Vol. VI No. 7 July 2008

The first monthly magazine on ICT4D

i4d

Information for development

www.i4donline.net

Enabled women in knowledge societies

Case Study: The Philippines and Thailand

Creating a world of equal opportunities

GKP, Malaysia

Using ICTs: The nonviolent way

APC WNSP, Mexico

netgov Speak:
Lead up to IGF 2008
Turn to page 28 and stand a chance to WIN a HCL Leaptop!

Gender and ICTs

ISSN 0972 - 804X

CSDMS
knowledge for change

Telecentre Forum

INDIA 2008

29-31 July 2008
Pragati Maidan, New Delhi, INDIA
www.eINDIA.net.in/telecentreforum

Can rural India empower itself with IT?

Find out this July at Telecentre Forum India 2008

The Indian Telecentre Forum 2008 (ITF 2008), fifth in the series of Telecentre Forums organised by CSDMS, will provide a platform for all key stakeholders representing the government, the private sector, the civil society, Telecentre practitioners and leaders, technology solution providers, social investors and funding agencies to join and discuss the achievements, challenges and the progress in the telecentre movement. The forum will create a common ground for equitable learning which will facilitate a process of overall development of the country. It will shape the way forward for the telecentre movement within India, and make it an example for the world to learn from.

Key Speakers

D Purendeswari
Minister of State for Higher Education, MHRD GoI

Prof M S Swaminathan
MP & Chairman, MSSRF

R Chandrashekhar
Additional Secretary, DIT
Min of Comm & IT, GoI

S Abbasi
Senior Director, DIT
Min of Comm & IT, GoI

Ashis Sanyal
Senior Director, DIT
Min of Comm & IT, GoI

Dr Basheerhamad Shadrach
telecentre.org/IDRC

Chetan Sharma
Founder, Datamation Foundation Charitable Trust, New Delhi

Rufina Fernandes
CEO, NASSCOM Foundation
Mumbai

Aruna Sundararajan
CEO, CSC Programme
IL&FS

Key themes

- A Close Examination of Telecentre Movement in India
- Demystifying Social Enterprise Model
- Discussions on Achieving Balance between Financial and Social Objectives
- Asian Telecentre Leaders Knowledge Sharing Session
- The Need of New Technologies and Innovations in the Areas of Content and Connectivity
- Upgrading the Skills of the Grassroots Managers
- Examining the Role of NGOs in Common Services Centres Programme
- Will Mobile Phones Take Over Telecentres?

Gold Sponsor

designmate

International Supporting Partners

D.Net Development Research Network · fusion · FIT NEPAL · ICTA · ONEROOF · UgaBYTES

Supporting Partner

telecentre.org

telecentre.org is a global community of people and organizations committed to increasing the social and economic impact of grassroots telecentres. The founding investors include Canada's International Development Research Centre, Microsoft, and the Swiss Agency for Development and Cooperation.The association will bring a knowledge sharing session for Asian telecentre leaders, an open conclave of service centre agencies, State IT secretaries and a high level delegation from Africa and telecentre.org village, at eINDIA2008. *www.telecentre.org*

eINDIA 2008 Presented by

Department of Information Technology, Ministry of Communications & IT
Government of India

GKID
UN Global Alliance for ICT and Development

CSDMS
knowledge for change

elets

Ministry of Human Resource Development
Government of India

Department of Agriculture and Co-operation
Ministry of Agriculture
Government of India

Contact Person: Vignesh Sornamohan: Mobile No: +91-9999654458, Email: ITF@eINDIA.net.in
For Exhibition or Sponsorship Enquiries: sales@eINDIA.net.in
For Registration Enquiries: registration@eINDIA.net.in

eINDIA2008 29-31 July 2008 Pragati Maidan, New Delhi, INDIA

Features

Guest Editor: Claudia Morrell

Columns

netgov Speak: Researcher and Coordinator, Sulakshana Bhattacharya, CSDMS

EDITORIAL GUIDELINES

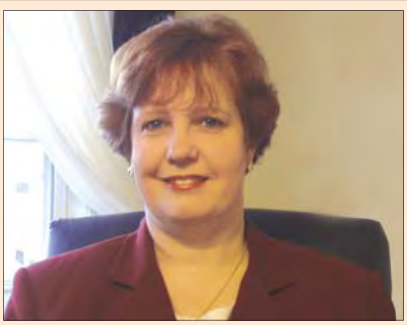
i4d contains articles and features on the theme of 'ICT for development' and related issues. Authors are requested to follow the guidelines while sending their articles to i4d. Please also consult the editorial calendar to choose the theme of your interest. We also accept soft or hard copy submissions of your contributions. We encourage you to share your original research with our readers.

The Editor's decision to select, accept, modify or adjust your write-ups due to space constraints will be final. Editorial guidelines are available at http://www.i4donline.net/Editorial/Editorial_Guidelines.asp

All correspondence should be addressed to:

The Editor-in-chief, i4d
G-4, Sector-39, Noida, India
Tel *+91-120-2502180 to 85*
Fax *+91-120-2500060*
Email *info@i4donline.net*

Acknowledgement



We wish to place on our record our deep appreciation for the leadership in steering this special issue of i4d Magazine focusing on Gender and ICTs to Claudia Morrell, Executive Director, Center for Women and Information Technology, and Champion of the International Taskforce on Women and ICTs. She has worked as Co-Editor of July 2008 i4d issue. Claudia volunteered relentlessly to stimulate discussions, debates and bringing in new authors. Claudia's personal enthusiasm and energies put in this issue have given it a truly collectible volume on this theme. Our sincere thanks to Claudia for her support in bringing out the issue successfully.

www.i4donline.net

Subscription Form

i4d
Information for development
www.i4donline.net

SUBSCRIBE TODAY!

Duration (Year)	Issues	News stand Price Rs.	Subscription Rs.	Saving	Subscription US$
1	12	2400	2160	10% (Rs. 240)	US$ 200
2	24	4800	4080	15% (Rs. 720)	US$ 320
3	36	7200	5040	30% (Rs. 2160)	US$ 400

I/We would like to subscribe for 1 2 3 **years.**
(circle as applicable)

First name..... Last name .....
Designation/profession ..... Organisation .....
Mailing address ..... City .....
State ..... Country ..... Postal code .....
Tel (o) ..... Tel (r)..... Fax .....
Email ..... Website .....

Payments for mailed subscriptions are only accepted via cheque or demand draft. Cash payments may be made in person.
(tick one and fill as applicable)

☐ Please find enclosed my/our cheque/demand draft numbered dated ..... for Rs..... in favour of **CSDMS a/c** payable at New Delhi.

☐ I am submitting this form in person and paying by cash

Please use photocopies of this form as required.

i4d, G-4 Sector 39, Noida 201 301, India
Tel +91 120 250 2180 to 85 **Fax** +91 120 250 0060
Email info@i4donline.net

i4d Editorial Calendar 2008

Month	Theme
January	Global Knowledge Conference (GK3) Special
Feburary	Open Publishing
March	Differently Abled and ICTs
April	Financial Inclusion and ICTs
May	Climate Change and ICTs
June	Mobiles for Development
July	Gender and ICTs
August	New Media in Development
September	Micro, Small and Medium Enterprises and ICTS
October	Community Radio
November	HIV/AIDS
December	Internet Governance

i4d
Information for development
www.i4donline.net

i4d
G-4 Sector 39, NOIDA, UP, 201 301, India
Phone +91 120 250 2181-85 **Fax** +91 120 250 0060
Email info@i4donline.net **Web** www.i4donline.net

Printed at R P Printers, Noida, India

i4d is a monthly publication. It is intended for those interested and involved in the use of Information and Commnication Technologies for development of underserved communities. It is hoped that it will serve to foster a growing network by keeping the community up to date on many activities in this wide and exciting field.

Editorial

Empowering women in the knowledge society

Gender has not been on the conscious agenda of the ICT4D domain area. It is not therefore unusual for development programmes to be conceptualised without taking into consideration the key or special needs of women. Even when development programmes have addressed access issues, like the telecentres, infrastructure development, etc they have been put in place with a concern for reaching the unreached, but not necessarily developed with gender sensitive designs, or bearing in mind the language and social needs of women.

In developing countries, particularly in South Asia, women who are the most marginalised, have to confront more than one kind of discrimination. They are usually powerless, often head households, without having ownership of land or other assets. This makes it almost impossible for them to demand any access to infrastrucutres, and even if they do manage to organise themselves, they often do not have sufficient negotiating powers.

It is important to note that the GDP contribution of women to the national growth is over 50 percent of the agrarian contribution, as they are engaged in most of the economic production activities. In the unorganised sector, women contribute substantively to the services being rendered.

With the advent of new technologies for communications, be it the telephones or mobiles, or computers, there has been a slow but steady uptake of the technologies by women. Wherever women's organisations have consciously designed programmes to suit the specific needs of women, they have created new opportunities for empowment, improvement in livelihoods, and overall well being of the families that women nurture.

The scope of ICTs to be a tool for empowerment, a voice and advocacy tool to prepare the society and grassroots communities , especially women, for the knowledge economy, is wide and an array of experiences from the world have been reflected in this special issue of i4d. We are very grateful to Claudia Morrel, who has kindly co-edited this issue. We hope you enjoy this issue, as much as we enjoyed producing it.

Ravi Gupta
Ravi.Gupta@csdms.in

Enabled women in knowledge societies

Ensuring that women benefit equitably from efforts to develop human capacity is at the core of the knowledge society

Nancy Hafkin
Director, Knowledge Working, Massachusetts, USA
nhafkin@comcast.net

From information society to knowledge society

Much of the attention to the information revolution has been on technology rather than on information and knowledge. In recent years emphasis has shifted from the information society to an emerging global knowledge society focused more on people using knowledge, rather than technology. Though there is no denying the fact that information technology remains a central element of knowledge society, combined with continuous learning particularly in science and technology, as well as innovation particularly through entrepreneurship. In knowledge society information technology is applied to the acquisition and use of knowledge towards the end of human development and economic growth.

The key elements of knowledge society are ICT use, highly educated and skilled people, progress in science and technology and innovation in the development of Small and Medium Sized Enterprises (SMEs). Scientific and technological knowledge not only engenders competitiveness in the global economy but can also improve the lives of the poor in many ways, such as through better nutrition and health, higher crop yields, cleaner water, and providing renewable energy sources. Innovation develops national capacities and leads to job creation and poverty reduction. Entrepreneurship, particularly in small and medium-sized enterprises in new areas, is usually regarded as a key indicator of a country's innovation. The growth of SMEs is important for their role in creating local employment and strengthening local economics.

Our concern here is the creation of socially inclusive knowledge societies, especially including women who have been bypassed in many fields and in many countries. Knowledge is not only for economic growth but its foremost use should be to empower and develop all sectors of society to understand and use knowledge to increase the quality of people's lives and to promote social development. A socially inclusive knowledge society empowers all members of society to create, receive, share and use information and knowledge for their economic, social, cultural and political development.

Role of women in knowledge society

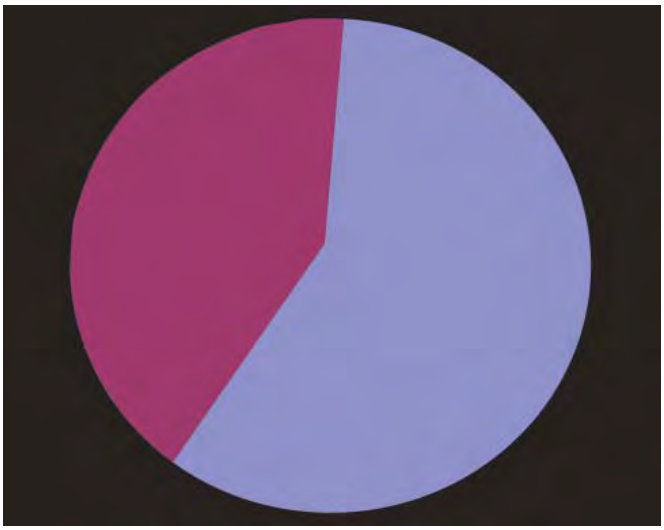
Amartya Sen makes the argument for the centrality of women in the knowledge society, placing emphasis on the agency and capabilities of women. He sees women's leadership as a crucial element in development and notes that the expansion of women's capabilities enhances not only women's own freedom and well being, but also has beneficial effects on society as a whole (Sen 1999)[i].

This article takes stock of the progress of women in evolving knowledge society in two countries, identifying areas of success as well as constraints to greater progress. We look at the situation of women in two middle-income Asian countries, the Philippines and Thailand, where women are doing well on several of the success indicators for participation in the global knowledge society. We note that while women are making strides in progress in the key knowledge society areas of use of ICTs, entrepreneurship, higher education and technical skills, they are not doing so in a situation of full equality.

A case study: The Philippines

By a number of indicators, Philippines comes out as an early leader in terms of the

Figure 1: Percentage Internet users by sex, Philippines (2003)



Source: *Digital Filipino (DF) Survey, The Filipino Internet User, part 2.*

participation of women in the knowledge society, as seen by their use of the Internet, their involvement as entrepreneurs, their high rate of education especially in science and technology and their numbers among highly skilled researchers. However, as we will see, leadership and a high level of participation do not necessarily result in equality.

Women have become significantly more numerous as users of the Internet than men in Philippines. Please refer to Figure 1 for further details.

In fact, the Philippines leads the world in the percentage of Internet users who are women, exceeding the rich countries of the United States, New Zealand, Canada and Australia by at least 6 points. Only Thailand comes close to Philippines in the rate of women's Internet use among rapidly growing Asian countries. Please refer to Table 1.

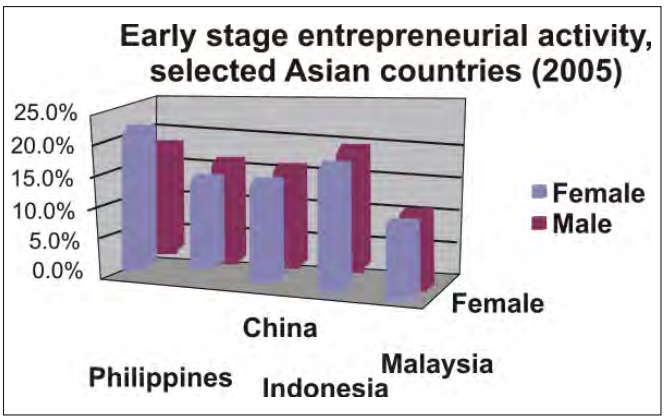
Table 1: Leading countries in women's use of the Internet

Country	% female Internet users (among all Internet users)
Philippines	58.0
Mongolia	56.0
Thailand (2003)	52.6
United States	52.0
New Zealand	51.5
Canada	51.0
Australia (2005-2006)	50.7
Hong Kong	50.0
Slovenia	50.0
Kiribati	50.0

Source: *Sophia Huyer (2008), "Gender and the Core ICT Indicators," Presented to 2008 Global Event for Measuring the information Society, Geneva, 27-29 May. Unless otherwise indicated, data are from 2006.*

Women are also leaders in entrepreneurship in the Philippines. The number of women engaged in early-stage entrepreneurial activity, regarded as an important measure of innovation and potential for knowledge society participation, exceeds that of men. In 2006, 22.5 percent of women were new entrepreneurs

Figure 2: Early stage entrepreneurial activity, selected Asian countries (2005)

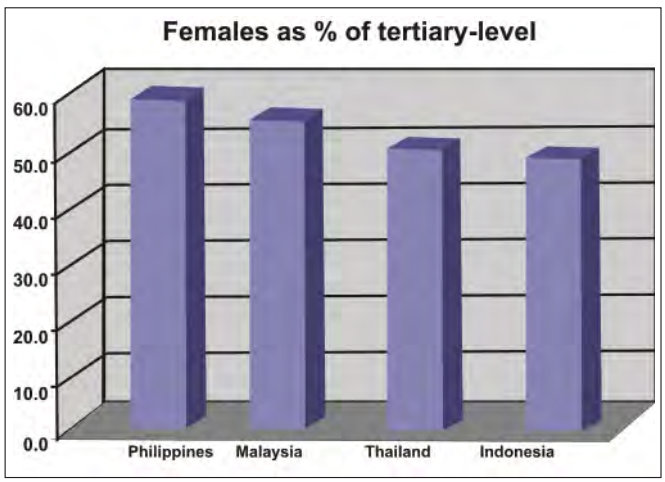


Source: *Allen et al. (2007).*

as compared to 18.4 percent of men. (Allen et al. 2007). The rate of female entrepreneurial activity in the Philippines is high not only compared to men in that country but also is the highest among either men or women in a series of Asian countries noted for entrepreneurial innovation.

The Philippines also ranks first among several Southeast Asian economic powerhouses in percentages of women in higher

Figure 3 : Females as a % of tertiary-level students



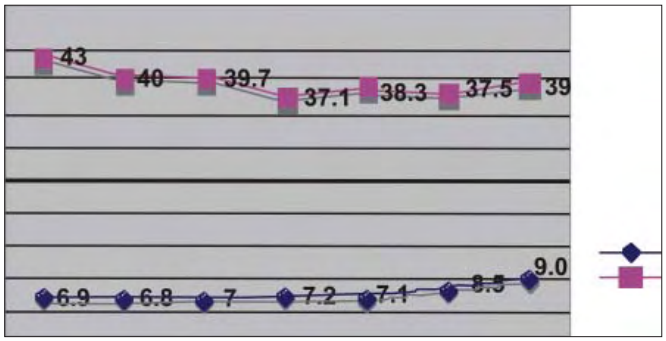
Source: *UNESCO Institute of Statistics (2006a) Women in Higher Education.*

education. Figure 3 depicts the percent of female students in tertiary level of education.

In the Philippines, the number of women engineers is low as an absolute percentage, but higher than in many other countries and increasing rapidly. While the rate for men graduating in engineering decreased by 10.8 percent between 1997 and 2004, that of women increased by 40.6 percent (Commission on Higher Education, Philippines, 2006).

The Philippines also distinguishes itself as being one of six countries in the world with more women researchers than men and among the top 10 countries in numbers of female science graduates. The World Economic Forum gender gap index put Philippines in the sixth place in 2006 and 2007 (see Table 2), the only Asian country in the top ten, notable for having closed the gender gap in education and health (again, the only Asian country

Figure 4: Percentage of graduates in engineering by sex, Philippines, (1997-2004)



Source: *Commission on Higher Education, Philippines (2006)*

to do so) (Hausmann et al. 2006, WEF 2007). Philippines has the highest percentage of women researchers of any country in the world with a sizeable research community (UNESCO Institute of Statistics, 2006b).

Table 2: Leading countries in bridging the gender gap, World Economic Forum Global Gender Gap Index, 2006-2007

Country	Rank 2006	Rank 2007
Sweden	1	1
Norway	2	2
Finland	3	3
Iceland	4	4
New Zealand	7	5
Philippines	6	6

Source: *http://www.weforum.org/en/initiatives/gcp/Gender%20Gap/index.htm*

This high level of knowledge society-related activity comes at a price for women in the Philippines. They work for longer hours and for lower wages than men. Women doing similar work to that of men earn only 73 percent of men's wages, while women's earnings overall are only 59 percent of men's — and women's workload averages 21 percent more than men. Women in Philippines have one of the world's highest workloads in comparison to men (Hausmann 2006; UNDP 2006). It is noteworthy to mention here that that although the WEF gender index measures economic activity and its enablers such as health and education where women rank high in the Philippines, it does not look at measures of gender equality such as equal workload or equal wages.

Table 3: Internet users by sex (%), Thailand, 1999-2003

Sex	1999	2000	2001	2002	2002
Female	34.9	49.2	51.2	51.7	52.6
Male	65.1	50.8	48.8	48.3	47.4

Source: *NECTEC, 2002, Internet User Profile Survey and National Statistical Office, Philippines for 2002 and 2003*

A case study: Thailand

Women in Thailand are also making significant progress in knowledge society areas, as shown by several indicators. With regard to Internet usage, women overtook men as a majority of users n 2001, and their numbers have continued to increase since then (see Table 3).

Encouraging as well for women's participation in the knowledge society is that in the age group 20-29 in Thailand – likely candidates to become knowledge society innovators — 53.2 percent of women use the Internet (NECTEC 2006).

Table 4: Ratio of female/male enrolment in universities in math and computer studies, engineering, Thailand, 1995-2002

Country	Math and computer Related Studies	Engineering
1995	0.78	0.16
1996	0.74	0.17
1997	0.76	0.18
1998	0.76	0.17
1999	0.75	0.20
2000	0.73	0.16
2001	0.83	0.20
2002	0.89	0.19

Source: *NECTEC, 2006*

Women have been the majority of students at secondary and tertiary levels in Thailand since 2006 (NECTEC 2006). In math and computer-related fields at university in Thailand, women are coming close to parity with men. While their representation is still low in engineering, it is higher than most other countries and on a generally upward slope (Table 4).

The surprising aspect of this encouraging picture of women using computers, in business, in higher education and in science and technology studies in Thailand is that it might not be expected given one of the standard indicators of women's empowerment (women in political/governmental positions at national, district and local levels). Here women have a low level of representation, as seen in Table 5.

Table 5: Women's representation in political/governmental positions in Thailand. 2003-2006

Women's empowerment area	Share of women in total
Female ministers (2006)	5.7%
Female members of tambon (village) administrative organizations (2003)	6.7%
Female heads of the tambon (Kamnan) 2004	2.9%
Female heads of the village (Pooyaibaan) 2004	4.6%

Source: *NECTEC, 2006*

Conclusion

This brief picture of women in two countries makes the case for systematic study of gender issues in the evolving global knowledge society. In the cases of the Philippines and Thailand, women are forging ahead despite an explicit lack of full gender equality and empowerment, especially in areas of employment and political representation. If the constraints to women's equality and empowerment were removed, their contributions to building knowledge society would increase, to the benefit of the whole society and a socially inclusive knowledge society based on full gender equality would emerge.

In order to secure women's equitable place in global knowledge society, a comprehensive framework, accompanied by systemic data collection and analysis, is needed to measure all relevant aspects of women's potential and participation and plan policy accordingly[2]. ■

egov I4d & Digital Learning : Size: 27cm (H) x 21cm (W) + Tab: 4.75cm (H) x 1.75cm (W)

Microsoft

Realising India's Unlimited Potential

Enabling Socio Economic Empowerment

Microsoft

Microsoft's goal is to create and deliver sustainable technology solutions to individuals and underserved sections of society across India and help them realise their full potential.

'Unlimited Potential' is Microsoft's global vision to accelerate and expand the power of computing to the next five billion. The Unlimited Potential initiative is centered on tools, industries and methodologies that are relevant, affordable and accessible to the large underserved populace. It relies on a strong partner foundation including governments, corporates, NGOs and communities. The three key areas of thrust for us are education, creation of jobs and opportunities and fostering innovation.

Unlimited Potential - Community Technology Skills Programme

One such initiative is the Unlimited Potential - Community Technology Skills Programme ('Project Jyoti' in India). The programme is driven via Community Technology Learning Centres (CTLC) in active partnership with civil society organisations, citizens and other experts, that seeks to broaden digital inclusion and alleviate poverty by providing technology skills to the traditionally underserved sections of the society. By providing IT skills, training, tools and guidance, the programme creates opportunities that can change lives, transform communities and strengthen local economies. Helping women and rural communities in particular, it gives them access to technology and basic computer literacy that would enrich their lives through an alternative and sustainable employment option. Microsoft currently partners with 11 NGOs and has set up over 680 CTLCs across the country through grants of cash, software and curriculum. More than 53,000 persons have received training through these CTLCs.

Learn more at http://www.microsoft.com/india/msindia

Microsoft Unlimited Potential™

Community Technology Skills Program

Footnotes and References:

(i) Allen, I.E., N. Langowitz and M. Minniti. (2006). Report on Women and Entrepreneurship. Global Entrepreneurship Monitor. http://wwwgenconsortium.org/

(ii) Commission on Higher Education. Philippines. (2006). Academic year 2004-2005 High Education Statistical Bulletin. Manila. www.ched.gov.ph/statistics/index.html

(iii) Hausmann, Ricardo, Laura Tyson, and Saadia Zahidi. (2006). The Global Gender Gap Report 2006. Geneva: World Economic Forum. http://www.weforum.org/en/initiatives/gcp/Gender%20Gap/index.htm

(iv) Huyer, Sophia and Nancy Hafkin. (2008). Knowledge society needs all the women it can get! egovmonitor, 25 February. http://www.egovmonitor.com/node/17358/print.

(v) Huyer, Sophia and Nancy Hafkin. (2007). Engendering the Knowledge Society: Measuring Women's Participation. Orbicom and International Development Research Center: Montreal.

(vi) Sophia Huyer (2008). Gender and the Core ICT Indicators. Presented to 2008 Global Event for Measuring the information Society, Geneva, 27-29 May.

(vii) National Electronics and Computer Technology Center (NECTEC). (2006). E-Commerce Development and Promotion Policy in Thailand, 15-Dec-06. Presentation by Chadamas Thuvasethakul at APEC Forum on Digital Economy for Women 2006: Innovation and Leadership in Asia-Pacific,15 December 2006, UNCC, Bangkok, Thailand. http://www.bpw-international.org/pdf/apec-forum-ebusiness-policies-strategies-thai-chadamas.pdf.

(viii) NECTEC. (2005). Thailand ICT Indicators: Thailand in the Information Age. Series II. Bangkok. http://www.nectec.or.th/2007/pdf/ict_indicators2005.pdf

(ix) NECTEC. (2002). Internet User Profile Survey. Bangkok.
Sen, Amartya. (1999). Development as Freedom. New York: Anchor Books.

(x) Unesco Institute of Statistics (UIS). (2007). Tertiary Indicators. http://www.stats.uis.unesco.org.

(xi) UIS. (2006a). Women in higher education. Montreal: Unesco.

(xii) UIS. (2006b). Women in science: Under-represented and undermeasured. UIS (xii) Bulletin on Science and Technology Statistics, 3, 2006. http://ww.uis.unesco.org/template/pdf/s&t/BulletinNo3_v12EN.pdf.

(xiii) United Nations Development Program. (2006). Human Development Report. New York: UNDP. http://hdr.undp.org/hdr2006.

(xiv) World Economic Forum. (2007). Gender Gap Rankings. http://www.weforum.org/pdf/gendergap/rankings2007.pdf

[1]See Hafkin and Huyer, (2008) "Knowledge society needs all the women it can get!" for a fuller exposition of the arguments for the equitable inclusion of women in global knowledge society. http://www.egovmotor.com/node/17358/print

[2]A framework to measure women's participation in the knowledge society has been outlined in Huyer and Hafkin (2007). Work is needed now to test and then populate the framework.

Gender budgeting

Budgets and financial allocations for development made by governments often do not have specific allocations for gender issues. In a comprehensive paper review of "Gender Budgeting, the problems and perspectives", presented by John R. Bartle from the School of Public Administration, University of Nebraska, Omaha and Marilyn Marks Rubin, John Jay College, City University of New York, in 2002, several country analyses were provided. These have been an eye-opener on gender budgeting.

Learning from other country initiatives

The first gender budget exercise was undertaken in Australia in 1984. It resulted in a comprehensive analysis of federal expenditures (but not revenues). However this effort was shut down in 1996. One of the lessons of the Australian case is that gender sensitive budgeting exercises that are not 'owned' widely by civil society groups are vulnerable to ideological shifts within the state. In the Philippines, since 1994, agencies are required to allocate at least 5% of their budgets to "the development, implementation, monitoring, and evaluation of gender and development plans." A national commission has published an analysis of expenditures for 19 agencies. Issues that had to be addressed were: need for technical assistance, difficulty in monitoring agency performance, and resistance from budget officers. The process in South Africa began in 1997, with the participation of several agencies, including revenue collection as well as spending agencies. Measures to improve data collection were necessary. "The experience of South Africa indicates that engendering the national budget is a process which has to be developed over a period of time." However, it does appear to be having an impact, both in statements of the Director-General of Finance and in the gender-sensitive national budget address. The budget, especially relating to spending, are disaggregated by gender. "This aim is to focus attention increasingly to government outputs and the impact of government expenditure."

In Spain, the government of the Basque Country has shown interest in introducing a gender sensitive budget approach. In 2000 there were two initiatives, which moved the process forward. The Basque Country's women's office, Emakunde, in partnership with the education information technology company, Infopolis, established a virtual library of materials on gender budgets. These materials are available on the web (*www.infopolis.es/usuarios/bibliotec.htm*). In Sri Lanka, five ministries were selected in 1998 to examine the gender impact of recurrent spending, as well as the gender distribution of public sector employment. One common finding was "that a proper mechanism is to be developed to collect data disaggregated by gender".

International agencies support initiatives

Various International agencies have been supporting partners to develop gender budgets in national programmes. The Commonwealth Secretariat (ComSec), United Nations Development Fund for Women (Unifem) and International Development Research Centre (IDRC) are the leaders in the field of gender budgeting which are intensely political processes. Over 40 countries around the world have responded to norms of preparing and presenting gender sensitive budgets. Looking at the impact and reach to women is the central goal of such gender sensitive budgets. Debbie Budlender, representing Community Agency for Social Enquiry, South Africa is an expert who has worked and supported gender budgeting programmes in at least ten countries, recently conducted a comprehensive review, case studies and analysis, entitled 'Review of Gender Budget Initiatives'. *http://www.internationalbudget.org/resources/library/GenderBudget.pdf*

Jayalakshmi Chittoor, *Programme Coordinator, CSDMS, India (jchittoor@csdms.in)*

Creating a world of equal opportunities

"As economies become more and more information-driven, the issues of women's access to and use of ICT is growing in importance for both developed and developing economies"

Rinalia Abdul Rahim
Executive Director
Global Knowledge Partnership, Malaysia
rinalia@gkps.org.my

Information and Communication Technologies (ICTs) are arguably the most potent tools shaping the 21st century as they re-define the way human beings communicate, learn, work and play. In essence, ICTs are re-defining how we live. As tools for human development and empowerment, ICTs have no equal. Their ability to enable inclusion and access to information as well as to offer a vast array of opportunities across the social, economic, environmental and political domains, make them strategic tools for individual, national and global development.

Women and girls have more to gain from ICT

ICT are key for the empowerment of both women and men, but women and girls have more to gain because they are the most disadvantaged where development opportunities are concerned. Over half the world's population still lives on less than $2 a day. Eighteen percent of this or 1.1 billion people live in extreme poverty on $1 or less a day. Forty percent are unemployed and one in every five adults is illiterate. More than 70 million children are out of school and a larger untracked number drop out of schools even before their primary srages of schooling. In each of these categories, women and girls make up the majority. Attention to the particular needs of women and girls given their position of relative disadvantage is paramount if we are to create a world of equal opportunities via ICT.

ICT amplify the gender divide while creating opportunities for equality

The digital divide between the ICT haves and have-nots is the fastest narrowing divide worldwide. As more people gain access to information and communication, they become better positioned to make decisions that improve their own lives, which in turn help the world address the problem of social and economic disparities. While digital opportunities are spreading to both men and women, the existing gender divide that runs across all social and income groups has been amplified where ICT are concerned. Throughout the world, women face serious challenges that limit or prevent their access, use and ownership of ICT. These challenges stem from economic, social and cultural obstacles, which must be tackled for the sake of equitable development opportunities.

"Women represent the main economic force in most developing countries. As economies become more and more information-driven, the issues of women's access to and use of ICT is growing in importance for both developed and developing economies. The involvement and engagement of women in the Information Society on an equal footing with men will directly contribute to improving the livelihood of people, making it more sustainable and thereby promoting the social and economic advancement of societies".
-Gender Issues in the Information Society (UNESCO, 2003).

In terms of appropriating the technologies and becoming leaders and creators of ICTs, women face even more challenges. At the World Congress on IT 2008 held recently in Kuala Lumpur, the speakers who represent experts that are world leaders and company heads in ICT, were predominantly male. To compound the problem, a study in the USA by the Center for Work Life Policy recently revealed that among women already engaged in Science, Engineering

and Technology careers, 52 percent leave their jobs over time. The implication is disturbing in terms of prospects for equality, growth and innovation, not only for women, but for the economies and societies where women are contributors to change and development.

The problem mainly lies in the existing gender stereotypes and biases that are embedded in cultures and social norms. Huyer and Hafkin's report on Engendering the Knowledge Society, Measuring Women's Participation, which was launched at the 2007 Third Global Knowledge Conference organised by GKP, details the socioeconomic and political factors that continue to frame the gender digital divide, including social and cultural barriers to technology use, education and skill levels, employment and income trends, media and content, privacy and security, and location/mode of access. Women and girls need to have more encouragement and structured support by way of policy and programmes to use and appropriate technology. The planning and implementation of ICT for development thus need to be viewed through a gender lens in order to ensure benefits do not perpetuate gender stereotypes and biases.

Effective ICT4D policy and programmes are gender informed

For leaders and decision-makers, improved understanding and awareness of the challenges faced by women as well as the opportunities that ICT can provide for women are critical for creating a world of not only equal opportunities, but of robust and sustainable growth. The effective inclusion and empowerment of women via ICT cannot occur when the approaches and technologies used are gender blind.

> "The involvement and engagement of women in the Information Society on an equal footing with men will directly contribute to improving the livelihood of people, making it more sustainable and thereby promoting the social and economic advancement of societies"

Gender segregated data are key for any policy-formulation and programme design, yet they are not always available, planned or demanded. The International Telecommunications Union (ITU) provides gender statistics on Internet users only for 2002, which only covered thirty-nine countries. Huyer and Hafkin (2007) discuss the lack of gender indicators in the major ICT, Science, Technology and Innovation indexes, where the only indicator included is usually that of women participation in the work force. More recent data, which is yielding interesting findings for gender studies, come from market research. There is a critical need to ensure the availability of gender-segregated data for policy and programme design as well as implementation. Governments in particular should ensure that gender-segregated data exist to support national development efforts.

National development efforts to address the issue of gender tend to range between mainstreaming and a focused approach. While mainstreaming is important to raise more awareness and generate wide-scale action across development sectors, without champions who ensure continued priority and who will raise red flags that trigger action when gender issues are not addressed adequately, the needs of women vis-à-vis that of men will continue to be neglected and will continue to limit a nation's potential for growth, competitiveness, and sustainability.

To ensure the effectiveness of mainstreaming, agencies established to promote development should be made to adopt gender evaluation methodologies that facilitate the integration of gender perspectives into the planning phase and enable the gender analysis of development programmes. Also, there must be a strong sharing and use of gender-segregated data, information, studies and methodologies among the agencies responsible for national development across the board. Finally, the data, information and knowledge that reside outside of government agencies should also be tapped by way of consultation with relevant private sector, civil society and international entities. Effective decisions, policies and programmes are developed when there is a continuous learning system in place and when knowledge flows across institutions.

Women are key for a nation's ability to innovate

A nation's ability to sustain competitiveness while ensuring the well-being of its citizens hinges on innovation. With women currently underrepresented in the ICT sector and across its decision-making structures, gender-sensitive investment decisions and the introduction of innovative patterns, policies and standards in the sector and across other development sectors could be affected adversely. Huyer argues that women entrepreneurs not only create jobs but also provide different solutions to management, organisation and business problems. Moreover, supporting women as active agents in development will enable them to improve their incomes, health and food production-benefiting their families and communities overall.

In the field of ICT4D, it can be observed across regions that women-initiated projects are usually created as solutions to their own problems and these solutions help further development efforts both nationally and globally. UNESCAP for example discovered that women's inventions have 'direct application to improving family and community well being or increasing efficiency', which includes farm tools built to women's physical needs. Though research on gender access is fragmented by country, what is evident is that women use technology in ways that bring high returns for the economy and society, and countries that are first to tap the

unused resource of women will potentially tap a reservoir of new ideas and innovation. With women making up approximately 51 percent of the population, imagine what happens to a country's chances of survival much less achieve development goals if women are not engaged and empowered to contribute. Women are actors and contributors in development. Help them help themselves, their community, and their country. Help them create a world of equal opportunities with ICT. ■

References:

1. *GKP Position Paper on Gender and ICT prepared in collaboration with the GKP Gender Cluster led by the Association for Progressive Communication - Women's Networking Support Programme. 2003.*
2. *Hewitt, S, Luce, C and Servon, L (2008). Stopping the Exodus of Women in Science. Harvard Business Review. June 2008.*
3. *Huyer, S and Hafkin, N (2007). Engendering the Knowledge Society: Measuring Women's Participation. Orbicom.*
4. *Huyer, S and Hafkin, N (2007). Why Women in the Knowledge Society? Unpublished document.*
5. *Huyer, S and Hafkin, N (2008). Knowledge society needs all the women it can get! eGov monitor. Available online at: http://www.egovmonitor.com/node/17358*
6. *Primo, N (2003). Gender Issues in the Information Society. UNESCO Publications for the World Summit on the Information Society. UNESCO.*
7. *United Nations Economic and Social Commission for Asia and the Pacific (2003). Women and Globalization. Gender and Development Section, ESID.*

GKP: addressing the issue of gender in the field of ICT4D

Global Knowledge Partnership (GKP) is the world's leading international multi-stakeholder network that connects organisations across sectors and regions to promote the use of Knowledge and ICT in development. GKP began exploring the issues of gender and ICT at the first Global Knowledge Conference in Toronto, 1997. Women participants at the conference were instrumental in developing the Canon on Gender, Partnerships and ICT Development, which outlined principles for the development and design of ICT that emphasised equal participation by women and men, and the importance of gender-aware assessments and evaluations of ICT development. By the second Global Knowledge Conference in Kuala Lumpur, 2000, mobilisation around issues of gender, knowledge and information was such that a specific Women's Forum was held within the conference, leading to a comprehensive set of recommendations and concrete actions to be taken by members of the GKP Network. Between 2003 and 2005, GKP focused its efforts on the World Summit on the Information Society and formulated a set of recommendations that are shared below given their continuing relevance. In 2007, at the third Global Knowledge Conference, GKP mainstreamed the issue of gender into the conference framework and plans to continue doing so for its future Global Knowledge Conferences to further promote awareness on the issues of gender in ICT for development. ■

GKP recommendations for addressing the issue of gender in the field of ICT4D

GLOBAL KNOWLEDGE PARTNERSHIP GKP

Sharing Knowledge • Building Partnerships

www.globalknowledge.org

Equity principle

Women and girls must be explicitly included amongst the beneficiaries of the ICT revolution if it is to deliver on the development benefits it promises. This is important not only as a fundamental principle of equity, but also for the direction and speed of growth of the Information Society.

Gender Perspective in all ICT initiatives

All stakeholders (governments, private sector, donor agencies, and civil society structures) must include a gender perspective throughout the process of planning, implementing, monitoring and evaluating ICT initiatives, especially ones that seek to address access, empowerment, and good governance. Hence, all stakeholders must of necessity develop indicators, benchmarks, and ICT for development targets that are gender-specific.

Infrastructure deployment that link women and girls

National and global ICT policies must make explicit reference to gender issues in ICT policy to increase the chances that women and girls will reap developmental benefits from the information age. National ICT policies must create an environment where more investment is directed to the expansion of basic telephony and public ICT access infrastructure that would link women and others in remote and rural areas to information resources and populations in urban areas.

Build on local initiatives that empower women

Donors, governments, and the private sector must actively seek to support and build on the innovative practices and lessons of civil society structures, especially women's organisations that have sought to use ICT to build a platform for women's voices, for information sharing, to mobilise women, and to empower women by expanding on their livelihood strategies.

Promote gender-aware training and content development

Multi-stakeholder partnerships must seek to empower women's and girls' access to and effective use of ICT at the local level through gender-aware education and training, as well as the development of content appropriate to local needs, while at the same time seeking to increase women's participation in ICT processes and decision-making at national and international levels.

Safe and secure online spaces for women and girls

In the promotion of a 'culture of cyber-security', all stakeholders must be involved in an open and consultative approach to communication and incorporate the freedoms inherent in 'Free Software' in the development of appropriate, proportionate and feasible solutions. Fundamental to this culture are the security of users, the right to legal protection and the right to privacy and anonymity in transaction, interaction and expression. Privacy, security and Internet rights are important thematic areas for women. Women's concerns include having secure online spaces where they can feel safe from harassment, enjoy freedom of expression and privacy of communication, and are protected from electronic surveillance and monitoring.

Promote women's and girl's communication rights

All stakeholders must promote knowledge production and exchange in a participatory and collaborative process that is open for everyone and not mainly dependent on hierarchically structured and controlled institutions. The challenge is to ensure that individuals, communities, nations, and the international community gain access to, and are able to use effectively, the information and knowledge they need to address their development concerns. This should be the strategic starting point for all concerned with gender equality and social transformation. In a globalised world that continuously undermines localised democratic institutions, the Internet provides an essential means for defending and extending participatory democracy.

Content for women

All stakeholders must support initiatives that facilitate the ability of women and girls to generate and disseminate content that reflect the own information and development needs. Women's viewpoints, knowledge, experiences and concerns are inadequately reflected on the Internet, while gender stereotypes predominate. These concerns around content relate both to issues of sexism and the portrayal of women in media generally, as well as to the need for women to systematize and develop their own perspectives and knowledge, and to ensure that they are reflected in these spaces.

Promote the global knowledge commons as part of a poverty reduction strategy

All stakeholders must promote the maintenance and growth of the common wealth of human knowledge as a means of reducing global inequality and of providing the conditions for intellectual creativity, sustainable development and respect for human rights. The privatization of knowledge and information through copyright, patents and trademarks is ceasing to be an effective means of rewarding creative endeavor or encouraging innovation and can contribute to the growth of inequality and the exploitation of the poor.

Women in ICT decision-making

All stakeholders must promote equal opportunities for women and girls, including the active participation of women in decision-making processes in the ICT field. Women must not only be considered in the ICT agenda, they must be actively involved in setting that agenda.

Science and technology education for women

Governments must design and implement national policies and programmes that promote science and technology education for women and girls, and that encourage women to entry into high value-added ICT careers. This is imperative to counter the reproduction of historical patterns of gender segregation in employment within this comparatively young sector where men are more likely to be found in the high-paying, creative work of software development or Internet start-ups, whereas women predominate in low-paid, single-tasked ICT jobs such as cashiers or data-entry workers.

Women as ICT entrepreneurs

Governments, the private sector and development agencies must ensure the design and development of suitable financial incentives and support packages for women entrepreneurs and innovators to enter the ICT industry, particularly at the level of locally owned and controlled enterprise. Industry associations such as Internet Service Provider Associations, computer societies, chambers of commerce should strive to achieve gender balance in their membership and leadership.

In addition it is necessary for governments and others who support enterprise development to ensure that there are measures that can enable women entrepreneurs to use ICT to promote their products and services, particularly at the level of medium and small enterprise. Such measures should be aimed at empowering women entrepreneurs by promoting their independence from intermediary marketing agents, helping them acquire greater control over their own resources, and enabling them to fully enter and compete within global markets. ■

For more information: *http://www.globalknowldge.org or contact gkp@gkps.org.my*

Empowering rural India

www.indg.in-A development portal dedicated to the empowerment of rural India

Developed as part of the InDG initiative, is the multilingual portal *www.indg.in*. The portal covers important sectors related to rural livelihoods, initially the five sectors of Agriculture, Primary Education, Health, Rural Energy and e-Governance. The portal hosts significant content with respect to the above five sectors in different local languages (presently-Hindi, Tamil, Telugu, Marathi, Bengali) besides English.

Sectors in *www.indg.in* – An overview

Agriculture: Towards Sustainable use of Resources and gainful Employment

The Agriculture section of *www.indg.in* focuses on information on technologies and processes for sustainable use of resources, besides creating avenues for employment and supplementary income for the rural communities. Presently the portal provides information pertaining to agricultural credit, crop insurance schemes, regional specific crop production technologies, dynamic information on market and weather, rural employment programmes, farm based enterprises, national level schemes related to agriculture, training and events, regional specific information related to animal husbandry and fisheries, etc.

Health: Improving the quality of Health in Rural India

The Health section of InDG aims to provide information that would help to improve the quality of health in the rural areas. Women and child care, nutrition for health, hygiene and basic information regarding various diseases are the focal areas of the portal.

The special attractions of the portal are an interactive multilingual CD on child health Sisu Samrakshak (child protector) and multilingual discussion forum to exchange ideas and information regarding health related issues. In the long run, the health portal of InDG aims to be the link between the health providers and rural communities in the best way possible.

Primary Education: Establishing the right of a child to quality Education

The Primary Education Portal of the InDG focuses mainly on child rights and improving the quality of primary education. *www.indg.in* currently covers the following areas – education as the fundamental right of a child, parental guidelines, governmental policies (State and Central Government) on primary education and education for the physically challenged, girl child education, resource materials for teachers, best practices, resource links, links to online text books, locate your school and an interactive medium for discussions through discussion forums.

Launch of the India Development Gateway webportal www.indg.in by her excellency the President of India Smt. Pratibha Devisingh Patil in the presence of the dignitaries Thiru A. Raja, Minister for Communications and Information Technology, Shri Jyotiraditya Scindia, Minister of State for Communications and Information Technology, Prof. M.S. Swaminathan, Chairman of the India Development Gateway initiative.

Rural Energy: Making Rural India Self Sustained Energy communities

In an attempt to contribute towards making rural India self sustained energy communities, *www.indg.in* portal focuses on three major areas, by way of providing information. These are increased energy conservation, improved energy efficiency and enhanced energy production from renewable sources. The rural energy section presently provides information in local languages related to Government schemes, simple technologies, success stories, women and energy, rural innovations and a database of contact agencies.

e-Governance: Complementing e-Gov movement in the country

www.indg.in focuses on propagating e-Governance initiatives through information in local languages for its e-governance section. Local language information regarding e-Gov initiatives of 13 Indian States, e-Gov based products, e-governance in the Indian Judiciary, Downloadable Public Utility Forms, useful resources, news and events, etc. can be accessed.

www.indg.in aims to be a channel complimenting the e-Governance movement in the country for the benefit of the person at the last mile. ■

India Development Gateway is an initiative supported by the Department of Information Technology, Ministry of Communications and Information Technology, Government of India and executed by Centre for Development of Advanced Computing (C-DAC), Hyderabad.

Department of Information Technology
Government of India

सीडैक
CDAC

Telecommuting: An Indian perspective

Certain major initiatives including telecommuting have been undertaken by several companies to attract more women to the workforce, and also ensure higher retention rates among working women

Jyotsna Anand
Strategy and Process Consultant
IBM India
jyotsna_anand@hotmail.com

It's life as usual for Amanjot Romley, a Bangalore-based Management Consultant with IBM India. She wakes up, finishes her morning chores and gets to work. But there's a difference here. Amanjot works from home. When she was two months into her pregnancy, Amanjot opted for IBM's work-life flexibility option. But that doesn't mean that her responsibilities are any less compared to her other colleagues. "I still work under the same deadlines," she says.

Amanjot works with a team spread across various cities in India and several of her team mates work from home too. Amanjot quite likes this option. "You can work when you feel like and relax in between. In fact, I'm planning to continue working this way for at least a year after I have my baby," she says.

This is no ordinary maternity leave. This, in fact, is part of a series of programmes IBM has undertaken in India to help women in the workplace, as part of its larger initiative to encourage diversity. There are various kinds of flexible work schedules on offer. In specific functions, employees are allowed to work out of their homes, meeting their manager and teams once a week in order to chart progress and manage deadlines. Others are allowed to take a leave of absence to take up an education course, or to look after a sick parent. Then, there are some who opt to work half a day at half the remuneration so that they can devote more time at home. The idea is simple: lots of women employees tend to opt out of the workforce due to child bearing and family reasons. There is already a severe war for talent and we don't want to close our minds to any segment of the population.

Work is something you do, not something you travel to — this seems to be the new catch phrase in Indian offices these days. With urban centres such as Mumbai, Delhi, Bangalore and Gurgaon getting more congested, corporate sector is offering its employees flexible work options that help them cut down on travel time and increase productivity. With work following the sun across the globe, employees find telecommuting the best option to manage deadlines and spend time at home with family.

Shifting to a global paradigm

According to the Dieringer Research Group, over 22 million Americans work from home, a growing segment that makes up about 16 percent of the US workforce. In India too, with the current advancement in telecom and Internet technologies, telecommuting is fast becoming popular as employees become adept with remote management practices. And for Indian employers, there are definite pluses in the form of employee retention, attendance and productivity. Not to mention a possible windfall through savings on work space and office infrastructure.

Infrastructure such as calling cards, telephone, wireless connections and faxes are provided by the company. Agilent Technologies, for instance, provides their employees with Sprint cards and Virtual Private Network connectivity so that they can make customer calls and access eMails when not in office. Manoj Tewari, Senior Manager (HR), Agilent Technologies, explains that telecommuting is not possible in domains which require direct face-to-face customer interaction and the most important rule is that the employee needs to work closely with his manager when on telecommute mode.

Anita Guha, Diversity Lead, IBM India, observes that while both men and

women employees welcome this flexibility in terms of work, employers view this as a valuable employee retention tool. Guha, one of the first IBM employees to opt for telecommuting, adds that employers are often able to cut down on costs in cities where the real estate prices are high by allowing employees flexible schedules.

Wipro Technologies had started a pilot telecommuting project in July 2005 with 20 employees in the company working on telecommute mode. The programme was open for employees who have minimum three years of work experience. Joseph John, Vice President, Talent Engagement and Development, Wipro Technologies had commented once, "We do a pre-assessment before approving telecommuting for an employee. For instance we check whether the absence of the employee from the office impacts the client and the team, whether the employee is mature and responsible to handle work from home on his or her own. We also check with the employee as to how he or she will handle the same kind of activities which he or she would have done from office, while telecommuting." Nandini Matiyani, Group head, HR, Wipro Infotech says that telecommuting helps managers and employees focus on performance management as there is greater accountability and clarity in such arrangements and employee is focused on delivering results.

Proactive approach to talent management, Case IBM: A step ahead of the rest

At IBM India, more and more women now have full-time jobs working from home. Male managers at IBM are sensitised not to schedule meetings after 6.30 pm. IBM India now has about 35 percent women in its workforce. The key idea is to create an environment that is more welcoming to women. The results are already starting to show: the percentage of women in IBM's 70,000 strong India workforce has steadily climbed up to 35 percent. Contrasting this with the figures revealed by a recent CII survey: in large companies, the ratio of women is barely 4 percent of the total workforce, whereas in medium-scale companies, the figure stands at 18 percent.

Employee-friendly policies help in attracting and retaining top talents and critical resources. The policies also facilitate employee productivity. In IBM India, there are various flexible options offered by HR like flexi-time, part-time, work from home, reduced work hours and work from other locations for short duration depending on the operations. Apart from flexi-timing and sabbaticals, IBM India has embarked on a project to help women who have dropped out of the workforce for various reasons, back into the organisation. IBM also gives placement agencies a higher fee if they bring in women candidates. Besides, it is investing in vendors who aid in the process of developing childcare centres and crèches in key cities in India. The idea is simple: once the projects are off the ground, children of IBM employees will get a preference.

Through a separate project, IBM arranges for people to visit the employees' homes and train their children's nannies in things like maintaining hygiene etc. More importantly, they train employees in how to tackle nannies. While all these programmes are gender-neutral, they are mostly used by women. This is because, a typical Indian household still revolves around women

and they are expected to keep hearth even if they are busier of the two partners. For such women, these options can be a blessing in disguise. They are able to focus on both professional as well as personal front.

By working flexi hours, the employee can concentrate better and be more productive. After opting for flexible work option for sometime, employees always have the option to get back to normal schedule as and when they feel comfortable. Companies agree that this offer has not only helped the employees but it has also helped them to cut the HR cost and administrative overheads. One thing's quite clear at IBM- this isn't just one more HR initiative, which is why there is a team that is now handling the diversity issue. Besides, strategising with HR teams and introducing measures to ensure that attrition among women doesn't increase, it also means going to girls' schools and talking about a career in technology.

Towards an equitable environment

The concept of diversity in the workplace was born in the US, so it's not surprising that American companies are driving this trend in India. 'Gender diversity helps employees become more tolerant of each other and prepares them to be a part of the global team'. Organisations are thus making constructive efforts to create an environment of inclusiveness on the gender diversity front. Women now occupy a much larger, though far from equitable-percentage of middle management berths than was the case even a few years ago. There are both push and pull factors behind this. The felt need to appear politically correct is undoubtedly playing an important role as far as large IT companies are concerned; but the economic pull of the fairer sex is making the process irreversible now.

It is not just IBM alone. Several other organisations are going all-out to attract and retain women employees. For instance, whenever headhunters conduct an executive search for Bharti Airtel, they are told to include at least 25 percent of women candidates in the shortlist. DuPont, which ranks among the world's best places for working women, makes sure that for every job opening there is at least one-woman candidate in the shortlist.

Vijaya Sampath, corporate director and general counsel, Bharti Airtel, adds, "But we make sure that all appointments are made on merit and there are no quotas for women". Bharti, which has about

17-18 percent of women in its workforce, has recently launched a major diversity initiative. It ensures that there are enough women senior managers on the panel during pre-placement talks on campuses across India.

For the last 10-odd years ICICI Bank has maintained a fairly high women-to-men ratio. Currently, nearly one-third of their workforce consists of women. ICICI Bank, which boasts an extremely high proportion of women by industry standards, has been running a campaign on campuses for the last three years to bust notions regarding career options for women. Mr. K. Ramkumar; group head (HR), ICICI Bank, believes that there are some male stereotypes about certain kinds of job profiles and that is a misplaced notion which they are now trying to correct.

Women - the versatile facilitators

But why do organisations really need to do all this? What is the compelling business imperative here? Perhaps, apart from the fact that there is a talent crunch, there are other reasons why women can make a difference in the workplace. Says Sampath, "In the services industry, women can relate better emotionally with customers. Besides they tend to be more loyal to organisations." Besides, nearly 50 percent of Bharti Airtel's customers are women and it's important to mirror their needs. IBM's Anita Guha adds, "Having more women in the organisation closes the gap between the workplace and the marketplace. When customers and suppliers look into IBM, they need to identify with the people they see there."

The headcount of women stands at 32,000, with about 40 percent in senior management ranks of ICICI Bank. "If an organisation has the same kind of people; no different points of view can be created. There will be no new ideas," says K Ramkumar, group head (HR), ICICI Bank. Sampath says that the results of Bharti's diversity initiative are already starting to show in terms of better ideas and a more open, transparent and inclusive organisational culture. There also appears to be a link between gender diversity and the bottom line. A recent study by Catalyst a research and advisory organisation on women at work, revealed, "Companies that have higher women's representation on their top management teams financially outperformed those companies that have lower women's representation."

Women as a part of Indian workforce

In Indian companies, the focus may not have been given the diversity label, but the qualitative difference that women can bring in, is something that's being acknowledged now. They call it a 'business imperative'. For many companies, recruiting women is part of a focused diversity programme. But the truth is, like it or not, many see women as more 'stable' in times when job-hopping's considered so cool.

In fact, there seems to be a demand for women recruits at the board level too. "There's an effort to have a more balanced board these days and there's a big demand for women executives because they are considered to be more creative and right-brained," says Uday Chawla, managing partner of global executive search organisation Transearch.

Take the case of Unilever India. A majority of its customers are women but till 2000 women constituted just 5 percent of its management. Alarmed by that number, the company put in place a plan to hire more women. It looked at companies like ICICI and IBM, which had a far better representation of women in their workforce. Unilever India started several initiatives like a six-month fully paid maternity leave as well as a five-year sabbatical. It also grants maternity leave in cases of adoption. When women return from maternity leave, the company makes sure that they are given a meaningful role. The results are beginning to show; today the number of women in Unilever India's middle management has gone up to 16 percent. Says Leena Nair, GM, HR: "There is more vitality in the workplace. Unilever India is a softer place, with less hierarchy"

All this isn't a trend sweeping across the MNCs alone. B K Modi, promoter of Spice telecom group, too has a 30 percent target for women. Even players in the manufacturing sector are trying to achieve a balanced ratio. Auto component maker, Cummins India, already boasts of having a 30 percent women population. At a recent auto component industry conference, Anant Talaulicar, joint MD, Cummins India, remarked that women constitute nearly 30 percent of the women workforce and that's because of a conscious effort on the part of the company. Minda Industries' president Mr. Nirmal K. Minda says "We believe women are better workers than men, as they have low attrition levels, work with more consistency and are easy to train". Minda Industries has women that are recruited from various technical polytechnics and IITs and have a lot of women workforce employed on the shop floor.

All said and done, only a handful of companies in India are embracing gender diversity in the right earnest. A principal consultant (human capital group), Watson Wyatt, points out that the percentage of companies that have policies to support working women is limited. There are still some organisations, particularly in factories, where the number of full-time women employees is so negligible or non-existent that there are not even cloak rooms for women. In an age when telecommuting is a reality, the unavailability of funds and infrastructure to support women in workplaces, is also very true and existent. ■

References:

1. Jhinuk Chowdhury, Leading Ladies, ET High Flier, The Economic Times 21st November, 2006
2. T R Vivek, Diversity Dilemma, Corporate Dossier, The Economic Times, 3rd November, 2006
3. World is Changing for Women Workforce, The Times of India, 2nd January, 2007
4. Debeshi Gooptu Bakshi, Home Rule, Education Times (supplement of The Times of India), 8th January, 2007
5. Mitu Jayashankar, India Inc 'Mix n Match' on Hire Ground, The Economic Times, 23rd January, 2007
6. Neelima Mahajan, Flexi timing a compelling biz imperative, The Economic Times, 3rd January, 2007
7. Bhaswati Chakravorty, A Potpourri Workforce, Dataquest magazine, 15th November, 2006

Uganda's WOUGNET initiative

Dr Dorothy Okello
Coordinator
Women of Uganda Network (WOUGNET)
Uganda
info@wougnet.org

Over 80 percent of Uganda's population of 29 million is rural based and depends almost entirely on agriculture at various levels for livelihoods. However, diseases, pests, soil degradation and other factors such as lack of market for easily perishable crops, have greatly affected the total national incomes and subsequently the standard of living of people in rural communities. Access to information as prescribed in government strategies requires cheap and fast dissemination of information to farmers, even in the rural areas. Limited resources, including limited telecommunications and energy infrastructure, have contributed to slow implementation of such government initiatives. Consequently, despite being the largest contributor to the country's economy, the agricultural sector still lacks knowledge dissemination innovations to facilitate timely, accurate and relevant information to farmers.

It is widely held that access to accurate and timely information by urban and rural women can not only increase agricultural productivity, but also result in enhanced economic and social development. Indeed, the Uganda government recognises that information is the key for all kinds of programmes [like the Poverty Eradication Action Plan, Plan for Modernisation of Agriculture (PMA)].

The backdrop

This article highlights Women of Uganda Network's (WOUGNET's) activities in addressing the need to enhance access to information by rural women in Uganda with examples from WOUGNET's initiatives in Apac District, Northern Uganda. Women of Uganda Network (WOUGNET) is a non-governmental organisation initiated in May 2000 by several women's organisations in Uganda to develop the use of ICTs among women as tools to share information and address issues collectively.

According to the findings of the 2003 WOUGNET Evaluation Report (which used the APC Gender Evaluation Methodology – GEM tool that is useful in assessing initiatives using ICTs for social change), WOUGNET activities did increase awarness and participation among women, and did foster information sharing and networking among women and women organisations. However, the benefits were still limited to those organisations that had access to Internet, leaving out the majority of women and women organisations in the rural areas. Only limited efforts were made to support women organisations in the rural areas to explore ICT opportunities in their activities through awareness workshops, seminars, print materials. Moreover, because of some constraints, women could not explore ICTs to their full potential in their activities. The constraints were:

- Inadequate skills and knowledge in ICT use and application in their daily activities
- Lack of ICT centres where they could exploit ICTs in their activities
- Lack of connectivity to access information disseminated online by WOUGNET
- Lack of information translated in the local language to meet the needs of the diversified members
- Lack of diversified methods of disseminating information that would satisfy both urban and rural women
- Lack of technical skills to address problems such as computer break down and maintenance.

> WOUGNET is instrumental in supporting women and women organisations to learn the use and application of ICTs

Reframing the WOUGNET objective

Following the 2003 evaluation, WOUGNET's overall objective was revised to strengthen the use of ICTs among women and women organisations, to build capacities in ICT use and application, and to expand activities to reach out to women in the rural areas. Currently, WOUGNET's activities are conducted under the guidance of the 2008 – 2010 Strategic Plan with the overall goal to enable women and women organisations strategically and innovatively use ICTs for sustainable development.

There are three major programme areas: Information Sharing and Networking; Technical Support; and Gender and ICT Policy Advocacy.

Sharing information using ICTs

The Information Sharing and Networking programme aims at facilitating and improving women's access to information through the use of ICTs and through networking. Under the Information Sharing and Networking programme, a project on 'Enhancing Access to Agricultural Information using ICTs in Apac District' was initiated in 2005 to develop and improve Information and Communication systems so as to enable easy access to agricultural information for rural women farmers. According to a research study[i] undertaken in 2003, findings revealed lack of information as a key limiting factor to increased productivity in Apac District. The rural farmers lacked information on how to improve quality of their products, improved seeds and crop varieties, source of inputs/implements, plant diseases, pests and their control, soil management and conservation, and improved skills. Lack of such information has limited the production levels of the rural farmers, hence limited income and poverty.

The EAAI project

The Enhancing Access to Agricultural Information using Information and Communication Technologies (EAAI) project is implemented in twelve parishes/villages of Atik, Abedi, Apac, Kungu, Awila, Apoi, Aumi, Agege, Angic, Adyeda, Bar Akalo and Adyang of Maruzi and Kole counties in Apac District. The project was initiated with financial support from the Technical Centre for Agricultural and Rural Cooperation ACP-EU (CTA), and targets grassroot women farmers as the main beneficiaries while not excluding men or the youth in the project activities.

Located in Apac town, the Kubere Information Centre (KIC) was also established to act both as an Information Resource point as well as to support project implementation and two-way linkages with the women farmers. Local agricultural content has been produced and disseminated via radio and SMS messages as well as on audiotapes, video tapes and CD-ROMs. The content is made available in the local language, Luo, and disseminated to farmers. In order to ensure timely dissemination of relevant information to farmers, the EAAI project has applied a number of collaborative strategies.

WOUGNET has teamed up with a rural radio in Apac to ensure delivery of information that is packaged, transcribed and formatted into a series of weekly radio programmes. Established in 1999, Radio Apac serves the target district and has got a good listenership in the community. In addition, WOUGNET has partnered with existing sources of agricultural information including Agency for Sustainable Development Initiatives (ASDI[ii]) and Volunteer Efforts for Development Concerns (VEDCO) – both NGOs based in Apac, The Radio and Internet Programme (RANET) – Uganda Metrological Department[iii], and the Apac District Agricultural Office.

Furthermore, a question and answer arrangement is also available to assist farmers in providing a technical back up. This has been done in collaboration with the National Agriculture Research Organisation (NARO), the local coordinator of CTA's Question and Answer Service and with the FAO/NARO Agricultural Research and Extension Network (ARENET) project that seeks to use the Internet to bring the gap between researchers, extension workers and the farmers.

WOUGNET's current initiatives

Currently, with support from UNESCO's International Programme for Development of Communication (IPDC) and from Hivos, WOUGNET in collaboration with Radio Apac is conducting the 'Rural Women's Voices' project. The eight-month project seeks to provide a platform for the community in Apac and most especially the rural women to voice their concerns in five areas of women's policy development: Health, Livelihoods, Education, Good Governance and Gender. Women especially in the rural areas are still lagging behind in accessing information through radio and other ICTs. Likewise their voices compared to those of their male counterparts are poorly represented in the mainstream and citizen media. Use of gender-responsive programmes that integrate a combination of ICTs like community radios and rural telecentres like the Kubere Information Centre (KIC) have shown that women can be empowered to use ICTs to improve their lives socially and economically. Through the project, a mini-studio has been established at the KIC to facilitate the capture of women's concerns on various issues. These recordings will be used in radio programmes and other fora so as to increase the channels available for the women's voices.

Regarding livelihoods and primarily agricultural activities, ICTs such as radio and mobile phones have indeed been affirmed as important media for information sharing. These ICTs have inspired progression in the agricultural practices among the rural women farmers in Apac. The challenge however, as voiced by the women farmers, is that some instructions received on air can prove difficult for farmers to implement. For instance, the farmers asked for instructions on how to plant trees and other measures so as to preserve their soil in these times of changing environments. Even with the radio instructions, for example, there was still a challenge to know how much fertiliser one would need to apply, and when too much fertiliser would be detrimental. In addition, the majority of women farmers were not able to read or write and hence were unable to take notes of the radio programme. Other concerns involved finding markets for the farmers' produce. While some of the women farmers have used their phones to obtain market prices, there were still challenges in accessing the market. This serves to illustrate the need to combine the use of ICTs with other methods for conveying and utilising timely and relevant information. Such methods include field demonstrations, exchange visits, posters, community stores/selling of the produce, etc.

Conclusion

While many constraints remain in enhancing access to information by women, WOUGNET is committed to directing all its efforts to supporting women and women's organisations in Uganda to access and utilise ICTs in their development activities. Access to information, knowledge and skills are key enablers for the socio-economic emancipation of both urban and rural women. ■

References:

[i] Participatory Research on Information and Communication Technologies for Poverty R duction in Apac, Northern Uganda. WOUGNET report presented at the Institute@WSIS, December 10, 2003, during the World Summit on the Information Society (WSIS) in Geneva, Switzerland.

[ii] ASDI, http://www.wougnet.org/Profiles/asdiug.html

[iii] Uganda Metrological Department, http://www.meteo-uganda.net

Building a better knowledge society

Access of ICTs to rural women can substantially improve their livelihoods and household incomes, their health and that of their children, husbands and communities

Samia Melhem
Senior Operations Officer
The World Bank Group, Washington DC, USA
Smelhem@worldbank.org

Measuring the feminine contribution

Gender considerations have become more and more prevalent in the discourses on applications of Information and Communications Technologies (ICTs) for development in the last few years. New research, case studies and analysis are emerging, replacing the earlier wave of advocacy and awareness raising articles on ICTs as tools for women's economic empowerment. For a long time, ICTs were suspected to help enable women in developing knowledge, skills and techniques towards effective human development. Unfortunately and until today, the world lacks a monitoring and evaluation framework with gender disaggregated indicators related to ICT usage and impact by women. As the popular adage has it, what cannot be measured does not count, and perhaps the lack of a consolidated set of indicators related to ICTs usage and production by females, half of the word's population, reflects a deeper set of socio-economic stereotypes and taboos related to women, sciences and technologies. These subconscious mechanisms have not yet been shaken hard enough to create action-oriented change, which would be translated into setting up gender-based ICT indicators.

For the last five years preceding the World Summits on Information Society (WSIS1 in Geneva, December 2003 and WSIS2 in Tunis, November 2005) the World Bank Group (WBG), International Telecommunication Union (ITU), United Nations Conference on Trade and Development (UNCTAD) and several multilateral agencies, donor groups, women NGOs, Gender Caucuses and private sector associations have been proposing specific gender-based indicators, to track progress in usage and productions of ICTs by women. The blue print and design exist. What is still needed is implementation at the national level (and hence, leadership, resources, skills etc.). With a few emerging exceptions that we know of (Ghana, Sri Lanka, Tunisia, Brazil, etc.), governments are not yet implementing base-line studies with gender indicators. These indicators do exist, world wide, in the education sector, as statistical offices, national education agencies and private educational institutions have traditionally kept count of student enrollment, graduation and achievement scores on a gender disaggregated basis. In fact this type of data is heavily used by United Nations Educational Social and Cultural Organisation (UNESCO), Organisation for Economic Co-operation and Development (OECD), World Economic Forum (WEF) and others on assessing the impact and roles of women in Sciences and Technologies, innovation, entrepreneurship, and knowledge economy.

Gender disaggregation: Role of the private sector

The private sector is missing the boat, in a world where apparently 80 percent of household purchasing decisions are made by women: Private sector is only starting to think of gender in its analysis of target market segments. Mobile telephone providers, data providers or Internet Service Providers (ISPs) have no way to account for the proportion of their female subscribers, even in developed economies. Not very surprisingly, the author of this article is consistently addressed to as 'Sir' in all marketing letters sent by cable TV providers, fixed line providers, and all their competitors, in the US. One could possibly infer from the above mentioned trend that

for operators, women never really counted as a sustainable market segment in their return on investment or Average Revenue Per User (ARPU) calculations. Many operators fail to recognise women as avid absorbers and consumers of the new technologies and technology-enabled services. To reverse this trend, many content providers, now-a-days, are trying to provide localised, contextual content that is of special appeal to women. Even though the exact breakdown of mobile telephone usage amongst male and female is not available, it is fair to assume that women have the same access that men do to mobile phones as 3.3 billion people, half the planet, now own mobile phones. Empirical evidence shows that these phones are shared within families and households. Hence, both men and women can communicate by voice or data (such as by sending and receiving SMS messages) with the outside world and break their geographical and physical isolation. This alone is a major fallout of the ICTs revolution as for the first time, both men and women got equal access to the same information, eliminating the potential abuse of power which usually results from asymmetric information access and utilisation. There are alarming stories from backward societies (such as isolated reports of hanging women carrying cellular phones in Taliban-dominated territories) but these are mostly exceptions, and will not be sustained; as history has shown the flow of information is unstoppable, and that it will, overall, improve societies' well-being.

Information and economic development

By and large, most societies and regimes have understood the critical role of access to information in accelerating economic development and growth. For the last twenty years, governments and policy makers have been reforming telecom sector policies and regulatory frameworks in order to create a vibrant and competitive telecom domain that is not only national in nature but also involves lower costs and quality services for the citizens. Several governments, helped by donors such as the World Bank Group, have launched national strategies to expand access to all its citizens, by using reverse subsidies to attract the private sector; and by an efficient usage of universal service funds. Their objective is access for all, men and women alike; even if we cannot really account for 'all' in a sex disaggregated way, at least not yet. The enormous success of the Grameen Village Phone experience in Bangladesh has no doubt help raise the profile of women, mostly illiterate, as users and entrepreneurs in the ICT sector and in the micro finance space. The replication of the model in Uganda, Nigeria, Rwanda etc. will help to establish and consolidate the role of women. It is all about image, and one day the change in image will dictate a change in the indicators.

There is huge and untapped revenue potential, as content itself becomes more and more feminine, and/or of utility for women. As most of our rural development projects try to reach out remote villages, ICT can and has been used very effectively to connect isolated populations. Several WBG funded programmes focus on the poor youth, on gender, on minorities, lower castes and handicapped by building capacity within the community to operate and manage village-based information centres. ICTs may be used for three purposes: (a) building awareness, basic information access and hence empowerment, among the poor especially youth and women (b) for income generating activities - accessing market information, pricing, employment information, and links with other agencies and local/global supply chain; (c) getting access to funding and microfinance, especially as mobile banking trends move from the main cities to the rural areas; (d) monitoring village level project activities, use of funds and benefits and disseminating lessons and learning among the community and by the community itself.

Women as producers of information: Indonesia

According to Indonesia's Ministry of Communication and Information (MCI)'s e-Strategy Report (2004), many women's groups in rural areas got organised around micro-credit assistance, using the new technologies provided such as computers for maintaining their accounts, acquiring skills in manufacturing, understanding their industries (such as craft, agro-business or farming products) to produce superior products, or to provide new information-based services to their communities. Survey of these groups reveals that women has been able to earn additional incomes. The women's cooperatives have proved to be model borrowers with outstanding record of repayments to banks and financing institutions, just as in other cases surveyed in Latin America (Equator, Bolivia, Brazil), Asia (China, Vietnam, Bangladesh, India) and Africa. Operationalisation of cooperatives and micro finance institutions has also facilitated the production of local content and the frequent updating of such content.[1] to the benefit of women, men and their communities; hence making women producers and guardians of the knowledge needed in local contexts. The caveat is that, women, just like men, are also victims of gender stereotype and bias. However, the new trend of information production had positive effect on women's image and self-esteem in the communities, and has built on women's abilities as knowledge gatherers and story tellers. A lot of the governments and donor funded programmes would benefit from using these types of indigenous knowledge producers, provide them with training and tools so that they could use these in turn to communicate best practices to their constituencies.

IT in health care: Andhra Pradesh, India

The project incorporated the use of handheld computers for primary health care workers to deliver their services to the rural population of Andhra Pradesh, India. Semi-literate midwives used mouse pads instead of paper to enter patient, as well as household, survey data. It reduced by 40-60 percent the time of the health workers in data entry and processing. Because of the use of computers, it made data electronically available for further analysis at higher levels of the health care system.

Grameen Bank: Bangladesh

Nobel Peace Prize winner Mohammad Yunus's innovative venture to lend money to village ladies so that they can resell phone services and repay the micro-loan needed to acquire the handset and mobile service is noteworthy. Based on several impact evaluation studies, the income, a Village Phone Operator derives from the Village Phone, is higher than average local household income. In 2005, based on the Canadian International Development Agency (CIDA) report, the mobile phone village operator was making on

average an average of $82/month, more than twice the per capita income.[2] The Grameen Village Phone web site now reports on average household improvement for its 220,000 village phone operators in Bangladesh. In a recent book called 'hear me now', author Nicholas P. Sullivan reports that the village phone ladies in Bangladesh always repaid their loan, and earned on average between $300 and $750/year after repayment – for a $284 GDP per capita[3]. The experience is being replicated in Uganda with financing from International Finance Cooperation (IFC). The village phone ladies interviewed by IFC's team in Uganda report an increase from $27/month as a farmer to a $38 weekly income by selling an average of 30 minutes/a day. This amounts to an almost 500 percent increase in household income[4]. IFC is also replicating the same experience in Nigeria and Rwanda; and has been featuring some of the outcomes of the project in terms of economic empowerment and poverty alleviation impact.[5]

Raising awareness

There are expectations that are widely distributed; state-sponsored information programmes will have as an impact a decrease in both gender-based violence and women's illegal trafficking. SMS messaging may be used to raise awareness on the issues of gender-based violence and on women trafficking. The state or municipal government representatives should be working with the local mobile operators to create, disseminate and receive feedback on such content. Local government agencies and NGOs should be trained and staffed adequately as such programmes usually cause an increase in complaints and visits to local officials.

e-Governance initiatives

The availability of government services online, and the ability of transacting with government electronically at all times from an office computer, a home computer or a public Internet kiosk, offer great benefits to all the population, both men and women. There are however, some women specific considerations when rolling out large scale e-Government programmes to include in the design of such programmes, so women can benefit equally from the services and content:

- Access: Quite often, women cannot access the e-Governance services as they have no home computer with an Internet connection, and/or are not trained on computer usage. Capacity building programmes for women and availability of telecentres for women only (or telecentres working in shifts with dedicated hours for women only) will have a positive impact on women adoption and use of e-Government services.
- Specific content provided by government to protect women, and to raise women and men's awareness on the women's right such as providing on line local language versions of (a) human rights (2) family law, (3) inheritance law (4) domestic violence legislation (5) local contacts for police, local authorities dealing with family matters, NGOs and self-help women groups
- Specific content provided by government on human development, maternal health, nutrition and education: This content is useful to both men and women but OECD research has proven that women are much larger users of health and education online web sites than men in most OECD countries. The World Bank group and the donors have been financing for years the production of that type of content through credits and loans in heath, education, disaster prevention, HIV aids etc. . . . The World Bank Group specifically has been financing multi million capacity building programmes which produced digital training material in local language that can be easily re-used if uploaded on a publicly available government portal. The content exists but is not optimally managed to benefit the population and to benefit women specifically at the state, provincial and local level. Some of this content cam is transformed into graphics with audio to help the illiterate. This is an area where the World Bank group can provide invaluable assistance to its client by helping setup and update e-Government portals to leverage on valuable investments in content and training.

Conclusion

In several countries, women are not in any citizen registration database, they are only the head of the household. This makes it very difficult for women, especially poorer women in rural areas and/or of lower castes to claim social security, social protection, inheritance, land, etc. as there is no proof of their existence. Some governments (Tamil Nadu, India for instance) are embarking on specific programmes to register women in the local/national database systems, to provide them with a social identifier (citizen registry) and inform them of their rights and train them in specific skills/farming programmes to lift them out of poverty. Land reform is making a large difference and has been pointed to as the best starting point in some countries such as Ethiopia. For rural women, getting a title to her land, of a joint tiling with her spouse is a good first step towards economic empowerment. By seeing their names on a business paper, many women report an increase in self-esteem, as they now have the proof they actually exist and are recognised as an economic entity in their local system… A feeling none of us (from privileged contexts) ever had to worry about, having a multitude of identifiers such as driver license, social security, credit cards, etc! At a time where the global food crisis is ubiquitous and the whole world is going back to the rural and agricultural space looking for improvements, empowered, healthy and committed women will be critical to agricultural productivity improvements, and to the safety and survival of their communities, including men! ■

Sources:

[1] Engendering Rural Information Systems in Indonesia, The World Bank Rural Development and Natural Resources Sector Unit, EAP, June 2005, http://imagebank.worldbank.org/servlet/WDSContentServer/IW3P/IB/2006/10/10/000011823_20061010153655/Rendered/PDF/376970IND0whit10Rural0info01PUBLIC1.pdf

[2] This is from the September '05 Progress Report.

[3] Sullivan, Nicholas P. "You can hear me now how micro loans and cell phones are connecting the world's poor to the global economy".

[4] http://www.grameenfoundation.org/where_we_work/sub_saharan_africa/uganda/success_stories/

[5] www.worldbank.org/gict

Disclaimer: *Opinions in this article are that of its author alone, and do not represent the opinion of the World Bank group, nor its staff and management, nor its board of Executive directors.*

Agility and gender diversity

Agile software development has the potential to increase diversity in general and gender diversity in particular

Orit Hazzan
Department of Education in Technology & Science, Haifa, Israel
oritha@techunix.technion.ac.il

Yael Dubinsky
Department of Computer Science, Haifa, Israel
yael@cs.technion.ac.il

Technion – Israel Institute of Technology, Haifa, Israel

Introduction

Gender issues have recently been discussed extensively with respect to the computing fields (cf. Camp, 2002; Margolis and Fisher, 2002; Bair and McGrathe-Cohoon, 2005). One of the discussed issues is the 'shrinking pipeline' phenomenon (Camp, 1997). Camp shows how, in addition to the shrinking of the pipeline upon transition from high school to graduate school, the pipeline has been shrinking also at the bachelor degree level since 1983. She argues that since the number of women at the bachelor's level affects the number of women at levels higher in the pipeline and in the job market, this phenomenon is of great concern (p. 104).

The significant decrease in the female population of computer science students over the past twenty years, from 35 percent in the 1980's to a 15-20 percent level at the beginning of the millennium (Camp, 1997; Davies and Camp, 2000) accompanied data that indicate that the software industry suffers from many typical problems. For example, software projects fail to be delivered on time, exceed their budget, and do not comply with the requirements put forth by the customer (see for example, Fairley and Willshire, 2003).

This article focuses on software development teams using the agile software development approach. High quality of working software is the primary measure of progress; however, agile software development processes promote in addition sustainable pace of all the individuals involved in the software development process, welcome requirement changes even in late stages of the development process, and favour face-to-face communication. Agile software development frameworks enhance diversity in general and, in particular, as is illustrated in this paper, enable women gaining new and better positions in software development teams. The perspective and data that are presented in this article are part of our research about human aspects of software engineering and specifically our comprehensive research about agile software development (Tomayko and Hazzan, 2004; Hazzan and Dubinsky, in press, 2008).

Agile Software development and managerial style

During the 1990's, the agile approach of software development started to emerge as a response to the problems of the software industry (Highsmith, 2002). In general, agile software development methods emphasise customer needs, communication among team members, short releases and heavy testing throughout the entire development process. These emphases are defined in the Manifesto for Agile Software Development[i], as follows:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to changes over following plans

It is stated that while there is value in the items on the right, agile practitioners value the items on the left more.

The agile principles are implemented quite differently by different agile methods all 'have some significant changes in emphasis from heavyweight methods', e.g., they 'are people-oriented rather than process-oriented' (Fowler, 2002).

As mentioned, agile methods reflect the notion that development environments

should support communication and information sharing, in addition to heavy testing, short releases, customer satisfaction, and sustainable work-pace of all individuals involved. At the same time, and independently, recent research studies have identified several characteristics attributed to women's management style that seems to fit the agile approach. Here are some examples (italics added by authors) that reflect that the main characteristics of women's management style seems to fit the agile approach.

- "Women's style of management is based on sharing power, on inclusion, consultation, consensus, and collaboration. Women work interactively and swap information more freely than man do. Women managers encourage their employees by listening to, supporting, and encouraging them." (Fisher, 1999, p. 32).
- "Women's management style is more equal and collaborative, often described as 'transformational', in contrast to the traditional 'transactional' style preferred by men who rely on power position and formal authority." (Vinnicombe and Singh, 2002).
- "Recent research indicates women's management style, which is centered on communication and building positive relationships, is well suited to the leadership paradigm of the 90's." (Peters, 2003).
- "The women's management style builds very much on participation by the employees and mutual trust, and they become very disappointed if the employees do not live up to that trust." (Kjeldsen and Nielsen, 2000).

Needless to say, these management attributes are compatible with any good management style; however, as the above quotes indicate, research attributes them to women.

Research field

One of the advanced courses offered by the Department of Computer Science at the Technion, and taught by the second author for more than ten years, is the project-based capstone course 'Projects in Operating Systems'. The Department of Computer Science is considered to be comparable to the ten leading Computer Science departments in the US[ii]. In addition to its general B.Sc. programme, the Department offers four special undergraduate tracks in Software Engineering, Information Systems Engineering, Computer Engineering, and Bioinformatics. The Technion in general, and the Department of Computer Science in particular, are one the main suppliers of (software) engineers to the Israeli hi-tech industry.

The course 'Projects in Operating Systems' is offered three times a year (winter, spring and summer semesters). The course has been taught in a studio-oriented format since the summer semester of 2002 in more than 50 projects. The 'studio' is the basic learning method used in architecture schools. In such studios, students develop projects, closely guided by a coach and while performing on-going reflection, both on what is created and on the creation process itself (Kuhn, 1998; Tomayko, 1996). The studio is a kind of computer laboratory that is equipped to serve as a project development centre. There is a discussion table in the middle of the room and computers tables around. There are boards that contain the project stories and management material such as measures that are taken regularly. Analysis of how the studio can be implemented into software engineering education is presented by Hazzan, 2002. Extreme Programming, commonly abbreviated XP (Beck, 2000) is the agile development method chosen to be introduced into that course.

The initiative is highly supported by the Department of Computer Science, which, among other things, provides the required resources and equipment. Thus, each team of 10-12 students works on a specific operating system project during the entire semester, in its own studio, which is equipped with computers, tables and white boards. Each team has also an academic coach who guides the development process.

Attendance of all students at all of the weekly 2-4 hour sessions is compulsory. In these meetings, XP practices are taught and employed. In between sessions, student communication is conducted via an electronic forum, which is part of the course web-based environment. The introduction of XP into the course has been found to enrich the development environment with respect to topics such as customer needs and process management (Dubinsky, 2005; Dubinsky and Hazzan, 2005).

Specifically, in a 14-week semester, the team task is to develop the first release of a software product in the subject matter of operating systems. The project subject, as well as a brief description of the software development method to be used, is introduced in the first meeting of the semester. In fact, in this meeting the first iteration (out of three iterations that comprise a release) starts. The first iteration is seven-weeks long and includes, in addition to the project development activities, the launching of the project development environment, the learning of the project subject, and roles distribution among teammates. Since after the first iteration the students are more experienced, the second and third iterations together are half of the semester.

The role practice

In Dubinsky and Hazzan (2004, 2006), the authors suggested an extended role scheme for software development teams. According to this scheme, all teammates are developers, and, in addition, each teammate has a special-personal role that addresses one aspect of software project management. Thus, the project management is covered by all teammates. Table 1 presents the suggested role scheme for an academic XP team. As can be seen, some of the roles are XP roles, like coach, tracker, tester, and customer; other roles represent software development practices that in our opinion should be emphasised.

Data analysis from the perspective of gender diversity

In what follows, the authors illustrate how agile software development in general and the role scheme presented above in particular can enhance diversity in general and gender diversity in particular. In Hazzan and Dubinsky (2006), the authors examined the above-mentioned characteristics of women's management style in light of the agile principles that support them. For example, a communicative-oriented examination of 294 students' behaviour, who worked according to the agile method during eight semesters in 27 different teams, reveals that females are equally communicative. Specifically, the communicative behaviour was measured using the electronic forum that the students use.

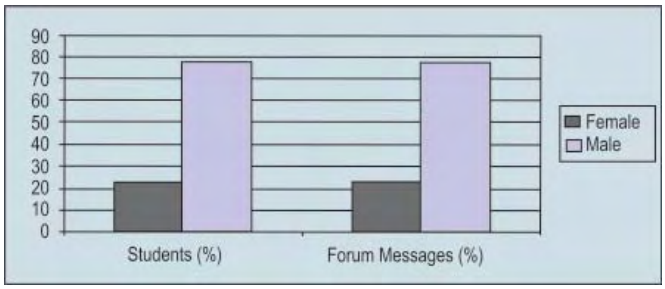
Table 1. Roles in an academic XP team

Group of Roles	Role	Description
Leading Group	Coach	Coordinates and solves group problems, checks the web forum and responds on a daily basis, leads some development sessions.
	Tracker	Manages the group diary, measures group progress with respect to the estimations and test scores, manages and updates the boards.
	Methodologist	Learns the software development method applied in the course and guides the software process when required, guides and supports the other team members with their role.
Customer Group	Customer	Tells customer stories, makes decisions pertaining to each iteration, provides feedback, defines and develops acceptance tests.
	Acceptance tester	Works with the customer to define and develop acceptance tests, learns the topic of test-driven development and instructs it to the other team members.
Maintenance Group	Presenter	Plans, organises and presents version presentations, demos, and time schedule allocations.
	Documenter	Plans, organises and presents the project documentation: process documentation, user's guide, and installation instructions.
	Installer	Plans and develops an automated installation kit, supports and instructs other teammates as to the appropriate way to develop software for easy and correct installation.
Code Group	Designer	Maintains current design, works to simplify design, searches for locations in the software that need refactoring and ensures proper execution of such.
	Code reviewer	Establishes and refines group code standards, searches for development tools that can help the team, guides pair programming, guides and supports in the maintaining of the code standards and tools.
	Unit tester	Learns about unit testing, establishes an automated test suite, guides and supports other team members in the development of unit tests.
	Integrator	Establishes an integration environment including source control, publishes rules pertaining to the addition of new code using the test suite, guides and supports other teammates in the integration task.

Figure 1 illustrates this observation presenting the percentages of the number of students – 228 males (77.6 percent) and 66 females (22.4 percent), and the percentage of the number of forum messages each student sent – 4702 messages by males (77.2 percent) and 1391 by females (22.8 percent).

In order to show how the role practice presented above also enhances diversity in general and gender diversity in particular,

Figure 1. Communicative behavior



the authors counted how the different roles have been distributed between genders over seven randomly selected projects over the years in which agile software development has been applied in the Operating System Projects course. Students in each team decided on the role assignments on a self-selection basis.

For each role listed in Table 1, the authors counted in how many projects a female student chose this role and in how many projects a male student chose this role. As the data presented in Table 2 indicates, roles have been assigned to genders more or less equally to the gender representation in the student body. Specifically, while female students' representation in these projects was 17 percent, they hold 20 percent of the roles (12 out of 60 roles). It is important to note that with respect to the more central roles, such as the tracker and coach, female role-holder even outreached their representation in the student body.

Table 2. Role distribution among genders in academic agile teams

Total # of students	# of male students	# of female students	# of projects
46	38	8	7
	83%	17%	

Notes:
1. In some projects one student has two roles and sometimes two students have the same role. It depends on the number of students in the team. Therefore, the total number for each role does not always equal seven.
2. Since the role scheme has been evolved during its implementation based on the accumulated experience, we present here data only with respect to roles that were applied in all the seven projects.

Role	# of male students	# of female students	% of female students
Coach	4	2	33%
Tracker	4	2	33%
Customer	5	2	29%
Presenter	7	1	13%
Documenter	4	0	0%
Installer	3	0	0%
Designer	3	1	25%
Code reviewer	2	1	33%
Tester/s	9	1	10%
Integrator	5	1	17%
User evaluator	2	1	33%
	48	12	
Total: 60 roles			

Conclusion

Diversity can be expressed in different ways, such as nationalities, world views, gender and minorities, cultures, skills and life styles. In general, studies suggest that no matter how diversity is expressed, it benefits with societies that foster it (see for example, Florida, 2002). Diversity is also perceived as a powerful management practice (see for example, Toyota's 21st Century Diversity Strategy[iii] and Thomas, 2004).

Diversity is also incorporated into and embraced by agile software development methods. According to Kent Beck: "Teams need to bring together a variety of skills, attitudes, and perspectives to see problems and pitfalls, to think of multiple ways to solve problems, and to implement the solutions. Teams need diversity." (Beck with Andres, 2005, p. 29).

In the work presented in this paper, the authors show that though females are still a minority, i.e., 22.4 percent of the agile teams we examined, they a) were equally communicative (22.8 percent) and b) equally held roles in general (17 percent) and leading roles (such as coach and tracker) in particular (33 percent).

Many associations undertake to promote women in the hi-tech industry. In most cases, these organisations seek ways to help women adjust to the prevalent work framework that characterises this industry in general and software teams in particular. By presenting agile software development environments as environments that welcome diversity in general and in which women can feel comfortable without requiring any adjustment, this paper offers another way by which to recruit women into the software industry and in doing so to help partially expand the shrinking pipeline. This perspective is further supported and put in the wider context of culture in Blum, Frieze, Hazzan and Dias (2007). ■

Acknowledgements :

We would like to thank The Samuel Neaman Institute for Advanced Studies in Science and Technology and the Technion Fund for the Promotion of Research for their generous support

Footnotes and references :

[i] The agile manifesto at http://agilemanifesto.org/

[ii] This is according to an international Review Committee that has reviewed the Department of Computer Science in January 2000 and has submitted a report to the President of the Technion (taken from http://www.cs.technion.ac.il/GeneralInformation/AbouttheDepartment/index.html).

[iii] Toyota's 21st Century Diversity Strategy: http://www.toyota.com/about/diversity/21stcenturyplan.pdf

1. *Bair, B. and McGrathe Cohoon, J. (2005). Special Issue on Gender-Balancing Computing Education. Journal on Educational Resources in Computing (JERIC) 4(1).*
2. *Beck, K. (2000). Extreme Programming Explained: Embrace Change. Addison-Wesley.*
3. *Beck, K. (with Andres, C., 2005, second edition). Extreme Programming Explained: Embrace Change. Addison-Wesley.*
4. *Blum, L., Frieze, C., Hazzan, O and Dias, B. (2007). Culture and environment as determinants of women's participation in computing, Reconfiguring the Firewall: Recruiting Women to Information Technology across Cultures and Continents, in C. J. Burger, E. G. Creamer and P. S. Meszaros (editors), pp. 109-133, A K Peters, Ltd.*
5. *Camp, T. (1997). The incredible shrinking pipeline. Communications of the ACM 40(10), 103-110.*
6. *Camp, T. (2002, editor). SIGCSE Bulletin inroads, Special Issue Women in Computing. 34(2).*
7. *Davies, V. and Camp, T. (2000). Where have women gone and will they be returning. The Computer Professionals for Social Responsibility Newsletter,http://www.cpsr.org/publications/newsletters/issues/2000/Winter2000/davies-camp.html.*
8. *Dubinsky, Y. and Hazzan, O. (2004). Roles in agile software development teams. Fifth International Conference on Extreme Programming and Agile Processes in Software Engineering, Garmisch-Partenkirchen, Germany, 157-165.*
9. *Dubinsky, Y. and Hazzan, O. (2005). The construction process of a framework for teaching software development methods, Computer Science Education, 15:4, December 2005.*
10. *Dubinsky, Y. (2005). Teaching Software Development Methods, Ph.D. Research Thesis, Technion – Israel Institute of Technology.*
11. *Dubinsky, Y. and Hazzan, O. (2006). Using a role scheme to derive software project metrics, Journal of Systems Architecture 52, pp. 693–699.*
12. *Fairley, R. E. and Willshire N. J. (2003). Why the Vasa sank: 10 problems and some antidotes for software projects. IEEE Software, April-May 2003, 18-25.*
13. *Fisher, H. (1999). The First Sex – The Natural Talents of Women and How They are Changing the World. Ballantine Books, NY.*
14. *Florida, R. (2002). The Rise of the Creative Class, Basic Books.*
15. *Fowler, M. (2002). The New Methodology, published in martinfowler.com, http://www.martinfowler.com/articles/newMethodology.html.*
16. *Hazzan O. (2002). The reflective practitioner perspective in Software Engineering education, The Journal of Systems and Software 63(3), pp. 161-171.*
17. *Hazzan, O. and Dubinsky, Y. (2006). Empower gender diversity with agile software development, The Encyclopedia of Gender and Information Technology, pp. 249-256.*
18. *Hazzan, O. and Dubinsky, Y. (in press, 2008). Agile Software Engineering, Undergraduate Topics in Computer Science' (UTiCS) Series, Springer.*
19. *Highsmith, J. (2002). Agile Software developments Ecosystems. Addison-Wesley.*
20. *Kjeldsen, J. and Nielsen, K. (2000). Women Entrepreneurs Now and in the Future, The Danish Agency for Trade and Industry, http://www.efs.dk/publikationer/rapporter/women_entrepreneurs/index eng.html.*
21. *Kuhn, S. (1998). The software design studio: An exploration, IEEE software 15(2), pp.65-71.*
22. *Margolis, J., and Fisher, A. (2002). Unlocking the Clubhouse – Women in Computing. MIT press.*
23. *Peters, H. (2003). Risk, Rescue and Righteousness: How Women Prevent Themselves From Breaking Through the Glass Ceiling. Hagberg Consulting Group.*
24. *Thomas, D. (2004). Diversity as Strategy, Harvard Business Review, pp. 98-108. http://www.gpworldwide.com/quick/sep2004/art2.asp*
25. *Tomayko, J. E. (1996). Carnegie-Mellon's software development Studio: A five-year retrospective, SEI Conference on Software Engineering Education.*
26. *Tomayko, J. and Hazzan, O. (2004). Human Aspects of Software Engineering. Charles River Media.*
27. *Vinnicombe, S. and Singh, V. (2002). Sex role stereotyping and requisites of successful top managers, Women in Management Review 17(3/4), 120-130.*

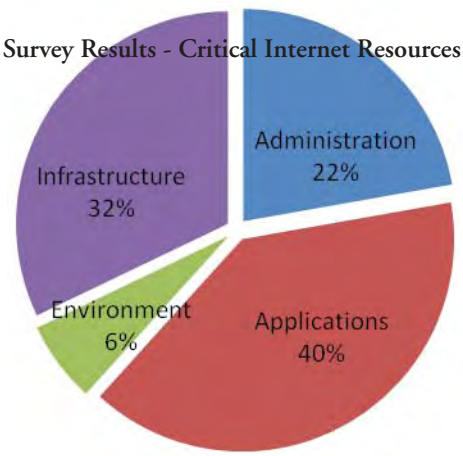
Part III: Internet Governance Issues – Critical Internet Resources

Critical is defined as "of essential importance, indispensible". In the context of the Internet, it is difficult to define what is indispensible. Imagine losing your phone. Or imagine your computer crashing. You could replace your SIM, handset or computer within days if not hours. In this situation, what is the most critical resource for you? For most people, it will be the data.

Water, power, road and cyber networks can all be classified as critical infrastructures. The Internet, however, is structurally and operationally quite different from the other three. It is a vast body encompassing stakeholders from all sectors: the public, industry and business, academia, governments and civil society. The underlying skeleton of this body lies in the hands of a multifarious amalgam of stakeholders. Each stakeholder contributes to building the skeleton in the form of physical infrastructure, i.e. cables, optical fibres, satellite, routers and other hardware. This includes filling out the flesh on the skeleton in the form of content and applications to facilitate communication, commerce and networking. Each aspect is as critical as the other and at the same time as varied.

What is critical?

The criticality of the resources is different for different users. In a survey conducted by Paul Wilson, Director General of Asia Pacific Network Information Centre (APNIC), the users were asked to name the resources they felt was most critical for the Internet. The spread shows that most users term applications such as Email, WWW, Search, Communications and Commerce as critical resources of the Internet. It is closely followed by Infrastructure such as Connectivity, Devices, Internet Exchange Points, Routing and Ubiquity. The administration of the Internet which includes resources such as DNS, IP Addresses and Standards is cited by 22 per cent of the users surveyed as a critical resource. Only 6 per cent cite environmental features, such as availability of electricity, as a critical resource for the Internet.



Source: *Paul Wilson, quoted from CircleID, http://www.circleid.com/posts/critical_internet_resources/*

Widely accepted critical elements required to keep the Internet running are IP addresses, the Domain Name System (DNS), sufficient bandwidth and security against Denial of Service (DoS) attacks. Most of these terms are rather technical and they may not seem critical by the common users as is evident from the smaller section of the pie chart above. However, the fact is that a seemingly unrelated event such as Pakistan blocking YouTube may block a user's access to YouTube in Europe, Southeast Asia or anywhere else in the world!

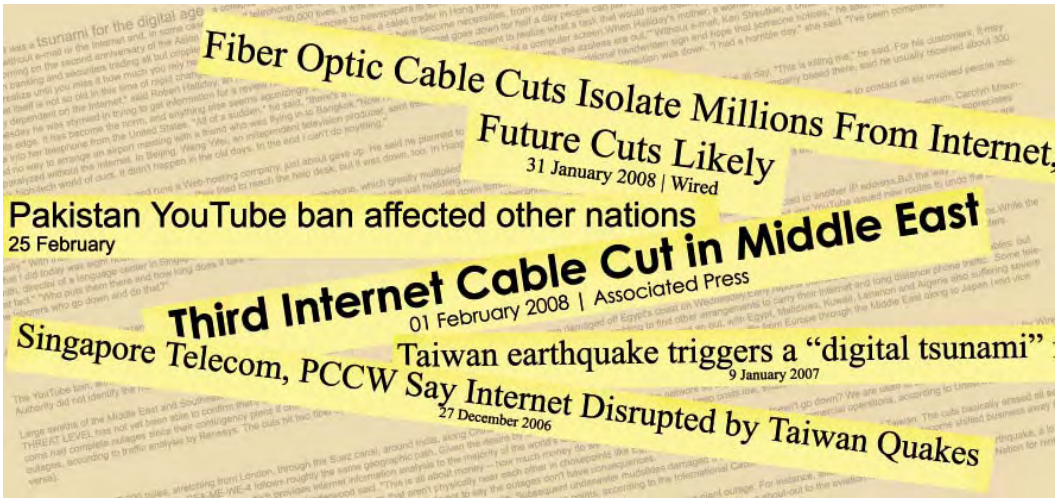
News stories like those above are not uncommon. Disruption due to natural or man-made cause can result in downtime for the entire globe. Quoting Eric J. Sinrod, an attorney from the United States of America, "*Problems in Cyberspace can Cause Real World Hurt*"[i]. For example the Taiwan earthquake in 2006 knocked out the Internet services in Phillipines, Singapore and Malaysia. These countries rely heavily on the Internet for day-to-day commerce, defense systems, medical systems, government transactions etc. "You don't realize until you miss it how heavily you rely on technology," said Andrew Clarke, a sales trader in Hong Kong. "Stuff you took for granted has been taken away..."

How do we secure Critical Internet Resources?

The Internet is a global entity. The management, security and administration of the various critical resources lie with multiple stakeholders. Root servers and policies in Internet issues are managed at a global cooperation level, the allocation of IP addresses are done by regional agencies; such as Asia Pacific Network Information Centre (APNIC) and the DNS is managed by ICANN broadly.

Rajesh Aggarwal, Additional CEO of NIXI, highlights a few issues related to India's IT policies and its capacity to ensure security of critical Internet resources. He says, "India has a light regulatory framework, with independent Telecom Regulatory Authority of India (TRAI) and positive court rulings, which has resulted in a vibrant telecom

sector. Prices are market driven and competitive when compared with global scenario". "However," he also points out, "as compared to the developed countries the broadband availability in India is still largely limited to a 256k connection, whereas for the developed world, 1-2MB lines are becoming commonplace. Though the market is fairly competitive we still have a long way to go to create systems to ward off massive DoS attacks".



Early this year, India faced a communications crisis which had a similar outage of Internet services as a DoS attack would. Due to the severance of multiple communication cables which connect India to the world, there was a 60 per cent cut in the Internet services. This is a very unusual situation where accidents have actually caused large-scale outage. However, a situation such as this is a good touchstone of the security of critical Internet resources of a country.

There are two factors which can contribute to such a major outage. The first is that since most Internet Service Providers (ISPs) get their bandwidth from only one of the seven operational cables, if the cable is down, it will completely shut down that ISP. A simple solution to this, as suggested by S N Gupta, telecom expert and currently Chief Regulatory and Government Affairs, India and SAARC, BT Global Services could be that each ISP hedges its connectivity by dividing its bandwidth amongst multiple cables. This ensures that the ISP remains operational even if there is an outage on one of its lines.

The second factor is that most of our communication is routed through international channels since website hosting is still very expensive in India, and most of the popular websites are hosted abroad. This further implies that a breakdown in international Internet communication, such as in case of an earthquake or accidents, effectively shuts down communication within the country as well. One part of the solution is that Government has to come up with plans to promote content hosting within India. Another part is ensuring that traffic emanating from India and destined within India must remain within India. This issue is being addressed by NIXI. Their objective is that all ISPs of the country should join NIXI exchange points at various locations and declare their regional routes to them. Therefore, all data whose origin and destination are within India are routed within the country itself and not through international servers.

Write to us and contribute to the upcoming articles

- **August** – Cybercrime
- **September** – Privacy & Data Protection
- **October** – IPv4 vs IPv6

Write to us at *response@i4donline.net*

IP Addresses and Domain Name Systems

From homing pigeons to emails, everyone needs an address to identify the destination of a piece of communication. IP addresses are the Internet equivalent of the same. Domain Name Systems (DNS) are the descriptive names that are assigned to IP addresses. The Internet could not have been as ubiquitous as it is today if it hadn't been for the DNS. Think of the number of phone numbers you remember and compare it to the number of people whose numbers are stored on your phone. Therefore, losing your phone will also mean losing the contact numbers. The DNS gets past this dependence on a single storage point to remember hundreds of numbers by associating a descriptive name such as www.google.com to them. This domain name will be recognised on any machine anywhere in the world as long as it has Internet connectivity.

The IP addresses are obviously the backbone of the Internet but like the city of New Delhi, the Internet is also running out of new addresses for the next billion who want to occupy this space. The present system is a 32-bit number called Internet Protocol version 4 (IPv4). However, these addresses are running out. At present, it is said that 75 per cent of all the addresses (approximately 4.5 billion) have already been allocated. The Internet is growing at an exponential rate. In India alone, we are looking at an expansion of another 20 million broadband connections. This spells a scarcity of IP address in the near future. The solution to this issue is being presented in the form of 128-bit addresses termed as IP version 6 or IPv6. Writing for Technology Review in 2004, Simson Garfinkel wrote that there will exist "roughly 5,000 addresses for every square micrometer of the Earth's surface"[ii]. This enormous magnitude of available IP addresses will be sufficiently large for the indefinite future, even though mobile phones, cars and all types of personal devices are coming to rely on the Internet for everyday purposes.

These issues among many others need to be discussed on a multiparty forum. On the 29th of July 2008, we are going to hold such as forum at the eINDIA2008 event at Pragati Maidan, New Delhi. We invite you all lend your voices.

References

http://www.mondaq.com/article.asp?articleid=62212
http://www.technologyreview.com/Infotech/13426/?a=f

For eINDIA2008 participation contact Sulakshana Bhattacharya at sulakshana@eindia.net.in

ICT enabled services - will women benefit?

Debra Howcroft
Manchester Business School
The University of Manchester, UK
debra.howcroft@mbs.ac.uk

Helen Richardson
Salford Business School
The University of Salford, UK
H.Richardson@salford.ac.uk

Introduction

According to the International Labour Organisation (ILO), women's participation in labour markets has increased considerably along with the expansion of service sector work. Expectations suggest that gender equality beckons with labour market trends linked to a common rhetorical theme that indicates ICTs are driving work transformations with women being the likely benefactors. This is coupled with the offshoring of ICT-enabled service work, which some view as being key to promoting development. Investment in ICTs is often touted as an instrument for bridging the gap between developed and developing countries and accelerating economic growth, yet these assumed gains - for both women and men - are dubious at best.

The opportunity to participate in the labour market has been positive for some women, yet a gender division of labour exists across the world and gender wage differentials prevail. Studies show that sex segmentation is endemic, with women often concentrated in industries where profit margins are protected by shrinking labour costs or extending working hours. Trends fail to indicate that the position for women workers is one of 'equalising up', while conditions for men are deteriorating ('equalising down'). This article, discusses working conditions within the ICT-enabled service sector and suggest that a degree of caution is required before assuming a reduction of gender inequalities.

Feminisation of labour

The feminisation of labour has seen an influx of women workers into the service sector; these trends are most marked in countries where women's participation in agriculture is low. For women moving into ICT-enabled service work, such as financial and IT services, they have displaced men in areas once considered to be well-paid and highly skilled. Labour markets are based on assumptions that women are secondary earners, and so women are concentrated in occupations of low pay, with gender pay gaps, and few opportunities for advancement.

Some argue that ICT-enabled service work has the potential to reduce gender inequities and provide economic autonomy for women workers. These opportunities arise in a number of ways. Firstly, the huge influx of women into the workforce provides a degree of financial independence from husbands and male relatives. Secondly, ICTs remove time and location constraints traditionally associated with the workplace, thus allowing women to combine paid work with caring responsibilities. Thirdly, proponents of the information age, predict the rise of flatter organisational structures, thus allowing for greater female representation in management positions.

This view of ICT-enabled change suggests that new technologies create new societies and assumes that unidirectional trends are taking place. Assumptions persist about opportunities for women in the labour market that are divorced from their socio-cultural experience. The impact of technologies on work is complex and uncertain and should not be treated as an independent given; it depends on the labour market, the industrial relations system, and the education system as such.

As illustration, the authors discuss two different economic profiles within the ICT-enabled service sector. The first example concerns IT-Enabled Services (ITES). This encompasses the outsourcing of call centre work, which has received a considerable amount of media attention as firms offshore voice work to cheaper overseas locations; it also refers to shared service centres, which emerged as back-office administrative jobs consolidated and moved offshore. The second illustration concerns the ICT industry, a sector that has enjoyed rapid expansion, particularly in economies such as India, where the software export market has made a substantial economic contribution.

> ICT enabled services work has much to offer especially to women who are poor and under privileged

IT-Enabled Services (ITES)

Many call centre jobs are outsourced offshore to locations such as India, the Philippines, China and Eastern Europe. The offshoring of call centre work and its potential to provide white-collar work for women workers may appear beneficial; yet, on closer inspection, it appears that benefits for women are questionable. According to the Global Call Centre Report relating experiences across 17 countries, international subcontractors are disproportionately located in India, South Africa, Canada and Brazil. These

subcontractors typically provide less training and pay lower wages and employees have lower levels of job discretion, more intense monitoring and weaker collective representation.

Within the workplace, technology is used to automate work with many of the calls being low-level transactional enquiries, which are fairly repetitive, with short cycle times (between 30 and 180 seconds). This intense activity of call handling for overseas customers occurs during shifts of between 8-10 hours duration, six days a week (Taylor and Bain 2005).

The combination of front-office (voice) work carried out mainly at night and back-office work later during the day enables firms to operate around the clock in offshored locations. For Indian workers one of the consequences of the 24-hour day is that they completely reverse their working lives to night time, leading a 'double life' and facing a number of tensions including health ailments and a separation from their family and the household. Yet the future growth of call centre workers in India will primarily be based on an increase of female employees (as NASSCOM and other reports suggest), despite working structures operating against those with familial responsibilities. Much of the 'front-line work' is seen as particularly well suited to women as managers and classify their social and emotional skills as non-threatening and trustworthy. These skills often go unrecognised and unacknowledged.

IT Enabled Services (ITES) and Business Process Outsourcing (BPO) also include Shared Service Centres (SSCs), a fast growing international business sector..SSCs are an interesting example of the reorganisation of IT-enabled organisations, clustered in particular locales. They exemplify a reorientation within organisations from 'jobs' to ''tasks' where similar activities are identified, lifted from their locations and brought together in centres dedicated to certain roles. This trajectory of change sees the simplification of work, through its standardisation, centralisation and then outsourcing and offshoring. Each move is associated with new forms of organising and reduced cost.

SSCs emerged providing a wide range of generally high-skilled back-office support functions, such as HR, IT or finance. As the service sector generally offers higher wages and greater job security than the agricultural sector, trends such as the offshoring of shared service centres could potentially provide high-skilled, flexible, well paid jobs for women workers, yet these highly gendered environments fail to operationalise policies and practices that support women at work. Their concern with 'transformation', which is geared towards cost-saving efficiencies, ongoing relocation, and standardisation of skills, offers limited opportunities for career development for women.

Within the service industry, particularly banking, finance, and insurance, the ILO (International Labour Organisation) has shown that women are predominantly based at the lower paid and less skilled employment levels, with few occupying positions in management.

Employers prefer young, single women, with a good education and rapidly shifting technologies tend to see the remuneration of young new hires rather than experienced workers. Underlining the assembly-line nature of the work, employers require flexible working, which frequently prevents women with families from taking jobs during off-peak hours.

The IT/ICT sector

In the IT/ICT sector, which is a fairly new, women constitute only 25 percent of global workforce (Ahuja 2002). Though much has been written about the so-called 'IT revolution', yet, despite the scale and potential of this sector, gender relations have been largely ignored in studies of offshore software development. Much of the labour process is highly labour-intensive and is seen to breed a 'masculine culture' as technical skill is intimately entwined with masculinity. In a study of workplace practices in global software organisations in Mumbai, Marissa D'Mello[i] describes how employees are required to work for long hours to accommodate different time zones and frequently operate in crisis mode with tight project deadlines. The mobile nature of these occupations works to women's disadvantage as they are faced with long hours of work, expectations of overseas travel and participation in informal social networks. Although it has been argued that the IT industry offers a less discriminatory environment nevertheless, the social construction of gender identity is heavily implicated in technology work. These sites are far from a 'level playing field', embodying stereotyped gender norms. Studies show that while men are concentrated in the more prestigious export software firms, appointed to analytical and managerial positions, women are found in domestic low -end and IT- enabled services, suggesting a clear gender differential in this sector.

Conclusion

One needs to be cautious while drawing positive conclusions about the employment opportunities provided by ICT-enabled service work and the prospects of advancement for women in developing economies. Labour market issues in the global economy cannot conveniently be 'black boxed' with the formal economy being divorced from the prevalent and expanding informal economy, where many women workers are concentrated. While numerous studies highlight the prevalence of informal work in manufacturing and within certain domains of service work, there have been virtually no studies - aside from anecdotal evidence - on the informalisation of ICT-enabled service work. Yet moves over the next few years towards the use of 'home agents' implies that this area of employment is potentially highly vulnerable to informalisation through global service chains. Far from re-shaping women's lives and creating new opportunities, ICT-enabled service work offers limited benefit to women, especially the poor. However, transformation is possible and examples of collective organising (such as UNITES) could provide workers with a voice that highlights the reality of their working lives, enabling women workers to connect with international systems of solidarity and fight for change. ■

References and Footnote:

(i) Ahuja, M. (2002) Women in the information technology profession: a literature review, synthesis and research agenda, European Journal of Information Systems 11: 20-34.

(ii) Gillard H, Howcroft D, Mitev N and Richardson H (2008) Missing women: gender, ICTs and the shaping of the global economy, Information Technology for Development

(iii) Howcroft D and Richardson H (2008)Gender matters in the global outsourcing of service work, New Technology, Work and Employment, 23:1-2

(iv) Taylor P and Bain P (2005) "India calling to the faraway towns": the call centre labour process and globalisation, Work, Employment and Society, 19:2, 261-282.

[i] D'Mello, M. (2006) Gendered Selves and Identities of Information Technology Professionals in Global Software Organizations in India, Information Technology for Development, 10.1002: 1-28.

APC WNSP, MEXICO

Using ICTs: The non-violent way

ICT-enabled tools and services offer new terrain for acts of violence against women and for women's rights advocacy

Erika Smith
Communications Coordinator,
Association for Progressive Communications Women's Networking Support Programme, Mexico
erika@apcwomen.org

He is leaning on a railing, looking cool and passing time. A girl walks by and he quickly follows her up the escalator. He then casually places his foot near hers on the same step. Only the observant can see a mobile phone strapped to his foot. The camera function does his 'peeping' for him, recording the underside of her skirt. But wait, the tables (and camera) are turned. The girl realises his trick and chases him down the escalator, with her friend capturing his act and face on her camera. His 'secret' act turned public as he is shamed and chased in front of the entire subway population.

This short video was created by members of Filmmakers Anonymous in Malaysia[i] in support of the Take Back the Tech campaign to end violence against women using Information and Communication Technologies (ICTs). It's a precise and clear demonstration of how new technologies can be used to create digital spaces where women become vulnerable to violence and other criminal acts of offence. Importantly, the incident cited above also manifests how women can apply technology to fight for their own rights.

ICT misuse

New tools such as mobile phones featuring audio and image recording are becoming increasingly cheaper and more important as a communication platform. Coupled with Internet connectivity, these tools permit an explicitly fast sharing of women's images – quite often without their knowledge or approval.

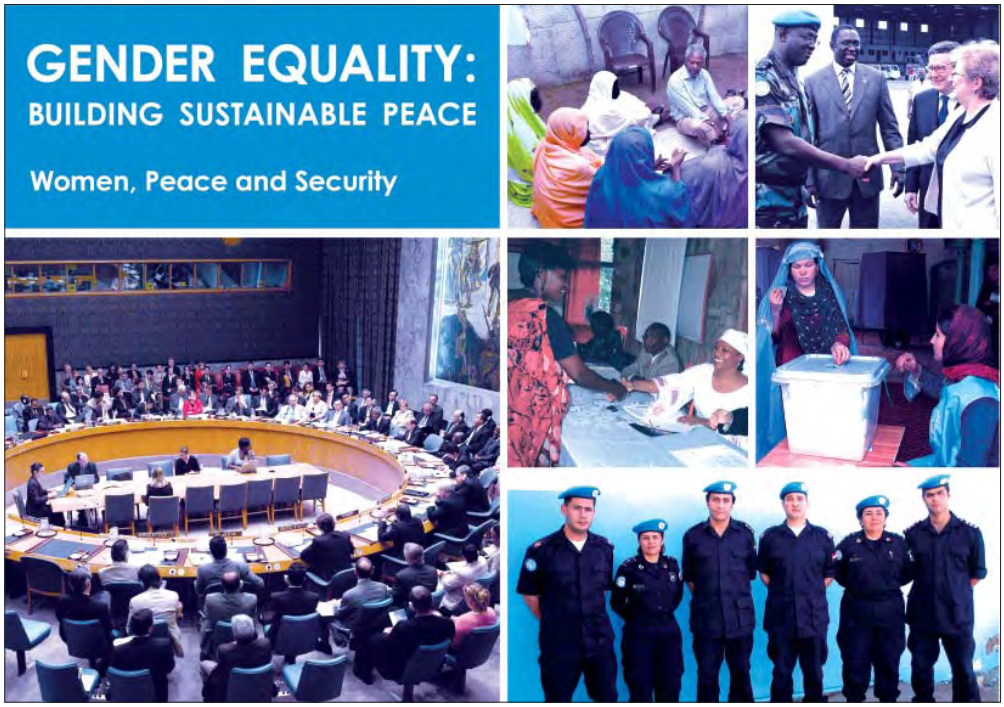
This raises serious implications on the question of privacy and personal data. For example, a woman in Pakistan reported receiving 30-40 odd calls per day on her mobile phone from strangers soliciting dates and a relationship. Worryingly, these callers appeared to know what she looked like.[ii]. Upon investigation, she discovered that her mobile phone credit reseller was selling not credit reloads, but telephone numbers and personal descriptions of their female customers as a lucrative form of side business. In another case, a woman in the Philippines sent her computer off for repair and suddenly photos from her hard drive started appearing on the Internet.

Web cameras, global positioning systems and spyware allow domestic violence abusers to track not only their partner's activity on the computer and in the home, but monitor their mobility as well. During an awareness-raising session on violence against women that Azur Development held in Brazzaville, Congo, women questioned whether instances of violence against women are only taking place where everyone is connected to the Internet. Immediately the group had examples of how the mobile phone had become a point of contention for many women in the Congo. Women had suffered abuse at the hands of their spouses for having received calls from men, or for putting a password on their phone.

Take Back The Tech

Violence against women is rooted in unequal power relations between men and women in almost all aspects of life. Concerned about the interconnections between ICTs and violence against women, the Association for Progressive Communications Women's Networking Support Programme (APC WNSP – *www.apcwomen.org*) launched Take Back the Tech! (*www.takebackthetech.net*), a yearly campaign, in 2006. This global, collaborative campaign accompanies the 16 Days of Activism against Gender-Based Violence November 25 through

December 10th every year. For each of the sixteen days of the campaign, ordinary ICT users are encouraged to take a new look at the tools they use from the perspective of women's rights. For example, Day 15 last year focused on 'Secure Online Communications: Your Right to Privacy' and encouraged users to be conscious about where images we record with cell phones, web cams or digital cameras, will end up; question how much personal information we are asked to surrender in different web services; learn how to eliminate spyware and erase our tracks when using a computer. The campaign motivates women and girls to explore applications and tools and use them for the fight to end violence against women – online and off. Campaigners charted survivor hotlines and resistance strategies in online maps; imagined their dream tool to aid in the fight against violence; shared digital post cards and pooled online resources including videos and photos using social bookmarking tools and the common tag, 'takebackthetech'.



Ease of publication and the increased normalisation of Internet in our lives has meant that digital spaces are where people go to get informed and to have discussions, especially given the restrictive nature of many traditional broadcast media. Take Back the Tech suggests how we can use the digital spaces we occupy to raise awareness about violence against women – from something as simple as changing our eMail signature or online messenger status to opening debate in blogs and chat rooms.

The campaign's collaborative open source site and adaptable imagery with a license to share facilitated take up in distant corners of the world, with translations of Take Back the Tech material in more than a dozen languages last year, including Khmer, Portuguese, Bengali and French.

Local campaigners adapted Take Back the Tech to address their specific concerns around violence against women. The global website became an important space for collecting local actions, aggregating blogs in a variety of languages, and pointing to campaign sites that sprang up in Brazil, Cambodia, Mexico, Canada and the UK. The Cambodian site[iii], translated in Khmer, highlighted women's NGO's activities and published media reporting on violence against women. In the UK[iv], local campaigners featured a different women's organisation every day, accompanied by an ICT tool highlight.

In Brazil, developing the campaign site was a good excuse to deepen technical skills and research, as campaigners from G2G comment: "It was a great opportunity to learn more about content management systems – the G2G Drupal site and Wordpress blog. We chose Wordpress after quite a bit of research, in particular because it is free software. We also bought a domain specifically for the Brazilian campaign which was exciting and also meant learning more about servers"[v]

Wougnet in Uganda partnered with WomensNet in South Africa in an SMS campaign 'Stand out, Speak out' across Africa, and blogged all the messages from 170 participants in 13 countries on the Take Back the Tech! campaign site[vi]. Silence Speaks in the US shared their existing digital stories on violence against women. Gender and ICT activists in Mexico, Brazil and Uruguay took advantage of the campaign to offer trainings to women's organisations on new ICT tools for advocacy.

Creating politically relevant digital spaces

As campaign organiser, Jac sm Kee, observes, Take Back the Tech! is about looking at digital spaces as politically relevant and setting aside sixteen days to take simple, creative yet concrete actions to address violence against women. In the process, knowledge is built, familiarisation with technology is instilled and importantly, an attitude about women's relationship with technology is changed.

Of course, such an enthusiastic response to the campaign is due to women's rights activists strong commitment to fight against violence against women, it's unfortunate pervasiveness in all facets of life, and how we can and must use all means available to ensure women's right to live in a world free of violence. ■

References:

i http://filmmakersanonymous.blogspot.com/2007/12/fa5-review-take-back-tech.html
ii http://www.pakspectator.com/mobile-numbers-of-girls-for-sale/
iii http://women.open.org.kh
iv http://www.takebackthetech.org.uk/.
v http://www.retomeatecnologia.info
vi http://www.takebackthetech.net/blogathon/wougnet See the Take Back the Tech campaign site for links to all local campaigns, blogs, and digital stories, etc.: www.takebackthetech.net

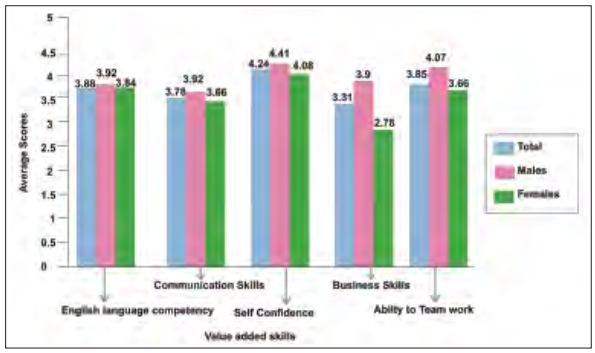
Value added IT skills

Introduction

The Information Technology (IT) industry emphasises intellectual rather than physical resources and is an equal opportunity employer for men and women. The work participation rate for women is 24 percent and 69 percent in IT and Information Technology Enabled Services (ITES) industry respectively (NASSCOM, 2006). These figures are higher than the national average of 25.7 percent for the total work force and 10.8 percent for the tertiary sector. Thus, computer related jobs hold more promise for females as compared to other kinds of work. Given that this industry is expected to emerge as one of the largest employers in the country creating 2.2 million jobs by 2008, it holds tremendous potential as a gender equaliser and as a means for bringing economically marginalised groups, such as Muslims, into the mainstream. ITES are major contributors to this figure and are expected to provide employment to more than one million by 2008. Unlike the jobs in IT that require sophisticated training, jobs in the ITES sector need elementary level of technical skills. However, these have to be supplemented with soft skills like communication skills which are traditionally associated with femininity and hence provide women an edge (Das, 2005).

Working in the IT and ITES is lucrative for marginalised sections like Muslims mainly due to high salaries that provide opportunities to leapfrog the socio-economic barriers. According to the 10th annual salary survey conducted in India by Hewitt Associates in 2006, the IT and ITES sectors (16.5 and 16.1 percent respectively) noted a higher salary growth than the national average of 13.8 percent (CIOL, 2006). Given the marginal representation of Muslims in government services, the young members are turning to the private sector (Sachar Committee Report, 2006). However, whether they are able to participate actively in the IT and ITES sectors depend on their capacities in technical and soft skills. In light of the above, this paper presents findings on gender differences in value-added skills-English language competency, communications skills, self-confidence, business skills and ability for team work -among Muslim boys and girls.

Figure 1: Average scores on value added skills for males and Females



Value-added skills and ITES

Though there are no academic studies on value-added skills, popular literature has highlighted its role in securing jobs in the ITES. Private training institutes have realised the importance of combination of technical and value-added skills. The researcher's survey (April to December 2004) of advertisements of a premier computer training institute in the Times of India and newspaper reports indicates that along with technical skills, certain soft skills are essential. The focus is on the personality gains following from computer education for both males and females. However, there is no systematic study of how the two sexes evaluate themselves on the value-added added skill set. These include English language competency, communication skills, self confidence and ability to work in a team. The list is based on the demands of customer care services that the Business Process Outsourcing (BPO) units like call centres offer. As majority of their clients are located in the West, the demand for fluency in English language is apparent. Socio-economic class influences individual's language competency. Being poor and less educated, Indian Muslim families cannot provide an appropriate environment to acquire English language skills.

> Technical skills need to be supplemented with soft skills such as English language competency and communication skills for jobs in IT and ITES sectors

With regard to self-confidence, females could be disadvantaged as they have an inadequate sense of personal competence; while males tend to rate themselves higher in estimating their abilities. Evidence for this comes from research in self-efficacy beliefs, wherein it is found that performance of girls is comparable to those of boys in varied academic tasks; but the girls often report lower self-efficacy (Pajares & Johnson, 1996). Thanks to their biological roles and socialisation experiences, women are likely to possess higher levels of communication skills and ability for team work.

Besides the above mentioned set of value-added skills, if a person seeks to apply their computer skills for expanding family

enterprise or set up one of their own, business skills are required. The Internet can aid business by providing relevant links to develop partnerships and information about financing, mentoring and business coaching. Self-employment offers real advantages for women since it allows them to work from home, offers flexible work schedule, and is compatible with their reproductive roles. Therefore, an effective way to improve women's position is to improve the returns to self-employment. Hence, women need to be groomed in business skills along with technical skills (Goyal, 2007). The social cues and the media highlight the relevance of value-added skills not only for economic benefits, but also psychological, social and educational gains. In light of the above, the present study seeks to explore gender differences in value-added skills.

Sample, tools and procedure

Participants of the study (N = 155; 82 females, 73 males) had completed a one year diploma course in Computer Applications and Multilingual Desktop Publishing offered under the National Council for the Promotion of Urdu Language (NCPUL) scheme of Ministry of Human Resource Development (HRD)[1]. The NCPUL approved centres offer highly subsidised packages with the facility of paying the fees in installments, if they complete their Urdu certificate course. This has attracted well versed in Urdu, but economically poor Muslim youth to take advantage of the computer courses. The average age of the sample was 21.34 years (males = 20.46 years; females = 22.31 years) and their educational level varied from higher secondary (45.93 per cent) to undergraduates (22.67 per cent) and college graduates (31.40 per cent). Majority of the subjects (69.77 per cent) studied in Urdu medium schools, while less than one-third (26.74 per cent) had English as the medium of instruction. 80 per cent of the participants belonged to low income group (monthly family income of less than rupees 10,000/-) and 20 per cent came from middle income group (monthly family income Rupees 10,000 – 15,000/-). Data was collected in groups of 10-15, from three NCPUL computer training centers in Mumbai using self-appraisal technique. Subjects were asked to rate the extent to which they possess each of the value-added added skill on a 5-point rating scale ranging from 1= not at all, to 5= very much. In addition, they answered a questionnaire that covered information on their demographic characteristics.

Findings and discussion

Males (mean = 20.23, SD = 3.45) reported significantly higher scores on the value-added skill set as compared to females (mean = 18.02, SD = 3.72; $t = 3.81$, $df = 153$, $p<0.01$). Though there was no significant difference between the two sexes on each of the value-added skill, the trend in all cases was in favour of males over females (Figure 1).

English language competency and communication skills are part of the soft skills that are much in demand in the ITES sector. Boys are better than girls in English language competency and communication skills partly because higher number of boys studied in English medium schools and partly due to their wider social circle. While more than one-third of the boys (38.57 percent) studied in English medium of instruction, less than one-fourth (24.51 percent) got an opportunity to do so. It is likely that higher levels of English language skills are associated with communication skills, giving males an edge over females. Personal interaction of the researcher with the subjects indicated that both the groups possessed average level of spoken English language competency. However, a higher number of males attempted to speak in English, even though they struggled to achieve fluency. Though it could have been an attempt to impress the female researcher, it is likely that males because of higher interactions outside family and wider friend circle have more opportunities for improving their English language skills. This is echoed in the analysis of computer advertisements in the Indian newspapers that illustrate higher male bonding but no group female bonding around a computer (Ghadially and Ranganathan, 2006).

Given that majority of the subjects (69.77 percent) studied in Urdu medium, acquiring English language competency is an added challenge. The Sachar Committee Report (2006) indicated that Muslim families are keen on educating their children. However, they are constrained by high cost of education particularly in private English medium schools. In addition, not being conversant with English language themselves, there is little confidence in being able to guide their children in academics as they enter middle school and beyond. Thus, young Muslim men and women continue to be disadvantaged in English competency and consequently, communication skills. This is an issue of concern, as these soft skills are imperative to find jobs in the IT and ITES sector. It is particularly disheartening for Muslim women, as this is one sector that is more accommodating of their gender roles. Research indicates that call centres are staffed largely by women (Mitter, 2004). However, Muslim females may remain outside this service sector unless efforts are made to improve their English language and communication skills. One such initiative is in places in the city of Hyderabad, wherein a local Urdu newspaper editor led initiative trains Muslim girls in English language and communication skills so that they can acquire jobs in call centres (Wajihuddin, 2006).

In addition to English language competency and communication skills, participants of the study rated their self-confidence and ability to work in a team. In line with the above trend, males reported higher self-confidence than females. This could be because males rate themselves higher in estimating their abilities; while females have an inadequate sense of personal competence (Pajares and Johnson, 1996). It is likely that higher interaction outside the family, wider circle of friends and peer bonding among males gives them advantage in team work. On the other hand, interaction of Muslim girls is restricted to their kith and kin that may themselves possess limited skills in this regard. Besides, girls may be unable to connect team work in the family with team work at the work place. Hence, they rate themselves poorly on these skills. However, there is evidence to suggest that the friendship circle of young Muslim women is gradually expanding which may go a long way in enhancing their value-added skills (Ghadially, 2003).

Business skills was included in the set of value-added skills in order to gauge the extent to which subjects are equipped to engage in tele-work or set up computer–related entrepreneurial venture. This is particularly relevant in case of young Muslims as

a majority of urban Muslims of western India are petty traders and young members are likely to join the family business (Hasan and Menon, 2004). It was found that males reported higher business skills as compared to females. This is not surprising as entrepreneurship is associated with masculinity (Liber 2007). Males are socialised to participate in the family business. Due to greater mobility they are more likely to get involved in the family business and in the process pick up skills of the trade. Females, on the other hand, are primarily the care givers of the household and shoulder the responsibility for domestic chores. As in the case of Indian women of other communities, Muslim women too get involved in the family owned business enterprise only circumstantially; if all the male members are busy or there is no male heir (Harris-White, 2002). Females, given their traditional role, are more likely to engage in home-based work (Ghadially, 1996). This is in concordance with socio-cultural ethos of Muslim families. If they can use their computer skills for tele-work, it will enable them to find a place for their skills in the IT-based market. For instance, in Indian metros as Mumbai, data entry jobs are increasingly outsourced at piece rates and are available to individuals with basic computer knowledge and a home computer. If the technical skills are supplemented with business skills, it will enable the young women to benefit from the opportunities provided in the present day information economy. As it is many Muslim mothers aspire that their girls pursue computer related work. Thus, computer based work can replace the traditional sewing machine as a means of income generation (Ghadially, 1996). However, low levels of value-added skills amongst girls imply that they have a distance to cover before they can enjoy the fruits of information based economy.

Conclusion and policy suggestions

The role of soft skills in empowering socio-economically marginal groups such as Muslims and women to access jobs in the ITES and IT sectors cannot be overstated. However, young Muslim women compared to their male counterparts remain disadvantaged on this score. The reasons for this as cited in the literature are many and complex. Initiatives to boost soft skills and greater involvement of women in family business can go a long way in easing women's entry into one of the most modern and promising sectors of the Indian economy. To counteract their marginalisation the following are some policy suggestions- While efforts for widened ICT access are essential, equally imperative is training in value-added skills for active participation in the information revolution. Government sponsored computer training centers such as the NCPUL (National Council for Promotion of Urdu Language) need to diversify their roles and provide training in soft skills in tune with market demands. This will not only enhance their employability but also facilitate intangible personal and social gains. Governments can provide subsidies to such training along with computer education programmes to boost such efforts. Civil society bodies and community based organisation can also take an initiative in training the youth in value-added skills. Given the potential of IT and ITES for setting up an enterprise and pursuing home-based work, it is imperative that business skills are addressed in these training programmes. Such efforts need to be particularly addressed to the Muslim women as they are more disadvantaged than their male counterparts. There is evidence to show that women are keen on imparting training to others once they acquire a particular skill (Hafkin, 2002). In order to harness this at the end of training, a group can be selected to mentor future beneficiaries. Besides, trained women can serve as trend setters and peer leaders and provide local role models to the Muslim girls.

Familial support is the crucial factor for participation of Muslim women in the training programme. The IT and ITES are still western for many Muslim families. Families impose reservations on girls and early aged women who pursue jobs in business process outsourcing units like call centres. Hence, awareness programmes can be conducted in local languages about the work culture and job demands in order to strengthen the familial support for the women. NCPUL computer centres have secured the trust of Muslim families as they are located in the vicinity of Muslim mohollas (ethnic enclaves). If they can create awareness about jobs in the IT and ITES along with field visits at such workplaces, it will help to overcome the misconceptions that many Muslim families hold. Community-based organisations as well as civil society bodies can conduct such programmes alongwith business skills workshops tailored according to the local contexts. ■

Footnote and references:

[i] For a detailed description of the scheme, refer Rehana Ghadially and Farida Umrani (2004) IT Education: Initiatives among Mumbai Muslims", i4d (Information for Development), February.

1 *CIOL (2006). IT and ITeS salaries to grow at 16% and 15.4% in 2006. Retrieved from: http://www.ciol.com/content/news/2006/106020804.asp on 30.06.2008*

2 *Das, P. (2005). It's times for success. Education Times, Times of India, 10th February, 15.*

3 *Ghadially, R. (1996). On their own initiative: Changing lives of Bohra Muslim women*

4 *Ghadially, R. (2003). Women's friendship. In S. Joseph, A. Najmabadi, J. Peteet, J. Siapno & J.Smith (Eds.). Encyclopedia of women and Islamic cultures (EWIC) (pp. 194- 195), Netherlands: Leiden.*

5 *Ghadially, R., & Ranganathan, S. (2006). Gendering computer marketing: A study of print media advertisements in India. Asian Women, 22 (1), 69-96.*

6 *Goyal, A. (2007). ICTs and the technological U-turn for women. In R. Ghadially (Ed.) Urban Women in Contemporary India: A Reader (pp. 255 – 269). New Delhi: Sage Publications.*

7 *Hafkin, N (2002). Are ICTs gender neutral? A gendered analysis of six case-studies of multidonor ICT projects. Background paper to UN/INSTRAW virtual seminar series on gender and ICTs, 1-12 July. Retrieved on September 9, 2006, from: http://www.unsinraw.org/en/docs/gender_and_ict/Hafkin.pdf.*

8 *Harriss-White, B. (2002). India working: Essays on society and economy. Cambridge: Cambridge University Press.*

9 *Hasan, Z. & Menon, R. (2004). Unequal citizens: A study of Muslim women in India. Oxford University press, New Delhi.*

10 *Liber, H. A. (2007). The Scientific Reproduction of Gender Inequality. A Discourse Analysis of Research Texts on Women's Entrepreneurship. Copanhagen business school press.*

11 *Mitter, S. (2004). Globalization, ICTs and economic empowerment: A feminist critique. Gender Technology and Development 8 (1), 5–29.*

12 *Pajares, F., & Johnson, M. J. (1996). Self-efficacy beliefs and the writing performance of entering high school students. Psychology in the Schools, 33, 163–175.*

13 *Sachar Committee Report (2006). Social, economic and educational status of the Muslim community of India. Prime Minister's high level committee, Government of India.*

14 *Wajihuddin, M. (2006). Voice behind the veil. Times of India, January 22, pg 31*

Farida Umrani
Post Doctoral Fellow,
Dept. of Computer Science and Engineering
IIT, Bombay, India
farida@iitb.ac.in

Rehana Ghadially
Professor of Psychology,
Dept. of Humanities and Social Science
IIT, Bombay, India
ghadially2003@yahoo.co.in

Does a telecentre empower women?

Telecentres can empower women in developing countries if we design them to meet their needs and reduce the barrier for women to access telecentres

Satoko Nadamoto
PhD Candidate
Gender Institute,
London School of Economics and Political Science,
United Kingdom
snadamoto@aol.com

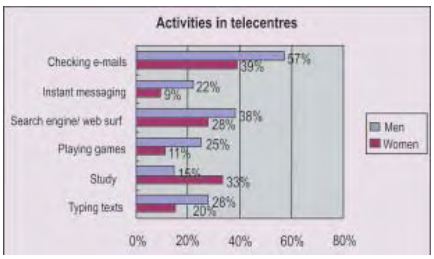
Some perspectives

Since the international community recognised ICTs as important tools for development in the late 1990s, a number of telecentres have been established in developing countries. But does a telecentre empower women in a developing country? Although telecentres are available, they might not be available to serve women and men equally. Although women could access the information at a telecentre, they might not do so much to improve the situation of themselves and their families. There is a view that telecentres do not always benefit women and the advancement of their life in developing countries. However, many scholars on gender and Information and Communication Technologies (ICTs) are skeptical about telecentre's impact on women and argue that telecentres in developing countries are not particularly effective in helping women to gain access to better economic, educational and other opportunities because of high access costs and other factors such as social and religious barriers and skepticism regarding ICTs (Gurumurthy, 2004; Huyer & Mitter, 2003). In order to examine whether a telecentre can empower women in a developing country, the author conducted a field study in five telecentres in Jamaica in 2006. The results of the study infer the potential of women's empowerment at telecentres by showing the different ways of using telecentres between Jamaican women and men and the significant role of computer training to empower women in telecentres in Jamaica.

Gender difference in the use of telecentres

In Jamaica, women and men use telecentres differently in terms of purpose and frequency. The result of the survey in five telecentres shows that the first three purposes of women for visiting telecentres are 1) checking e-Mails, 2) study and 3) web surfing. The first three purposes of men's visit are 1) checking e-mails, 2) web surfing and 3) typing text. Only 15 percent of the male respondents stated that they use telecentre for study whilst 33 percent of women do so. 25 percent of men visit telecentres for playing games, whilst only 11 percent of women do so. Thus, men tend to use telecentres for entertainment whilst women use them for learning activities in Jamaica.

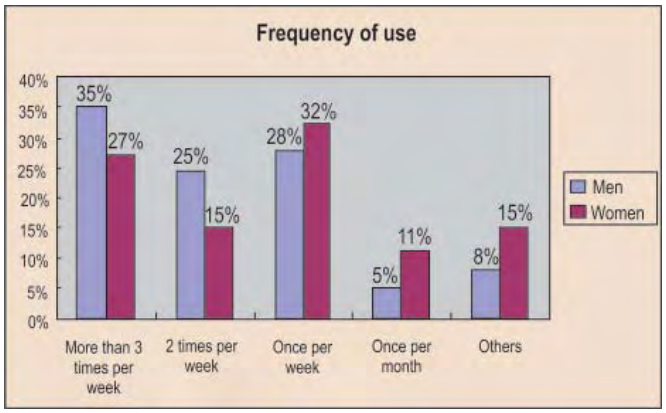
Chart 1: *Activities in telecentres*



(2006, N=122)

Another finding of the study is that men visit telecentres more frequently than women in Jamaica. The survey result in five telecentres indicates that 35 percent of men visit telecentres more than three times per week whilst 27 percent of women do so. On the other hand, 11 percent of women visit telecentres once per month whilst 5 percent of men do so. Thus, Jamaican men seem to have more time to visit telecentres than Jamaican women. Whilst 46 percent of the female users identify time as a factor to prevent them from visiting telecentres, 42 percent of them suggest money as a factor to affect the frequency of their visits in telecentres. In this way, Jamaican women and men use telecentres differently whilst they have different restrictions for using them.

Chart 2: *Frequency of use of a telecentre in Jamaica*

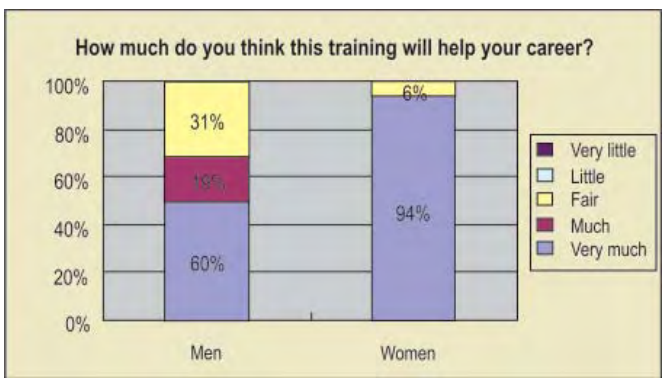


(2006, N=114)

Measuring women empowerment

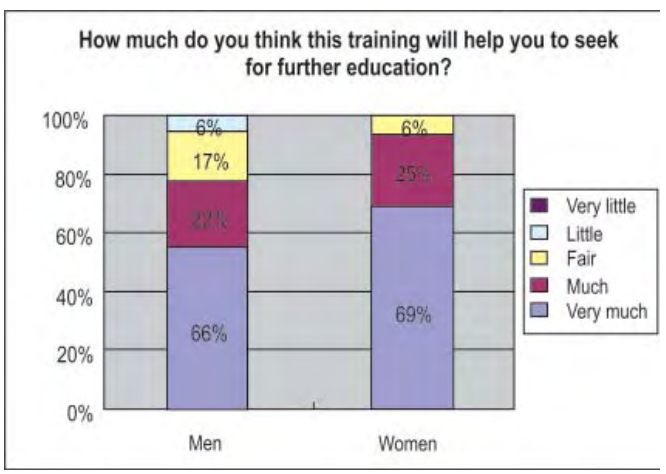
Whilst it is difficult to measure women's empowerment in telecentres, some evidences show women can be empowered through training in telecentres in Jamaica. Survey results suggest that many Jamaican women than men think that computer training at a telecentre will help their career and education. 94 percent of female trainees at Jamaican telecentres think that computer training will help their career very much, whilst only 50 percent of male trainees think so (Chart 3). Similarly, 69 percent of female trainees think that computer training will help them further their education whilst 56 percent of male trainees think so (Chart 4). Thus, Jamaican women have more expectation toward the benefits of computer training than Jamaican men. The same phenomenon is also observed by the fact that more women than men participated in computer trainings provided by UNDP and Microsoft in telecentres in Jamaica in 2005 (Table 1).

Chart 3: *Computer training and career*



(2006, N=33)

Chart 4: *Computer training and education,*



(2006, N=35)

Table I: *Number of male and female participants of trainings in four telecentres in Jamaica in 2005*

	Men	Women	Total
Liguanea Cybercentre	30	40	70
International School of Jamaica	19	24	43
Bluefields Peoples' Community Association	26	57	83
The Caribbean Coastal Area Management Foundation	4	10	14
Total	79	131	210

(*Annual Report of UNDP/Microsoft ICT Training for Disadvantaged Youth, UNDP Jamaica, 2006*)

Jamaican women's experience of empowerment in telecentres

The sign of women's empowerment in telecentres in Jamaica was also identified in the findings from focus group interviews.. For example, an 18 year-old Jamaican woman taking computer training course at the International School of Jamaica (ISJ) stated, "I would like to use them (ICTs) to the best (availability) in school and at work to uplift my knowledge and workplace capabilities." Similarly, another 18-year female trainee at the ISJ said, "I would like to be able to work in a large business using different types of technologies including computers." Several Jamaican women showed their desire for further study with computers at the University or at the Institute of Technology in Jamaica. A 25 year-old Jamaican woman asserted, "I plan to go further into more computer studies to know every aspects of computer and to get a job that involves the computer."

In addition to their eagerness to apply computer skills in their study and work, the author found that Jamaican women have strong desire to help other people with their new computer skills acquired through telecentres. For example, a 20 year-old female trainee at ISJ avouched, "I would like to help others who are in the position I was in." Similarly, another 25-year old Jamaican woman from ISJ stated, "I would like to use it (a computer) on my job and to help my son and my other family members who have no computer skills."

Results of the case study revealed that a number of Jamaican women want to use their computer skills not only for the purpose

Girls studying at Liguanea cybercentre (Nadamoto, 2006)

of enhancing their education and work, but also for helping their children, family and others.

On the basis of the respondents' feedback, it was found that Jamaican men preferred to use their computer skills for themselves such as for their work and hobbies. A 19 year-old male affirmed, "I would like to use the skills to do graphic design." I would like to further my computer skills." Another 20 year-old male said that he uses telecentre to develop web pages. According to a 40 year-old male, a telecentre is a facility for him to make music and music videos also to do flyers, business cards and movie making etc. A 34-year old male maintained that he uses telecentres to do presentation at work and for future use in soccer coaching. Thus, Jamaican men's attitudes toward computer skills are different from those of Jamaican women.

Conclusion

Whilst Jamaican women and men use telecentres differently, it is important to lessen the barrier for women to use telecentres by reducing access fees and building telecentres in convenient and safer locations. It can be argued that telecentres have their limitations in regard to women's empowerment; the findings of the study in Jamaica show that women can be empowered through telecentres provided the telecentres are designed and implemented to meet particular needs of women. However, poor and old women are still excluded from telecentres whilst many middle-class women have access to telecentres.

Although several telecentres offer free computer training courses for women in Jamaica, there are not yet many inexpensive advanced computer training courses for those who have completed a basic computer course.

Moreover, there are yet few job opportunities for women who have completed a computer training course in Jamaica. Hence, it is necessary to design telecentres to meet the needs of women from all classes, provide a series of computer trainings to empower women for a long term, and connect women to the job markets for their economic empowerment. ■

References:

1. *Gurumurthy, A. (2003). Bridging the Digital Divide: Issues and Insights on ICT for Women's Economic Empowerment: UNIFEM*
2. *Huyer, S., & Mitter, S. (2003). ICTs, Globalization and Poverty Reduction: Gender Dimensions of the Knowledge Society. from http://gab.wigsat.org/partI.pdf, http://gab.wigsat.org/partII.pdf, and http://gab.wigsat.org/partIII.pdf*
3. *UNDP Jamaica (2006). Annual Report of UNDP/Microsoft ICT Training for Disadvantaged Youth*

[i]N stands for 'no of respondents'

Raising awareness to opt for IT jobs among females

With more job opportunities coming in IT related field in US, educators are working strenuously to bridge the digital divide that exists between the male and female employers. According to The National Centre for Women and Information Technology (*www.ncwit.org*) report "although more than 50 percent of high school advanced placement(AP) test takers are female, girls make up only 15 percent of those who take the AP computer science test. What's more, women fill only 26 percent of IT-related professional positions".

To keep the interest of girl students alive educators were asked to work in this direction to change the attitude and develop strategies to sustain the interest of girls in computer science and related careers. 'Tech gURLs: Closing the Technological Gender Gap' is a unique article by Sarah Ringer that is strongly advocating for the issue on consolidating the voice and work of the like minded organisations, programmes, services and e Books for the cause. Some of the organisations are IGNITE (*www.ignite-us.org*), Roosevelt High School's Autism Programme (rhs.seattleschools.org/autism_program/index.html), TechREACH (*www.pugetsoundcenter.org/techREACH*), Centre for Gender Equity (*www.josanders.com/genderequity.html*), Teen Girls and Technology:What's the Problem, What's the Solution? (*store.tcpress.com/0807748757.shtml*), Tomorrow's Women In Science and Technology or TWIST (*activities.tjhsst.edu/twist/*) etc.

Source: *http://www.edutopia.org/computer-science-technology-gender-gap*

HP initiatives: A personal perspective

Barbara Waugh
Director , Office of Open Innovation
Hewlett-Packard Laboratories
barbara.waugh@hp.com

Introduction

Since our founding over 60 years ago, Hewlett-Packard (HP) has invested in development for the communities in which we operate. Now, as the biggest IT company in the world, we invest in 173 countries, with programmes in every region that benefit women. We invest not only to be a good neighbour, but to thrive in business. Ensuring the full participation of women in Information and Communication Technology (ICT), we increase the talent from which we recruit, the researchers with whom we innovate, and the markets into which we sell. For many in the private and other sectors, investment in women has added to an historical ethical commitment a survival imperative.

HP's commitment to women and technology

Increasingly, governments, NGOs, educational institutions and businesses understand that by working together our investments in gender equity can accomplish more than if we work alone, or confine ourselves to partnerships within our sector. The intent of this article is twofold: first, to share with business colleagues, not yet engaged in gender equity in ICT, business benefits HP realises by our investment, limiting the focus to just one of our many partnerships: that with the International Task Force on Women and ICT (ITF). Second: to encourage those outside the private sector to consider that neither our own or any other large company is monolithic and impregnable, but instead consists of individuals that welcome engagement, that work and live in our communities, and who may personally share values and even life experiences that align with your own. For more information about HP social investments, many of which benefit girls and women in the areas of education and entrepreneurship, one may refer to *http://www.hp.com/hpinfo/grants/*.

Rather than reiterate publicly available information about our investments, I will instead provide a personal perspective on HP's investment in ICT for Development of Women through the International Task Force on Women and ICT (ITF).

The journey across

I am an activist. For 15 years prior to joining HP, I worked in the Peace, Civil Rights and Women's movements, including several non-profit organisations. From tear gas during Vietnam War protests, to death threats for our Freedom Schools in the early Civil Rights Movement, to voodoo dolls luridly full of pins, and kidnapping threats for writing the first feminist newspaper column in the US, to co-directing the women's center for nine theological schools, and teaching my way through two Masters degrees and a doctorate, I came to know the joys and challenges of activism in the civic, academic, and non-profit sectors. I joined HP 25 years ago with the goal of figuring out how to get more money for non-profits out of corporations. I planned to stay two or three years. I'm still here because with many colleagues, I continue to discover ways for the company to do well by doing good. I am convinced that profitable business models to end poverty represent a critical and underdeveloped strategy both for profit-making businesses and for the poor.

> HP has been instrumental in investing in businesses that promote

Creating a gender megacommunity: the business way

In early 2005, I received a call from Claudia Morell, then the Executive Director of the Center for Women and IT at the University of Maryland Baltimore County, inviting HP to attend and sponsor her center's first international conference a few months later. As I had already invested my budget in other programmes, and could find no takers in other functions, I had to decline. Claudia also made additional calls within HP and soon came back to me. Our printer business had agreed to sponsor the conference out of its marketing function, but had no one who could attend.

She had already told them of my wish to come, and they'd immediately agreed. I give this example because it's the kind of thing I did not understand when I was in the non-profit world: that a US $100 billion company might have more than one function or person or region who could say Yes!, and also to highlight the role those outside the company often play in connecting those on the inside.

The Baltimore conference was exhilarating and productive on every level. Claudia and her team had designed for action, decisions and outcomes, and invited women from NGOs, multi-laterals, government, academia and the private sector. We had all been at this work for 2-5 decades and none of us had time to waste.

Our first decision was unanimous: to organise, scale up and leverage our individual efforts through a multi-stakeholder global network to create measurable progress on the MDGs by 2010. Veteran researchers Nancy Hafkin and Sophia Huyer fueled this decision with research that would soon be published in their book, Cinderella or Cyberella, immediately selected as a Harvard book-of-the-month.

Our second decision was to create a portal organising all our programmes and resources, parametrically searchable by country, region, language, level of intervention, funding source, sector, etc. Our Microsoft colleague designed the information architecture, and, taxonomy, and mere weeks after the conference, Claudia applied for and received a grant from the US National Science Foundation to create the portal.

Our third decision was to become the International Task Force on Women and ICT (hereafter ITF), to meet monthly by phone to ensure synergy between our efforts, forge strategies for measurable impact, and plan for a second meeting in Paris in a year to go to the next level, to be defined. Monthly meetings in this first and in subsequent years produced many connections for all of us. For HP in the first year alone came

- an HP sponsored and ITF co-led pre-conference workshop at WSIS in Tunis, of NGOs laying out the educational and employment issues for women and ICT, and publication and brand value through a chapter presenters collectively wrote in Past, Present and Future of Research in the Information Society (Springer, 2007),
- a workshop on women and ICT at the World Computer Congress in Chile, keynoted by the HP HR senior vice-president and serving as a recruitment opportunity for the company,
- the opportunity to co-sponsor with UNESCO and the World Federation of Engineering Organisations (WFEO) in Tunis an international conference of 300, 'Engendering ICT'; featuring the top HP woman leader in the region, discussions between two NGOs and our local office, and the opportunity to recruit women,
- inspiration for launching Engineering Africa!, an HP program to build engineering education in the region, launched in Nigeria, site of a big HP market on the continent,
- the emergence of a new model for the ITF and HP social investment in Africa, Latin America, and elsewhere: 'megacommunity', and national and international recognition for HP, when the originator of the model, Booz Allen Hamilton published my work in an executive leadership reader, an online article at: *http://www.strategy-business.com/li/leadingideas/li00050?gko=66c0c* and in Megacommunities: How Leaders of Government, Business and Non-Profits Can Tackle Today's Global Challenges Together (Palgrave Macmillan, 2008)

Engendering IT

For women and ICT (which by the ITF definition includes engineering), the WFEO conference resulted in a resolution introduced to and accepted by the WFEO executive committee to engender this organisation. Engendering would begin by adding a standing committee on women to engender the other all-male standing committees, and continue by building relationships and strategies to engender each of 92 countries' engineering societies.

In November 2006, HP and UNESCO co-sponsored our second ITF meeting in Paris, and four of our teams, including our VP of University Relations attended the conference. One of my colleagues confided that he'd never before understood the depth and variety of issues in gender equity for ICT, and these insights inform his role in HP strategy and innovation to this day.

This conference resulted in several major outcomes for women:

- An invitation and resolution to engender the UNGAID sponsored Global Knowledge Partnership conference in Kuala Lumpur in 2007, and there have our next annual meeting,
- And by our annual meeting to have developed a proposal for ratification, to systematically ensure global gender equity in ICT

We engendered the GKP in Kuala Lumpur not by showing up en masse: we could not afford that kind of travel. Instead, from all over the world we collaborated with the GKP Secretariat to tweak the rules for workshops. To be accepted, every workshop would address gender equity, and have at least 1/3 women on the panel. To assist workshop leaders, we quickly developed a database of over 100 experts from around the world, organised by the thematic tracks of the conference.

In conjunction with the GKP, we held our 3rd annual meeting, and adopted a proposal to establish 10 regional women's centers over the next three years around the world and raise US$ 10 million to do it. Uniform baselines would be established in each country where a center was located, so that a global picture could emerge and progress be measured. This strategy could enable critical progress on the MDGs. .

Business – NGO partnership: An example of a global imperative for impact

Data have only recently been sex-disaggregated, and now we see comparisons from country to country of apples, giraffes and volcanoes, since no uniform taxonomy prevails. Each center will build on an existing successful center in the region, and be resourced to provide local and national services, conduct research on outcomes of services, function as resources in the region, and be networked to each other and through a global hub. Fully developed, a center will provide services and measure impact of programmes most needed in the country for education, workforce development, entrepreneurship and leadership. The toolkit across all centers will include strategies and skill building for policy and action, research and impact metrics, dissemination and communication, resource and service development, and context and culture.

We ambitiously resolved to establish 3 centers in the first year. However, momentum has built so quickly that in the first year we may instead establish 5, beginning with the European Center for Women and ICT, and in short order, with centers in

Breaking down traditional barriers

Claudia Morrell
Guest Editor, i4d July 2008 and Secretariat Chair, International Taskforce on Women and ICTs, cmorrell@mdwit.org

Notes from the Guest Editor

Since 2005, I have been 'on the road' traveling to every part of the world and talking with women about their experiences. I have been privileged to see and hear about new ideas and programmes that have emerged thanks to the new technologies. I have also heard about the ways technology is used as a weapon against women in frightening and horrifying ways. Through the years what has resonated with me is that no matter where you are in the world, women's needs, experiences, and issues of importance are the same. What varies is the degree. This became truly clear to me in two meetings that stand out in my mind. The first was in Kuwait, where I was privileged to be selected as a delegate of the US State Department. In the meetings we talked at length about programmes, challenges, and opportunities, but in the breaks and lunches we talked about our sons and daughters, the best way to remove stains, and laughed about silly anecdotes that we shared about our husbands. It made no difference that some women were in head scarves or other attire, men everywhere leave their socks on the ground. It may seem trivial, but at a profound level it speaks to our daily lives and experiences, which are uniquely different but also hold some important shared elements that allow us to reach across the oceans and between the changing landscapes to understand our mutual goals and hopes for the future.

A second meeting I found to be profound was one I attended in India at the kind invitation of Anita Gurumurthy, Executive Director, IT for Change, an India-based NGO fighting for the upliftment for the grassroots. In that meeting, I learned so much from the women from the developing regions. I learned more about what I don't know than what I do. Clearly, we, as North American women, need to spend more time at the feet of women in India, not only learning from them, but also washing those feet to honour their hard work and struggle, often without recognition or support.

One area of shared knowledge that did come from that meeting was a recognition of the different relationships we have with our business community. For me, business women have always been partners in my projects helping me to change business thinking from the inside, as well as the outside. We have had some small victories, but there is a lot of work to be done. But one of my challenges has also been to convey to the world that women in business are first women working to support themselves and their families and often subject to harsh or unfriendly conditions within the workplace. They need the support of their sisters in the Civil Society and NGO community.

Then together, they can help us channel the funding and influence needed to both support women and their families and communities from the business community and help us change business practices to be more friendly and supportive of our issues and concerns. With approximately 50 percent of women in the middle management in many developed parts of the world, it is only a matter of time before women move into more leadership roles. I have learned so much from the women of the world, and I have only one lifetime to learn more. I suggest that to the extent we can learn from and be open to others ideas, wherever they are and whatever they do, we will all be stronger and our lives richer. ■

---

the Middle East, Africa, Oceania/Australasia Region, and Latin America. Discussions have already begun on the remaining centers in Africa, 2 more in addition to the first, and in India, East Asia and in North America.

Our 4th annual meeting will be in New York in December' 08, hosted by the UN Global Alliance for ICT for Development at the United Nations, to celebrate the signing of MOUs and the commitment of funders to celebrate the first 5 centers.

At the (new) regional levels and soon global level, the ITF continues to develop and implement bold plans, enabled by the vision, skill, commitment and resources of women and men in our multi-stakeholder network. We continue to add visionary leaders and organisations from every sector to our growing megacommunity.

We appreciate enormously the opportunity to focus one issue of i4d on women, and HP very much appreciates this opportunity to share a bit about one of our many investments in ICT for development. As HP has learned, the world rewards those who help solve the world's problems. Overcoming the barriers to women's full participation in the knowledge economy is a big problem, with potentially infinite rewards for us all.

Enabling a more sustainable gender environment

On a final note, until six months ago I was the director for gender equity, Africa and the Middle East in HP's University Relations programme, working to build engineering education in my focus areas. Six months ago University Relations was absorbed into HP Labs *http://www.hpl.hp.com/* to become the Office of Open Innovation: *http://www.hpl.hp.com/open_innovation/irp/.*

I now work to establish research relationships for HP Labs research in these focus areas. The ITF continues to be a rich context supporting my work and my vision, providing contacts, thought partners and inspiration in my new role. Through this network, and more systematically through the new regional centres, I can recruit women researchers from around the world for joint research to invent services and solutions uniquely suited to local needs as women define them for their regions, their countries and their lives. And as they do, they will build new products and markets for HP and a better shared world for us all. ■

To join or learn more about the ITF :
http://www.mdwit.org/init_international_itf.html.

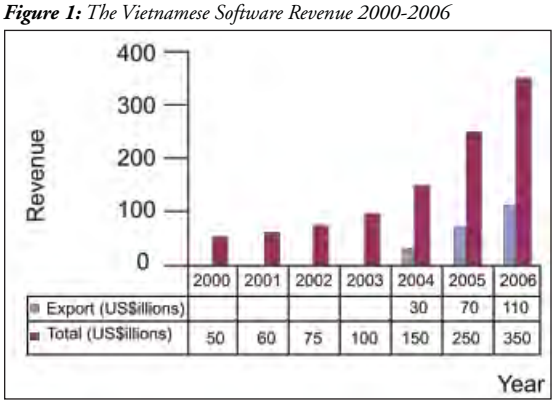
What does the future hold for women?

Research suggests that despite a booming software industry in Vietnam, only a few women are found in the valued areas of employment

Le Anh Pham Lobb
Research Scholar
Research School of Social Sciences
The Australian National University
ibninternational@gmail.com

International studies show that women's representation in IT and software work is strong where the poorest employment conditions are to be found, whilst men have dominated in the more valued areas of employment, such as technical management; system analysis and programming (Wajcman 1991; Webster 1996; Gaio 1995; Mitter and Cecilia Ng 2005). Some recent research into the future of women in computing in Britain suggested that women's position in computing is not likely to be improved as some optimists have anticipated (Woodfield 2000). Despite these stark findings, there have been some inspiring views that opportunities for women in the field of computing will increase, in terms of both recruitment and promotion. This article that tries to explore the possible future of women in Vietnam's software industry is a compilation of data (collected during a research study).

Figure 1: *The Vietnamese Software Revenue 2000-2006*



Source: *Nguyen Trong Duong; 2004, 2007*

The Vietnamese software industry

Vietnamese software industry is a new-comer in the global software industry. Most of the software firms, which are members of the Vietnamese Software Association, were only established in the early 1990s. The young Vietnamese software industry has experienced rapid growth, averaging more than 40 per cent per year during the past five years (Figure 1). By 2007, there were more than 750 software firms with 35,000 software workers. The government of Vietnam aims for the establishment of a private software sector with a strong emphasis on the export market.

The research experience

In 2004, the author carried out an extensive and systematic research on the software workforce in Vietnam. The research work covered 26 randomly selected software firms located in Hanoi and Ho Chi Minh City and attracting 1056 software workers, among which 787 were men and 269 were women. The research study tried to know the perceptions of software workers' (inclusive of all forms of gender) about women and their involvement in software work. Data were collected via both questionnaire surveys and in-depth interviews.

This paper has the data collected from questionnaires. Data collected during the course of the research study suggest that Vietnamese women have not had the same access to the young and rapidly growing software industry. In fact, women's participation in the industry is low and concentrated in testing[i] (quality assurance) activities, the task that is considered low skilled because it is seen as a woman's task. Women are discouraged from obtaining training, and are differentiated in terms of technical skills; and there are various challenges for women's advancement

in software work (Pham Lobb, 2006; Wajcman and Pham Lobb 2007).

Does software work suit women or men better?

In a questionnaire survey, respondents were asked 'In your opinion, is software programming more suitable for men or women?' Three choices of answer were provided including (a) more suitable for women; (b) more suitable for men; and (c) no difference for women and men. The respondents were asked to select only one of these choices.

The responses suggest that only a very small proportion of men and women thought that software programming is more suitable for women; by contrast a large proportion of both women and men thought that software programming is more suitable for men (Table 1). More women than men considered that software work made no difference for women and men (Table 1).

Table 1: Is software programming more suitable for men or women?

Software workers' opinion	Men (%)	Women (%)
More suitable for women	1.5	2.6
More suitable for men	63.2	50.6
No difference	35.3	46.8
Total (n)	**787**	**269**

Source: *Software Work and Career Survey 2004*

Will women have a future in the software industry?

Participants in the questionnaire survey were asked several questions to try to gain an understanding of the software workers' views about the future of women in software work. The first question was 'The view has been expressed that the software industry will mainly involve women in the future. Do you agree with this statement?' Five choices of answer scaled from strongly agree to strongly disagree were provided and respondents were asked to select only one of these choices. About 67 per cent of men and 55 per cent of women disagreed with the statement that occupations in the software industry would mainly involve women in the future; another 18 per cent of men and 7 per cent of women strongly disagreed with the statement (Table 2). The proportion of women who agreed with the statement was significantly higher than that of men (10 per cent and 3 per cent respectively).

Table 2: Software workers' opinion about the statement "software occupation will mainly involve women in the future"

Software workers' opinion	Men (%)	Women (%)
Strongly agree	1.1	1.1
Agree	3.3	9.7
Undecided	10.7	27.5
Disagree	67.2	54.6
Strongly disagree	17.7	7.1
Total (n)	**787**	**269**

Source: *Software Work and Career Survey 2004*

The second question was 'Are women the wrong gender for IT?' Five choices of answer scaled from strongly agree to strongly disagree were provided, and respondents were asked to select only one of these choices. Since a high proportion of both men and women did not agree that software work would be mainly for women in the future, one would expect that a high proportion of men and women would agree or strongly agree with this question. In contrary, 60 per cent of men and 65 per cent of women disagreed; another 9 per cent of men and 13 per cent of women strongly disagreed (Table 3). It is interesting to note that about 18 per cent of women software workers agreed and strongly agreed that women were the wrong gender for IT (Table 3). Cross table data shows that these women were spread across different age groups including 25-29; 30-34 and 35-39; they were holding different positions including testers, software developers; software designers and team leader; most of them were married and had children.

Table 3: Software workers' responses to the question "Are women the wrong gender for IT?"

Software workers' responses	Men (%)	Women (%)
Strongly disagree	8.5	13.0
Disagree	59.7	65.4
Undecided	11.3	10.4
Agree	18.0	8.2
Strongly agree	1.0	10.0
Total (n)	**787**	**269**

Source: *Software Work and Career Survey 2004*

So what is it about women that makes their participation in the software industry at a lower level than men? This question was asked with five choices of answer including (a) women's skills are not recognised; (b) a 'Glass Ceiling'; (c) women's lack of information; (d) women are not given the right tasks in which to excel and (e) women compromise their work for family. A five-point scale starting from strongly agree to strongly disagree was provided for each answer option and respondents were asked to respond to every option. Men software workers' responses are summarised in Table 4 and women's software workers' responses are summarised in Table 5.

The majority of men software workers agreed that compromising work in favour of family was the main reason that made women's participation in the software industry at a lower level than men; about 34 per cent of men agreed that it was because women were not given the right task in which to excel (Table 4).

Table 4: Men software workers' opinion about the reasons that make women's participation in software industry at a lower level than men

Men's opinion	Skills are not recognised	Glass ceiling	Lack of information	Not right tasks	Compromise for family
Strongly disagree	6.4	3.2	5.0	2.9	1.3
Disagree	48.3	49.7	60.2	42.3	8.1
Undecided	18.0	17.3	23.1	19.9	9.4
Agree	26.3	29.1	11.4	33.8	67.6
Strongly disagree	1.0	0.8	0.3	1.0	13.6
Total (n)	**787**	**787**	**787**	**787**	**787**

Source: *Software Work and Career Survey 2004*

A large proportion of women software workers agreed that women's participation in the software industry at lower levels than for men was because of four reasons including: women's skills are not recognised; 'glass ceiling'; women were not given the right tasks and women compromising for family (Table 5).

Table 5: Women's opinion about the reasons that make women's participation in software industry at a lower level than men

Women's opinion	Skills are not recognised	Glass ceiling	Lack of information	Not right tasks	Compromise for family
Strongly disagree	5.9	3.7	7.4	1.1	3.0
Disagree	24.2	21.9	55.8	26.8	13.0
Undecided	17.5	13.4	20.8	13.8	5.2
Agree	44.2	54.3	14.9	55.8	65.1
Strongly agree	8.2	6.7	1.1	2.6	13.8
Total (n)	**269**	**269**	**269**	**269**	**269**

Source: *Software Work and Career Survey 2004*

Conclusion

The findings of the research affirm that Vietnamese software workers in general do not perceive that software work will be mainly a woman's domain in the future. There would not be much change to women's position in the software industry unless there is radical change in software workers' perception about women and software work. Men in general named 'compromising for family' as the reason leading to women's low participation in the software industry. Besides compromising for family, women recognised that lack of skills recognitions; the existence of a 'glass ceiling' and a lack of suitable tasks all contributed to their lower participation in the software industry. ■

References:

[1]It is necessary to mention that in Vietnam software workers doing testing jobs were entitled either 'Tester' or 'Quality Assurance' workers. The first title seems to be more popular in companies located in Hanoi or state-owned companies while the second title seems to be more popular in 100 per cent foreign own companies. Software experts agree that the jobs are the same but the 'Quality Assurance' title is much more prestigious than 'Tester.' Similarly, what is referred to as 'testing' in Vietnam is more often called 'quality assurance' in international manufacturing enterprises, including those manufacturing software.

i Gaio, J. F. (1995). Women in Software Programming: the experience of Brazil. Women Encounter Technology: changing patterns of employment in the third work. S. M. a. S. Rowbotham. London, Routledge.

ii Mitter and Cecilia Ng (2005). Gender and the Digital Economy: Perspective from the Developing World. London: Sage

iii Nguyen Trong Duong (2004). Software Industry Development in Vietnam. Open Source Software Conference, May 2004. Hawaii.

iv Nguyen Trong Duong (2007). Vietnamese Software Industry. Hoc Chi Minh City. Vietnam

v Pham Lobb, Le (2006). Gender and Software Work in Vietnam. Presentation to the World Bank. http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTGENDER/0,,contentMDK:20207786~pagePK:210058~piPK:210062~theSitePK:336868,00.html

vi Wajcman, J (1991). Feminism Confronts Technology. North Sydney : Allen And Unwin

vii Wajcman, J and Pham Lobb, L (2007). The Gender Relations of Software Work in Vietnam. Gender, Technology and Development. UK: Sage

viii Webster, J (1996). Shaping women's work : gender, employment, and information technology. London ; New York : Longman

ix Woodfield, R (2000). Women Work and Computing. UK: Cambridge University

ISIS initiatives

ISIS, Manila, Philippines, is one of the premier NGOs working to create scientific spaces for women and buttress capacity-building among women. ISIS International launched a three-year and five-country exclusive research project named People's Communications for Development (PC4D) to explore the operational effectiveness of ICT tools in extending information and accessibility to grassroots women and to gauge the relationship between communication tools and empowerment within the lives of grassroots women in the developing South. The project embodies a three-year research study involving the participation of non-government organisations and grassroots women in Fiji, India, Papua New Guinea, Thailand, and the Philippines. The research study was executed in collaboration with four partner organisations: Aalochana Centre for Documentation and Research on Women in Pune, India; the Civil Media Development Institute (CMDI) in Bangkok, Thailand; FemLINK Pacific in Suva, Fiji; and HELP Resources Inc. in Wewak, Papua New Guinea and supported by International Development Research Centre (IDRC). The research study questioned the effectiveness of ICT-enabled framework in providing better modes of accessibility to grassroots women. Evidence from the research study shows that grassroots women in all the five countries viz. Fiji, India, Papua New Guinea, Thailand, and the Philippines, still prefer traditional communication tools like radio, television etc. to the new tools of communication and information interchange like Internet and cell phones. ISIS is currently promoting a book and a campaign on an alternative communication model that emanated from PC4D.

Apart from focusing on PC4D project, ISIS engages in a number of activities in order to promote and foster

communication and knowledge networking among women. These are:

- Documentation of cases of atrocities against women
- Creation of a unique platform so that women can not only voice their grievances on issues relating to the violation of gender rights but also initiate debates and discussions on feminism, gender and trade
- Provision of financial support to promote gender equality and to empower women and girls with technology, information and knowledge.
- Creation of communication structures and processes to facilitate the --- of women
- Promotion of new media including the use of Internet

The ISIS website http://www.isiswomen.org/index.php?option=com_frontpage&Itemid=1 bears important news, initiatives and events circumscribing gender and ICTs.

Going beyond the supplementary roles

ICTs can create conducive and enabling environments that extend communication and accessibility infrastructure to women

Habiba Tasneem
Chief Coordinator
Institute of Hazrat Mohammad (SAW), Bangladesh
email@ihmsaw.org

Introduction

Social development at individual and collective level is fundamentally dependent on 'knowledge' through sharing of information, transfer of skills and augmentation of technology. This is also a pathway for the evolving process of globalisation. In the present context, ICT in all its various forms is playing a pivotal role in human development at community, national and international levels.

However, the pursuit of correct knowledge through ICT has become a recurring challenge towards gathering intelligence because of information overload consisting of ideas, opinions and views that may not confirm information but rather express attitudes of a few trying to influence many. Gender, especially women's, emancipation has sadly culminated to such a level. Women and their betterment require comprehensively objective analysis and understanding of history, traditions, values and cultures that contribute towards shaping their lives. Relevant issues pertaining to women and their development need to be cognizant of contextual factors like family and societal dynamics, ethnic diversity and the influences of the immediate vicinity that shape collective behaviour.

While a generic definition is needed for problem identification and cohesive action, it should not completely eliminate the bridging agent that is based on 'faith.' Erudite minds all over the world are now deliberating on the significance of faith in dealing with critical socio-economic and cultural factors relating to gender issues. Traditions and values that have mostly originated from faiths are often misinterpreted as obstacles in the way of human development. But true knowledge can recognise the potential strength of faith based traditions and expand processes that capitalise on it for diminishing gender biases. For example, human and humanity is the essence in any faith, and it is from this perspective that an individual's position is delineated within the context of family, community and nation. As such exploitation in any form has always been ostracised by different faiths and this very exponent overarches the principles of gender bias and promotes an individual's rights based status.

Any knowledge has two aspects-theoretical and empirical. Theories are static. They provide concepts but until they are applied these do not have much substance. Empirical or applied knowledge is evidence-based; thus its uniqueness emerges from acknowledging diversity, respecting individual needs and effectively extending the knowledge gathered thereof. When transferred into the various modes of ICT it becomes a resource base of vital information that has the capacity of drawing attention to concerns that impact humanity - for example gender bias.

Gender awareness via ICT

In the context of Bangladesh, ICT has played a prominent role in a succession of programmes for mass awareness. Radio and TV were the initial mode of ICT in the country that contributed immensely to behavioral change, specifically on gender based topics. We will briefly examine the progress of ICT in social development focusing on women – its current situation and future scope.

In the early fifties radio became an important tool to disseminate health-related messages specifically on family planning that targeted young married women all over the country. In essence, it was an effective tool, but when applied this media approach needed reinforcement from personal or group counseling as the cultural norm did not permit open discussions on reproductive health education. At that

point in time, rural women in Bangladesh could not sit, even with their husbands, to listen to the radio programmes. Furthermore, as the campaign focused only on married women the important young unmarried segment was left out until they were married; thus, a large number of the target audience was not appropriately reached to. Clearly, the campaign could not produce the desired result by ignoring the socio-cultural norms and practices and using the theoretical conceptualisation that was expected to generate wide-scale adherence.

Similarly, TV became and continues to be the centre for entertainment-based knowledge resource that has scope and attraction as a mass communication media. Any kind of social or behavioural change requires message reinforcement through repetition and this process was effectively used from 1979 when BRAC (Bangladesh Rural Advancement Centre) launched nationwide Oral Therapy Extension Programme. The primary target audiences of this campaign were rural and semi-urban mothers in their household position preparing and administering homemade oral rehydration. It was carried out on a one-to-one approach over a period of 10 years during which time TV played a strong supplementary role through reinforcement of the messages. The combination process reduced diarohea-related child mortality from 285 to 75 per thousand. Simultaneously, it generated concern and effort towards reducing illiteracy through non-formal primary education focusing on the girl child. Communication technology was used as an effective intermediary role; however, its immense possibilities for expansion were not optimally utilised.

A concerted and coordinated movement is needed to bring together all the players; government, NGO, private sector and the people on one platform for overall sector based advancement and growth for the country to compete for global outsourcing

Meena Communication Initiative

A more concerted and comprehensive approach was through the Meena Communication Initiative of UNICEF launched in Bangladesh in 1998. This was a culturally appropriate communication model aimed at changing the attitudes and behaviours that hinder the survival, protection and development of the girl child. This initiative is still considered a precursor to addressing larger gender biases and an endeavour that bears significant impact on processes leading to the empowerment of girls in challenging gender environments by expounding their rights to education, health services and economic emancipation for self realisation. Focusing on the fair play message, the Meena campaign, utilising print, radio and TV, became a phenomenal success and was finally incorporated in the formal and non-formal school curricula. It currently focuses on sensitive issues like HIV/AIDS. Meena generated substantial attention amongst the relevant stakeholders because of correct and timely use of ICT that is culturally appropriate.

Grameen Telecommunications

The Internet and cell phone penetration in Bangladesh happened much later and is still in a rudimentary stage in so far as access, reach and usage are concerned. The cell phone was released in 1991, but it took another five years to bring this technology to the mass usage level. Grameen Telecommunications, Bangladesh launched several initiatives that were explicitly aimed at enhancing women's income generating activities and reached beyond the traditional norms towards the optimum utilisation of the technology sector. By virtue of the pervasive cell phones, women in Bangladesh started getting wider access to markets, skills and information. Perhaps the most indomitable is the village phone service. The cell phone service is a small home-based enterprise owned and run by women. It is interesting to note that the women phone operators are generally poorer than the average villager but the income that they earn through a cell phone is significant. It can account for 30-40 percent of household income and averages $300 per year in a country where average per capita income is $286. Almost 90 percent of the operators are married and half of them have no formal education. The phones are primarily used for calls pertaining to remittances from overseas that are a major source of income amongst the poor villagers. This process has provided rural poor women with the much needed economic freedom and empowerment for decision making roles in the family and community.

Communication barriers

Internet as the most vibrant ICT mode still remains rudimentary in Bangladesh. The mushrooming small town cyber café's and community based non-profit NGO resource units are the main venues for Internet usage for young men and women in rural and semi-urban periphery. These setups provide them with access to information, networking and opportunities of learning about advances in education, law and policies. Nevertheless, notwithstanding this limitation, a significant number of female students applying for higher education within the country and overseas sourced the basic information from the Internet. One of the primary reasons behind limited access and availability is the slow and often complex IT related infrastructure development in the country creating wide scale digital divides. Additionally, there are the language, skills and price factors. Most of the information available on the Internet highway is in English and a lot of time that becomes a key challenge to the rural user. Second is the price factor. The Internet service centres charge a usage fee that is quite high. And last, but not the least, is the skills factor that limits the user's search for information. Computer skills are still not a regular

and compulsory subject in the secondary school system. Most of the users are self taught or just learn by watching and following and some through informal computer learning centres.

As such the Internet continues to remain outside the purview of the common people making it a mostly unutilised resource for social development especially on the agenda of women's emancipation. Thus, correct and updated information pertaining to general health, reproductive health and communicable diseases available on the Internet are not accessed by women. Women have little and limited knowledge on reproductive health and rights, sexually transmitted diseases and its prevention and drug use.

In Bangladesh, cell phones not only foster connectivity and access but also contribute towards income generation and value-addition. Cell phone networks and operations have the potential for an immediate remedy to efface some of the obstacles relating to ICT as learning and teaching modalities. For example, correct messages and supportive counseling through call centres especially for women, especially espoused by NGOs, do inform and empower women in certain ways.

Unfortunately, Internet and cell phone tariffs continue to remain comparatively high in Bangladesh. Although, the Bangladesh Telegraph and Telecommunication Board (BTTB) the country's only Internet band width provider, had reduced the tariff by 20 percent to 40 percent earlier in the year; yet, it is still inadequate for making Internet use affordable to the general population. There is now a proposal from the BTTB to further reduce the tariff by 30-37 percent.

Livelihood opportunities

The country's largest export-oriented industry, the readymade apparels sector, employs the highest number of female workers - women are the main workforce in the apparel industry. However, this labour force is mostly underpaid and overworked. Employers of the apparel industries gain the most by having skilled, healthy and hard working women work force while women are deprived from developing their career path in a professional manner. ICT in Bangladesh has enormous possibilities for direct intervention

to augment high-tech industries that would optimally use human resources specifically women and diminish the gender gap in all areas. Cell phone message system can provide women workers with relevant information about their rights to health, education and employment opportunities. Computer-based training at work can enhance their capacity to learn and develop more technical skills.

Conclusion

Traditional role of rural women has the potentials to be expanded within the existing habitat settings through cost effective use of ICT. This reduces the mobility barrier and promotes home based learning processes e.g. hygiene, health and income generating training and education through computer kiosks in villages. Social concerns that are now addressed by the NGOs working hands-on at the grass roots level would actually achieve quick results through greater mobilisation of ICT. To diminish gender bias and make ICT available to women, it is necessary to create a conducive and enabling environment that extends communication infrastructures to where women live and also ensures enhanced educational levels. ■

Sources:

(i) Measuring The Impact of ICT on Women In Bangladesh by Alauddin Ahmed et al, Independent University, Bangladesh

(ii) BRAC Report Health Sector Intervention

(iii) UNICEFMeena Communication Initiative Report

CIRDAP to focus on gender equality and sustainable livelihood programmes

Centre on Integrated Rural Development for Asia and Pacific (CIRDAP) conducted a three day ministerial retreat (24th- 26th June 2008) in New Delhi, India to review the firm commitment of the member countries to alleviate poverty, ensure gender equality and sustainable development of the rural poor of the region through knowledge sharing and collaboration focusing on creation of sustainable livelihoods in the rural areas. Hamid Ansari, Vice President of India inaugurated the conference and Raghuvansh Prasad Singh, the minister for Rural Development presided over the meet.

The member countries, CIRDAP shared their collective experiences and discussed on the use of Information and Communication Technology (ICT) for effective implementation of rural development programmes and promotion of gender equality and empowerment of women through these innovative programmes and discussed on steps to be taken to ensure mutual cooperation in the field of rural development and agrarian reforms in the Asia Pacific region. India's National Rural Employment Guarantee Programme and the SHG movement that has enabled to transform the face of rural India was also widely appreciated. Mr. Nasser C. Pangandaman, the Chairperson of CIRDAP Governing Council and Secretary Department of Agrarian Reform, Republic of Phillipines said that "there has been a radical shift in the thinking of Rural Development Policy-makers and international institutions on the concerns of development of rural areas and rural people". He also stressed on the need for strengthening the activities of CIRDAP and its evaluation to make the results tangible and quantifiable in the long run.

Source: *http://pib.nic.in/release/release.asp?relid=39833*

User centric design for innovative women

The benefit of a truly inclusive design process is an end result that is genuinely well suited to the needs of the community

S Revi Sterling
Doctoral Candidate - ATLAS Institute
University of Colorado at Boulder
revi.sterling@colorado.edu

John K Bennett
Director - ATLAS Institute
University of Colorado at Boulder
jkb@colorado.edu

In a rural community in Southeast Kenya, women's Self-Help Groups (SHGs) are the driving force behind a technical initiative that enables women to be heard on community radio. In pre-deployment conversations, these women clearly articulated project features not originally envisioned by the project's ICTD technical 'experts.' In so doing, these women became active participants in community development - as they defined it. Their input also contributed to the development of technical innovations not originally within the project's scope, which were then piloted in the community for the women's evaluation. This inclusive feedback loop sustains interest and participation in the ICT intervention. The authors describe their experience with this process at the intersection of need and innovation, and cite two examples of technical innovation that resulted from this process.

Introduction

ICT for development projects often follow a common model: an expert has an idea for a technical intervention that will help a community, verifies with the community that the idea is sound and that the targeted problem is relevant, and can now assert that the project has community input and participation. Subsequently, the expert may be disappointed that the community is not making full use of the ICT intervention, or is not using the intervention as envisioned by the expert. The best-intentioned intervention can yield this result - the Internet kiosk meant to provide health information is instead used almost exclusively for entertainment; the text-based service that goes unused because user commands are not sufficiently intuitive; the laptop screen used for night illumination only.

Of course, efforts to introduce new technologies are not intrinsically bad- indeed, more innovation is needed in ICTD initiatives. For example, even with the fastest growing cell phone market in the world, almost half of the African subcontinent does not enjoy coverage. Low literacy, high cost, perceived relevance and cultural impediments can slow adoption of any ICT solution, including the best ICTD interventions. However, we argue that designers of ICTD interventions who fail to listen to the real system experts - the end users - are destined for failure. This translation of community needs into technical requirements goes beyond what is frequently termed 'participatory design.' Indeed, it goes to the heart of innovation. An inclusive design process can yield unexpected innovation, as designers respond to technical challenges introduced by end users who are unaware and unconcerned with the common wisdom of what is considered possible. In this paper the authors share their experiences with these ideas in the context of the AIR (Advancement through Interactive Radio) project.

AIR - Advancement through Interactive Radio

A more concerted and comprehensive The AIR project - Advancement through Interactive Radio - is a system that enables women off the cellular and electric grid to communicate with their local community radio station. AIR allows women to 'talk back' to the community radio station to ask questions, comment about programming content, and create content themselves. This community radio programme can specifically address women's unique development concerns and needs by letting women articulate these concerns, thus enabling women to achieve a greater level of empowerment as they define empowerment. The AIR Project thus explores how technical intervention

changes both the individual and their community. The project's first deployment is at Radio Mang'elete in Southeast Kenya. In discussions with the station and its listeners, the authors identified some common frustrations - the radio station wanted to increase women's participation but had not come up with sustainable ways to do so; the female listener base wanted to provide feedback to the station regarding programming content, but did not have convenient means to do so. The authors set out to design, implement and deploy an ICT-mediated solution to this problem. When the authors met with the community to describe their design, the authors found that some features that the community expected to be important were irrelevant to the users of AIR, and some features they considered essential had been overlooked. The final feature set of the AIR device, created by its intended users, challenged the authors' textbook understandings of 'Africa,' 'women,' 'rural,' 'community radio,' 'feedback,' 'user interface,' and 'need'.

However, the experience of the author suggested that a truly user-centric design process, one in which users not only inform, but actually lead the identification of design requirements, offers substantial benefit. Below are two examples of how the user requirements shaped technical decisions as the authors translated these requirements into hardware and software. In some cases, the requested features addressed technical issues that had otherwise frustrated the authors, demonstrating how user-centric design is not just a good principle, but also a potential strategy for technical innovation.

Power management

The pilot deployment of AIR is in the three communities primarily served by Radio Mang'elete: Nthongoni (where the station is located), and the outlying communities of Ivongoni and Masongaleni. Ivongoni and Masongaleni are too far from the station to support a standard wireless back-haul solution. The authors considered and rejected a variety of alternatives due to range constraints and lack of power. However, when the authors discussed the problem with the community, they learned that women travel every week to Nthongoni on market day. The authors arrived at a simple solution in which one AIR device in each of the two outlying communities is designated to serve as the primary collection device for that community. These designated devices have expanded voice storage capacity, and are programmed to promiscuously collect voice input from all other devices in range, but otherwise function as standard AIR devices. The collection devices are taken weekly into Nthongoni on market day by women who routinely make the journey to sell their goods at market. The stored voices from the designated collection devices are then transmitted to Radio Mang'elete while the women are in Nthongoni.

The potential one-week market day to market day cycle between recharge opportunities challenged the power design of the AIR device, since the available power from four rechargeable AA batteries was only six volts at 2500 milliamp hours. Low-power high-efficiency components and an efficient switch-mode voltage regulation circuit were insufficient in themselves to provide a week of operation. The required additional power reduction was achieved by having the device enter a sleep mode when not being used to record voice, and to only periodically awaken from this sleep mode to check if another device is in range. If no device is in range, or there is no new information to transmit or receive, the device returns to sleep mode for another few minutes. This sleep interval is increased or decreased based upon observed activity levels and remaining available power.

Adaptive routing

When deployed in the community, AIR devices are used by women to record feedback and questions about existing programming content, as well as to create their own new content. There are multiple devices in each community, one for each women's work collective, or mwethya. These devices form an ad hoc network in which recorded voices are asynchronously passed from device to device, eventually reaching a device that is (or will be) in range of the radio station.

When a woman presses the push-to-talk button and speaks into the device, her voice is filtered (in hardware) and compressed for storage (in software). The resulting content is then stored. Transmission of the stored voice is accomplished as follows: Each voice message is tagged with a unique field of separately stored metadata that indicates the originating device and message recording time. This metadata is used by all devices in the system to track message status. When a device comes within range of another device, the devices exchange metadata, allowing each device to pull or to push particular messages. The interesting part of this algorithm is how devices decide when to send and receive message content.

Assuming the device has not already processed the message, whether a particular message is transmitted depends upon a probabilistic adaptive algorithm that makes this decision based upon (1) the number of other devices to which the message has been successfully transmitted (the more devices that receive the message, the higher the likelihood that the message will reach the radio station); (2) a measure of device mobility (a historical record of the number and diversity of devices that have been recently in-range); (3) available power (devices will reduce transmission rates when low on power); (4) the number of devices in range (messages need not be transmitted to every device in range), and (5) the state of these devices in range (messages should only be sent to devices that have adequate capacity and power). The parameters that guide these choices are adjusted from their initial settings based upon the device's success in ultimately getting all messages to the radio station within one week. This maximum time delay was collectively decided by the user community. The idea is to use the minimum number of redundant transmissions to other devices (and therefore power) to accomplish this objective. If all messages get through, parametres are relaxed; if the objective is not met, transmission parametres are made more aggressive. The algorithm uses hysteresis to prevent oscillation.

The remaining question is how a device decides to delete stored voice message. As a practical matter, once the radio station has received and stored a particular voice message, that message can be deleted from all devices that store it. However, if devices in contact with the radio station simply deleted the message, more remote devices would not be aware of this fact. The authors originally intended to have all devices purge their message buffer

every seven days, but a user-driven design requirement led to a more elegant solution.

The women who were going to use the device wanted to be able to hold the radio station accountable for what it did with user voice information. They asked for an LED that would be illuminated when all of their voice data had reached the station. In considering how to support such a feature, which would clearly involve having information find its way from the radio station back to the device, we arrived at the following solution: When the radio station receives a voice message, an acknowledgement packet is sent to the transmitting AIR device. That device can then recover the buffer memory used to store that message, but the message metadata is retained, so that other devices with which that device comes into contact will receive the acknowledgement packet, indicating that they too can reclaim their buffer memory.

Once the originating device has received the acknowledgement, all AIR devices can delete all references to that message. This is accomplished by marking the message metadata appropriately and forwarding the revised metadata the next time metadata is exchanged. This process will eventually clear all buffers and metadata associated with that particular voice message. When a device has cleared all of its current metadata, it can turn on the 'My voice has reached the station LED.

Principles of user centric design

These two examples illustrate how user-centric design can lead to both more appropriate and technically innovative results. By considering user needs paramount, we achieved a better design from the perspective of all concerned. In this case, recognising how women move throughout the community in semi-structured patterns, consistently attending certain market days, stopping by the same wells and community establishments at fairly set points during the week, resulted in power management and message routing designs superior to those conceived by our technical experts. We recognise once again that ICT for Development truly is a social science. Successful ICTD strategies should understand and adapt to the movements and interactions of the communities that we seek to serve, rather than attempting to train the community to move, act, and interact in a way dictated by the technology.

Suggestions and recommendations

The authors, on the basis of their recent experience on how to create a climate for more effective requirements gathering (which is where opportunities for innovation are likely to be found) suggest the following:

- **Follow** women of the community throughout their day, selecting these women with as much geographical, economic, age and ethnic diversity as possible. Ask permission to do this, and be sensitive to the potential negative impact on important daily activities. Seek to understand how women interact with their environment, including those things they might wish to change in that environment.
- **Participate** in daily chores and recreational activities, in order to understand where technology (any technology, not just ICT) is utilised.
- **Verify** observations by asking a wide variety of people if these observations relate to the actual experience of the community. This is one way to have erroneous assumptions challenged, as well as to highlight the differences of perspectives within the community.
- **Discuss** prototypes together, once an ICT concept is ready for testing. While drawings are a common method for discussing prototype ideas, tactile examples (such as might be created using molding clay or play dough) may more readily convey certain ideas.
- **Play** with the targeted technology, to diffuse concerns about use and self-efficacy - and budget for this play time. In the early stages of the AIR project, the authors gave the women's groups digital voice recorders to understand women's willingness to 'talk back.' While the authors tried to conduct a structured training, the women were more interested in recording their voices and playing back the recordings, amazed at hearing their voices for the first time.
- **Wait** while people mimic the familiar, before expecting that they will generate new feature ideas. After becoming familiar with the AIR device prototype, women were able to recognise its limitations and propose new features based on that familiarity.
- **Act** upon what is learned. Genuine human need, rather than technology, should always drive the design of any ICTD intervention. Innovation in ICTD requires a clear understanding of both social and technical requirements, and a willingness to let the community fully participate in the technological design.

Following these principles will contribute to the creation of ICTD solutions that are successful, and innovative, and that serve well the real needs of the community.

Conclusions

In contrast to waning interest as novelty fades, the authors have observed a consistent increase in the engagement of the mwethya members served by the AIR Project. In addition to being active participants in community development, these women contributed to the development of technical innovations not originally within the project's scope. The authors argue that this inclusive feedback loop both sustains interest and participation in the ICT intervention. The authors describe their experience with this process at the intersection of need and innovation, and cite two examples of technical innovation in their current project that resulted from this process.

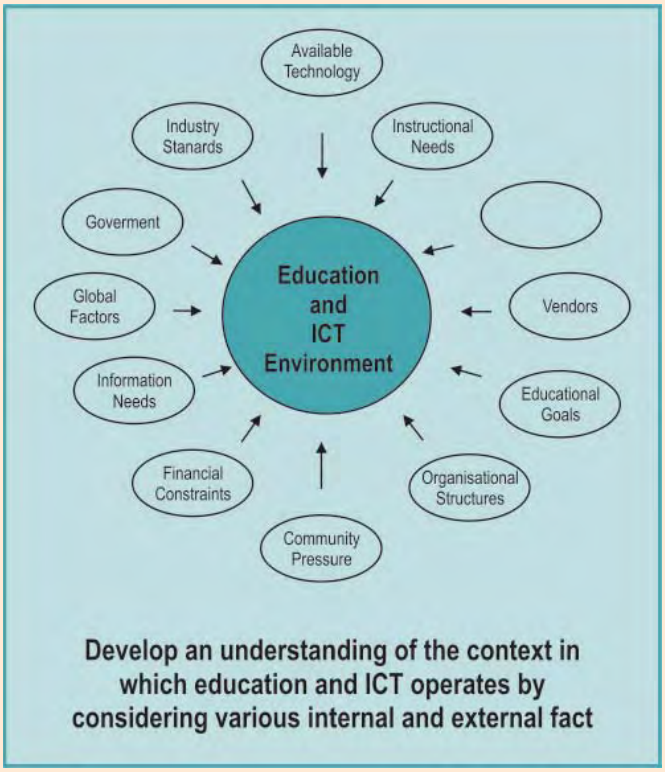
The critical view that mwethya members have taken during the design and implementation of the AIR system has positively impacted the project from the initial feasibility studies through the evaluation process. These women have apparently made the connection between desired community change, community radio station accountability, and the potential of the AIR system to help accomplish these objectives. The authors are continuing to focus on linkages between voice, feedback, and the technologies that help mediate and support community participation, while enabling individuals to articulate their own unique experiences. Future directions include longitudinal studies of this community, and further exploration of potential feedback mechanisms for Community Radio development initiatives. ■

Summary of discussions for the month of June 2008

The June 2008 discussion has been one of the most in-depth discussions we have ever had on our list in the recent past. The month's discussion has been dominated by whether our educational systems need to be changed to be in tune with the changing times, and specially so for developing countries. It all started when a reader posted about Bangladesh's ICT policy. There appears to a healthy churning of grey cells among our readers. We only hope the voice of the cyber citizen is heard and opinions incorporated by policy makers. Enjoy the intellectual ping-pong! Here goes…

Changing the face of educational systems

Bangladesh National ICT Policy Review Committee headed by Professor Jamilur Reza Chowdhury met for first time in May 2008. Besides, ICT professionals, industry leaders, academicians, and government officials attended the meeting. The committee took a decision to seek recommendations and opinions on the Bangladesh's ICT policy, from all stakeholders. A post to this effect was submitted by one of our readers Farah. This invoked strong reactions from a host of our readers. Edward Cherlin wanted to know what kind of programmes the ICT policy initiative proposed for, what the previous ICT policy initiative had accomplished, where it had failed, what were the obstacles in executing the plans and programmes, whether there was funding, whether any legislation was passed etc. Edward suggested that this discussion should be thrown open to the public. He posed the first question. The British Empire imposed an education system on the colonies intended to create an obedient and manageable workforce, military and well as bureaucracy, so that the characteristic pillaging done by rulers would go unabated. The education system for the children of the rulers however was quite different. The colonies have since become free, but the oppressive systems are still followed by them. Edward asked what is the alternative system to be followed by free people. Steve Eskow said that the decision to change their educational system should be left to the people and not to 'outsiders' with only strong opinions and nothing at stake. Ziaur Rehman was of the opinion that if we must have 'ICT for development' then local stakeholders and specially poorer communities, whose voices are never heard must be engaged. If an e-Governance project fails, it just becomes an expensive mistake, which no one owns up to while the resources of the country are wasted. And especially smaller countries like Bangladesh need to be careful with such experiments. He also suggested that another question should be asked as to who is to be blamed and punished for failure to deliver. He also opined, that ICT strategies need not be the exclusive domain of people related to ICT. A select few cannot be made to control the destiny of rest. In that case, the elite will only change colour and financial elites will now be known as technological elites. A point another reader Vickram Crishna also agreed with. Vickram pointed out that even though its necessary to take input from stakeholders, we have to remember that some are better at 'defining needs' while



some are good at 'outlining solutions'. To Steve's comment on educational systems, Vickram reacted saying that they cannot be validated unless we start with 'tabula rasa' or 'blank slate'. Steve said that his country, the USA was an erstwhile British colony, and the current educational system is a patient evolution from the colonial one. It requires improvement no doubt but it is impossible to start with a blank slate, because we cannot overlook the fact that colonial culture gets interwoven into the native culture. Even if we want to erase the slate, we cannot ignore the chalk or the slate, which in effect is a product of the hybrid culture. Steve says it's more useful to move the present systems in new directions then to design educational utopias.

***Source**: http://tech.groups.yahoo.com/group/bytesforall_readers/message/11997*

Continuing with the debate

Vickram reacted saying that 'tabula rasa' was our ability to accept that something we have learnt is wrong and therefore start again. The old technologies i.e. reading and writing are however taken for granted even in tabula rasa. Right now there is a huge latency period in the educational curriculum. Science taught to us in school may be updated or completely corrected by the time we graduate. However the system is such that we produce individuals who believe everything taught in school and refuse to change, to the extent that they suffer life long angst and are rigid to the core even in other aspects of their life. Such people are a spoke in the wheel of ICT progress. Edward went on to cite what German philosopher Johann Gottlieb Fichte had to say about colonial systems, and thus implying why it was imperative to change them 'the schools must fashion the person, and fashion him in such a way that he simply cannot will otherwise than what you wish him to will'. Steve pointed out that Mahatma Gandhi had colonial education. However his mind was shaped by the English traditions of freedom and liberty and his techniques of nonviolent resistance were an outcome of this education.

***Source**: http://tech.groups.yahoo.com/group/bytesforall_readers/message/12069*

Is ICT a great leveler in education?

Its better if we judge an educational system by its fruits rather than its seeds. Edward suggested that ICT tools could be the great leveler. A computer could read for us using text-to-speech technology, an asset to the illiterate and pre-literate. Steve pointed out that most of us, couldn't understand speech that is spoken at more than 150 words per minute. And then is accent as well. He said further that one of the greatest barriers to the adoption of the new technology is the cliché that the insiders are 'resistant to change' while the outsiders somehow have learned of technological miracles that can transform teaching and learning We need better explanations of the problem than'resistance to change.'on the part of those who have to somehow use the new tools in the old structures. He wondered aloud whether the failure of the computer to take hold in the poorer nations is because the non-Western advocators of the computer as the traditional system of education. However, he pointed out that 150 words per minute were quite normal for visually handicapped people and even the elderly who are blind. Even aircraft pilots could comprehend speech with noise over low bandwidths. He said most of us are capable of doing something when it suits us. He hoped that educational systems would not be used as a tool to force a brand of economic straightjacketing. Ziaur mentioned that during his travels he has met with many brilliant people in their own fields, who have never used a computer let alone the Internet. He suggested that maybe we need to 'unlearn' what we have learnt and 're-learn' what we have failed to notice earlier.

Bytes for All: *www.bytesforall.org or www.bytesforall.net*
Bytes for All Readers Discussion: *http://groups.yahoo.com/group/bytesforall_readers*
To subscribe: *bytesforall_readers-subscribe@yahoogroups.com*
Bytes for All Discussion summary compiled by:
Archana P. Nagvekar, archananagvekar@rediffmail.com, India

Resources and studies on gender and ICTs

Various reasons for manifestation of 'gender digital divide' has become a cause of concern world wide. The below mentioned are some of the organisations/resources/studies that have tried to look at the issue and has put a sustained effort to prevent the adverse effects of trends of disparities to the access and to harness the potential of ICTs for women's empowerment. ■

Organisations/Resources/Studies	Websites
American Association of University Women (AAUW)	*http://www.aauw.org*
Asian Women's Resource Exchange (AWORC)	*http://www.aworc.org*
Association for Progressive Communications Women's Networking Support Program (APC WNSP)	*http://www.apcwomen.org*
Asia-Pacific Development Information Programme	*http://www.apdip.net/projects/gender/resources/*
Asian and Pacific Training Centre for Information and Communication Technology for Development (APCICT)	*http://www.unapcict.org/ecohub/communities/gender*
Bridge (development-gender)	*http://www.bridge.ids.ac.uk/reports_gend_cep.html#icts*
Bridging the Gender Digital Divide: A Report on Gender and ICT in Central and Eastern Europe and the Commonwealth of Independent Nations	*http://web.undp.sk/uploads/Gender%20and %20ICT%20reg_rep_eng.pdf*
digital opportunity channel	*http://www.digitalopportunity.org/article/archive/1077*
Engendering ICT Toolkit: Challenges and Opportunities for Gender-Equitable Development	*http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTGENDER/EXTICTTOOLKIT/menuPK:542826~pagePK:64168427~piPK:64168435~theSitePK:542820,00.html*
Forum for African Women Educationalists (FAWE)	*http://www.fawe.org*
GenderIT.org	*http://www.genderit.org*
Gender in the Information Society: Emerging issues	*http://www.genderit.org/wsis/wsis_process.shtml*
Institute for Women in Technology (IWT)	*http://www.iwt.org*
International Women's Tribune Centre (IWTC)	*http://www.iwtc.org*
International, Multilateral, and Bilateral Organisations	*http://siteresources.worldbank.org/INTICTTOOLKIT/Resources/ResourcesSection1.htm*
IT for Change	*www.ITforChange.net*
Open space to showcase UNESCO's application of knowledge societies	*http://portal.unesco.org/ci/en/ev.php-URL_ID=24226&URL_DO=DO_TOPIC&URL_SECTION=201.html*
PovertyNet	*http://poverty2.forumone.com/library/view/14821/*
Putting Gender on the Agenda of WSIS	*http://www.genderit.org/wsis/wsis-presentation-asw.ppt*
Society for International Development (SID), Women on the Net Project	*http://www.sidint.org*
Synergy Gender and Development (SYNFEV)	*http://synfev.enda.sn/*
Women in Global Science and Technology (WIGSAT)	*http://www.wigsat.org*
Women of Uganda Network (WOUGNET)	*http://www.wougnet.org*
Women's Learning Partnership (WLP)	*http://www.learningpartnership.org*
Women's Net (South Africa)	*http://womensnet.org.za/ict/ict.htm*
AMARC' Women's International Network (WIN)	*http://win.amarc.org/*
World Links for Development (WorLD) Programme	*http://www.world-links.org/*
WikiBooks	*http://en.wikibooks.org/wiki/Gender_and_ICT/Resources.*

Source: *http://www.apdip.net/publications/iespprimers/eprimer-gender.pdf, Wiki Pedia*

SYMPOSIUM ON GEOSPATIAL FOR SOCIAL INFRASTRUCTURE

at MAP WORLD FORUM

12 -13 February, 2009, Hyderabad, India



The term `Social Sector' refers to the factors, which contribute to human capital formation and human development. The important sub-sectors of social sector that contributes towards social development are education, health and medical care, social security and social welfare. Improvement in the social sector pave the way for equitable distribution of basic resources in turn for economic development. Geospatial technologies have much to offer in the social infrastructure sector wherein geographic elements in every branch of social management could be visualized and analyzed.

The sub sectors where geospatial technologies have brought about substantive changes are:

- Education
- Health and Medical care
- Social Welfare

Media Partners	Organiser
i4d, eHEALTH	GIS DEVELOPMENT

CHAIRPERSON

B K Sinha
Director General
National Institute of Rural Development
India

For more details log on to
http://www.mapworldforum.org/2009/conference/gsi.htm

4th eINDIA2008

India's Largest ICT Event

29 - 31 July 2008, Pragati Maidan, New Delhi

Organisers

CSDMS knowledge for change

elets

Co-organisers

Department of Information Technology, Ministry of Communications & IT, Government of India

Ministry of Human Resource Development, Government of India

Ministry of Urban Development, Government of India

UN Global Alliance for ICT and Development

Government Partner

Department of Agriculture and Co-operation
Ministry of Agriculture
Government of India

eINDIA 2008 Lead Sponsors

Diamond Sponsor

Microsoft Unlimited Potential

Platinum Sponsor

intel

Lanyard Sponsor

ca

eINDIA THEMATIC TRACKS

egov INDIA 2008 | digital LEARNING INDIA 2008 | mSERVE INDIA 2008 | eHEALTH INDIA 2008 | Telecentre Forum INDIA 2008 | eAGRICULTURE INDIA 2008 | municipalIT INDIA 2008

egov Track

Gold Sponsor

sify

Silver Sponsors

Sun microsystems | VISA

Associate Sponsors

CrimsonLogic | NIIT

mServe Track

Supporting Partners

ICA | IPTV | ISPAI | TEMA | TUG

Municipal IT Track

Supporting Partner

Telecentre Track

International Supporting Partners

D-Net | fusion | ICTA | ONEROOF

Network Partner

GEA

eHealth Track

Official Health IT Partner

INTERSYSTEMS

Healthcare Transformation Partner

21Century

Healthcare Solution Partner

idhasoft

Associate Sponsors

CGSL | Karkinos

eHealth Track

Knowledge Partner

FROST & SULLIVAN

National Accreditation Partner

Online Health Partner

Yes Technologies

eAgriculture Track

Supporting Partners

Digital Learning Track

Learning Partners

Educomp | NIIT eGuru School learning solutions.

Assessment Partner

MeritTrac

Platinum Sponsor

SMART Technologies

Gold Sponsors

Gold Sponsors

GLOBUS | HITACHI

Silver Sponsors

edutech

Associate Sponsors

Adobe | DELL | edunite

Exhibitors

actis | Adobe | Aavanor | ankita enterprises | CyberSchool | CCCCO | CGCSL | CORESYS | DELL | Educomp | EdistaLearning A QAI Venture | edutech | edunite | eBlocks | GLOBUS | HITACHI | idhasoft | IPBOARD | inVidya | itz Cash The power of money | Luidia | MINDSTEC | metalearn | mimio | SiPA | NetSupport | NIIT eGuru School learning solutions. | NIIT | ONEROOF | sudiksha | SMART Technologies | SafeNet | TUG

eINDIA 2008 Supporting Partners

e-gov | gesci | gtz German Technical Cooperation | IAC | MAIT | telecentre.org | TUG | The World Bank e-Development Thematic Group | WiMAX

Register NOW at www.eINDIA.net.in