project.

4. Wireless fidelity (Wi-Fi) is a network standard rapidly gaining in popularity in developed countries that creates wireless local areas networks in homes, offices and, increasingly, restaurants, hotels, and airports at speeds faster than advanced mobile-phone networks. Wi-Fi LANs can be accessed with a relatively inexpensive network card.

5. This section owes a heavy debt to Sonia Jorge, *Gender Perspectives in Telecommunications Policy: A curriculum proposal*, ITU, Geneva, 2000.

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