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GENDER AND UBIQUITOUS TECHNOLOGY

REFLECTION POINTS ON THE POSSIBILITIES OFFERED BY UBIQUITOUS TECHNOLOGIES IN CLOSING THE GENDER GAP IN A DEVELOPMENT CONTEXT

BACKGROUND PAPER FOR THE TOMORROW'S NETWORK TODAY WORKSHOP

ST. VINCENT (AOSTA), ITALY, 7-8 OCTOBER 2005

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The present paper is a voluntary contribution prepared for TNT workshop by Blerina Vila <vila@ilo.org> who works for the International Training Centre of the International Labour Organization (ITCILO) in Turin, Italy. She has been working on women's rights and gender since 1997 in NGO sector in Albania and since 2000 internationally for the ITCILO. Currently she works for ITCILO with a project on gender mainstreaming in the European Commission development cooperation.

The ITCILO is the training arm of the International Labour Organization, with an over-40 years long experience. Since 2000 it has started the use of on-line training on gender issues for its constituents (Government, Trade Unions, Employers' Organizations, and other non state actors). The topics of the on-line training are related to gender poverty and employment, gender mainstreaming in the world of work as well as in the local development and government, etc. ITCILO has been developing methodology and software that allows easy access to such training to participants from countries with limited or low quality access to internet. More details are available at **www.itcilo.org** Also, through the project on gender mainstreaming in EC development cooperation, it has launched the first on-line course for the EC RELEX family on gender mainstreaming.

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The opinions expressed in this paper are those of the author and do not necessarily reflect the views of any of the institutions mentioned here.

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1 INTRODUCTION

The purpose of this paper is that of a tandem presentation of gender and ubiquitous technology issues in a developing context. Rather than a conclusive work, it is a modest basis for further reflection on the contribution ubiquitous technology can bring to bridging the existing gender gaps not only in relation to the access and use of technology but in a wider social and development context. The paper is a desk review based on easily accessible public documents; it does not aim to give a full picture of what is available in research, regulation, etc.

It frequently occurs that gender and technology are put in the same phrase to identify gaps and problems and criticize what has not been done. The reader is here invited to seize the opportunity of the TNT forum to open the floor to discussion on how the enormous potential brought about by the ubiquitous technologies can be put to the benefit of as many men and women as possible, especially to the benefit of the poorest and most disadvantaged.

It is necessary to start from understanding that there are intersections between gender and ICT and ubiquitous technology. We operate within the sum of interrelations between men and women which do influence the way decisions are made and actions are implemented, in addition or even conditioning other influencing factors such as market forces. Technology that is developed as a result of our decisions is not immune from this influence. The digital divides – gender, age, geographical, rich and poor – are indicative that market alone cannot respond to all needs of users and that there is a necessity for proactive intervention by both public and private sector to eliminate gaps. The disadvantages of unequal development (of economies, countries, communities) have long been spoken of and analyzed thus they will not be elaborated here. In order to develop the understanding for informed proactive use of ubiquitous technology as a vector for gender equality and development, specialist in gender and ICT need to find a common language and interest in exploring possibilities. Efforts have been made and are ongoing in nurturing such dialogue; ITU itself has taken steps by including gender in its forums, establishing its Task Force on Gender Issues; much work is being done by researchers, NGO and networks establishing a wealth of case studies and experiences from all regions. There are many challenges to be solved among which is collecting and measuring information that can create the basis for gender sensitive approaches to the development and use of new technologies; there is need to raise awareness of the necessity to identify adaptable solutions in order to serve women and men in developing countries. Experience has shown that the benefits of technology need to be directed and fostered in order to benefit all and especially the poorest and the disadvantaged.

1.1 Definition of gender and gender mainstreaming.

As a footnote, here are suggested two key concepts for facilitating the reading of the following pages.

Gender refers to socially defined characteristics based on the sex of the person that are changeable over time and space. In daily parlance gender can be heard in expressions like “Boys don’t cry!” or “Girls ought to be nice and sweet!” In a more formal context discrimination based on gender results for example in women in some countries not achieving legal adulthood throughout their life, women not being able to own property at all or only a fraction of what their male counterparts own, not being able to open a bank account without permission from a male tutor, or not being in a position to give their citizenship to their child, not being able (or not authorized) to leave their homes without being accompanied by a man, or not being authorized to take up employment outside their household, not able to access education or information, etc. Gender is about power relations between men and women, which are embedded and institutionalized in the society and which can be modified, like they have, through the use of different strategies (e.g. gender mainstreaming) and tools for example, gender sensitive education, work relations, and indeed technology.

Gender mainstreaming is one of the *strategies* that help to achieve gender equality (which is the ultimate *objective*). It consists in a systematic inclusion of gender concerns in all aspects of life into all levels horizontally and vertically. One example of gender mainstreaming in the education sector would be action on all of the following: inclusion of the principle of gender equality in the policy for the development of education in the country, including women and men at high level decision making positions in equal numbers, efforts done to include proportional numbers of men and women teachers and professors in all levels of schooling, non-biased representation of men and women in text books, efforts to provide appropriate school infrastructure for boys and girls, etc. Gender equality is about ensuring that each individual without prejudice based on their sex have the same opportunities, entitlements and rights, and are fully able and enabled to benefit from them.

2 WHY TALK ABOUT GENDER AND UBIQUITOUS TECHNOLOGY?

Gender is a necessary ingredient of the planning and implementation of all activities in all spheres of economic and social activity. Gender's constant integration in the process would avoid that it fails to take into account the specific needs of men and women and appropriate answers to them. There is a relevance to consider gender in the ubiquitous technology discourse in different respects: ubiquitous technology can be a tool for creating access to services or increase quality of services to men and women in a personalized way; can be a venue for development and distribution of content that is sensible to men's and women's needs and responds to them in a personalized fashion. For example, within their communities men and women cover different tasks and responsibilities. (Research and development of) Ubiquitous technology that takes this fact into consideration and seeks to respond to the needs of women like to those of men would help in facilitating these tasks for both of them equally, without exclusion.

Both in developed and developing countries especially, women suffer from a great deficit in an irreplaceable asset: TIME. This becomes clear through analysis (gender analysis) of the roles of men and women in a community. In a typical setting, women are responsible for the wellbeing of family members within the household and will provide all the care needed within the household (health care, cooking, cleaning, etc) which are needed daily and are not paid for or are not calculated in pecuniary terms. Men are responsible for the material means needed by the family members and that are normally the product of remunerated work or a pecuniary value of goods and services produced by the family. Men are also responsible generally for the liaison with community and the labour market for which they are more outside the household socializing with others and seeking possibilities to ensure that material sources for their family are met. This division of duties entails that men will have more time left for socializing and leisure. Women instead are on call in a continuous way, limiting their time for rest and indeed for leisure. This impacts on their physical capacity to appropriately respond to the continuous needs of the family members and it becomes clear that whatever portion of time that can be saved from the performance of their daily chores is an 'investment' in terms of women's health and wellbeing of their families. Ubiquitous technology can give a contribution to 'purchasing' time for women and men if their specific tasks are taken into account when developing for example smart objects. In a longer term perspective, this would mean that women would have time that before was not available for them. This time can be used for personal development (education, etc) quality time with family members (taking better care of children and elderly to meet not just their basic needs but also to create stronger links avoiding cracks in the social fabric) or simply leisure time that allows also for quality rest and thus better health.

As an example of what information gender analysis can provide, we can consider the following gender gaps applicable to the relation of women with ICT[1]

- Access and know-how usually limited for women due to the traditional beliefs of the capacity of women to deal with technology
- Education, training and skills development in that women are involved in smaller numbers in technology and engineering at all levels of education or vocational training. This helps widen the gap of their involvement not only as users but especially as creators/ developers of technology and content conveyed by it
- Industry and labour is in continuation of the divide that starts at education reflecting unequal involvement of men and women in jobs that deal with technology. Women generally are involved in low skilled operator work thus not able to fully benefit from the potential that is offered by the rapid development of the sector
- Content and language does not always take into consideration the needs of men and women in all parts of the world largely applicable for the developing world, since the content is mainly developed by and for populations in industrialized countries; also being English the

predominant language of the available information on the WWW, a large number of people who do not understand it are excluded unless an intermediary is present

- Power and decision-making; women are missing from the boardrooms and other decision making levels in the industry
- Privacy and security affects women and children particularly especially due to the facilitation of human trafficking by use of technology. (As a note of caution, it is clear that technology *per se* is not the evil responsible for its use by criminal networks.)

Ubiquitous technology creates possibilities for bridging the distances and lack of human resources for example in health. Combination of ICT with existing structures of health care has been suggested in other cases to increase the quality and outreach of the information related especially to reproductive health[2] and HIV/AIDS which have privacy implications. It is obvious that even though the new technologies create vaster and higher quality of information and communication venues excluding the continued use of the old technologies can widen the gap between the top end users and the bottom end users who have basic access difficulties[3]. Ubiquitous networks can to help fill in this gap not only by combining different capacities of existing networks and new solutions (e.g. Mobile communication and RFID) but also by bridging the technical gaps between areas that are connected and others that are out of reach (difficulties of the last mile). Also 'smart things' can be designed so that they are accessible and available for use by women and men alike avoiding the typical barring of women from technology.

ICT generally speaking and gender have a common characteristic: they are cross cutting to all aspects of life. In other words ICT and ubiquitous technology especially have, as the name suggest, virtually no limits in their use in daily life. On the other hand gender is present at the individual, community, institution level determining the way decisions are made and the actions are implemented. For example preferring to employ a man over a woman because she will soon be pregnant and employer will have to pay social benefits (ILO research has challenged this belief), not educating girls because that would be an investment over a person that will soon leave her family to join another (UNICEF has made the opposite conviction on the value of girls education for overall social welfare a basis of its interventions all over the world), etc. The changes that ICT has brought to social relations are visible in a number of cases in India for example[4]

The cross cutting nature of both the ICT and gender may make the language of documents rather complicated. In the same spirit that gender specialist are trying to get hold of the possibilities that are offered by technology (as witnessed by the large array of material available over the Internet on the linkages between gender and technology) ICT and ubiquitous technology for development should seek to benefit from the methodologies that have been elaborated and are available for gender sensitive data collection and information. Such initiatives will allow the tapping of existing knowledge to the benefit of gender equality development in general and the development of innovative ubiquitous technologies.

ITC and ubiquitous networks can bring enormous contribution to communities that are in need for assistance and development (e.g. they are cost effective, offer varied connection modules that can be adapted to stark topology conditions, are ideally independent from the input of the user thanks to sensors and actuators). These characteristics can be very useful in addressing certain gaps and differences that bring about disadvantaged situations especially for women. A gender analysis exercise would help bring into light which are the barriers of ICT use by men and women in a given situation as well as identify the opportunities that ICT ubiquitous networks bring about with the view of contribution both in the improvement of the life quality of the poor but also in bridging the discrimination gap between men and women. There are examples which show how work possibilities created by the ICT have influenced the social context. Options which were before not possible now are accepted by communities thanks to the employment created by ICT in India[5]. Work in ICT has provided women with financial and social autonomy which they did not have before as well as has made them present in public spaces at hours which are not typical for young women. Also other case studies testify of the empowerment of women by their involvement in state supported small enterprises that provide ICT services in Kerala, India. Women there are involved in management positions and are

able to make decisions on employing men in their activities. Such progress is notable in societies that are strongly biased on the ability of women to make decisions and to lead activities.[6]

United Nations Human Development Report 2001 points out that, “technology is created in response to market pressures – not the needs of poor people, who have little purchasing power”. In most parts of the world therefore, the promise of connecting the majority of the people remains unfulfilled. The report also confirms the fact that research and development, personnel and finance are concentrated in rich countries and led by global corporations. For example, in the Organisation for Economic Cooperation and Development (OECD) countries, the public sector’s role in research has diminished with more than 60 per cent of research and development now being carried out by the private sector. Equally eschewing the technology distribution is its sharply uneven diffusion. About 79 per cent of Internet users are in OECD countries. The whole continent of Africa has less international bandwidth than Sao Paulo while Latin America’s bandwidth is roughly equal to that of Seoul.[7]

3 REGULATORY REFERENCES ON GENDER AND TECHNOLOGY

Continuous efforts have been made and continue to be made to include gender in the regulatory frameworks with feeble results apparently at the national level. The UNESCAP study shows there is less visibility of the issue of ICT and gender at the local level than at the international level. Countries would normally have separate policies on gender and on technology development. The challenge is that both these issues are cross cutting thus it may be difficult to finding the appropriate balance in their meaningful mainstreaming into each other and in other aspects of economy and society.

There are some main references in the intersections between gender and technology. The most important one is the Beijing Platform for Action (BPfA) adopted in the 1995 Beijing UN Fourth World Conference on Women: Action for Equality, Development and Peace. This plan for action has become binding for those countries that have signed it (over 180) and is put into practice through the adoption of the national policies on gender equality. It underlines the importance that the development of technology has for the advancement of gender equality as well as its use of an important tool in closing existing gaps. In addition BPfA coined gender mainstreaming as the main strategy for the advancement of gender equality in all spheres of life as well as suggested the institutional basis for its implementation. Each country adhering to the BPfA formulates its national policy and sets up a responsible body for its implementation – the national machinery on gender equality.

The BPfA has been taken up and elaborated in further detail through the activity of the ITU on what concerns gender and technology. This has become possible through forums at the regional level as well as by inclusion of gender into the debates at the WSIS. ITU has established the Task Force on Gender Issues which serves as the main organ for effecting the mainstreaming of gender issues and aims to ensure that the benefits of telecommunications and the emerging information society are made available to all women and men in developing countries on a fair and equitable basis. Its significance lies in the fact that its work is focused on ensuring that women, including girls, benefits from the rapid pace of change in the telecommunications sector. The task force has members from governments, the private sector and NGOs. It meets annually to assess and plan activities of its various working groups that tackles issues such as legislation and regulation of telecommunications, technologies and global information infrastructure development and rural development and universal access. Much of its work is concentrated on developing policies that mainstream gender in ITU programmes and policies. For example the task force has produced a “Gender-Aware Guidelines for Policy-making and Regulatory Agencies” (2001) to ensure that gender analysis becomes an integral part of licensing and regulatory activities in the telecommunications sector.

The Declaration of Principles of the World Summit on the Information Society (WSIS, 2003) suggests:

> *“We affirm that development of ICTs provide enormous opportunities for women, who should be an integral part of, and key actors, in the Information Society. We are committed to ensuring that the Information Society enables women's empowerment and their full participation on the basis of equality in all spheres of society and in all decision-making processes. To this end, we should mainstream a gender equality perspective and use ICTs as a tool to that en.:”*

The 9th International Interdisciplinary Congress on Women was held in Seoul, Korea from June 19 - 24, 2005. Gender and ICT advocates also met separately for 2 days to discuss gender and ICT issues at the World Summit for the Information Society (WSIS 2005). They came up with the 'Seoul-Gyeonggi Declaration' a document that gives recommendations on gender concerns as regards internet governance and financing mechanisms, which are the two themes of WSIS 2005. The Declaration was to be presented at the Third Preparatory Committee Meeting of WSIS in Geneva, 19-30 September 2005.

One example of combining technology and gender equality through the mainstreaming approach is given by the newly proposed EC development policy. It suggests:

> *"Some issues require more than just specific measures and policies; they also require a mainstreaming approach because they touch on general principles applicable to all initiatives and demand a multisectoral response.*
>
> *This is true, for example, of* ***gender equality****, human rights in general and the rights of children and indigenous peoples in particular, environmental issues and capacity building, including* ***increased use of information and communication technologies****.*
>
> *The Commission will relaunch this approach, making systematic and strategic use of all resources at its disposal[15]. For instance it will intensify the dialogue with its partners and set up networks of expertise and technical support, pooling the Member States' resources with those of partner countries."*[8]

4 WHERE COULD GENDER AND UBIQUITOUS TECHNOLOGY MEET EACH OTHER?

For the development of the ubiquitous technologies for poor countries a look at the infrastructures can be disheartening, especially in Africa. This calls for efforts from both the countries in developing their network infrastructure especially at the regional level due to the large investment that is required and on the other had by the donor and industry side in partnership to developing technology that would be able to complement the response to the needs of poor countries. This will mean a response that is tangible in the current setting as well as development of networks that can allow adaptation with the networks of the rest of the world (e.g. provide cheap internet access now seeking to increase the number of users and penetration in order to be able to envisage extension of broadband networks in the near future.)

The Millennium Declaration acknowledges that ICTs are an important tool to achieve its overall goals; ICTs can help alleviate poverty, improve the delivery of education and health care, make government services more accessible, and much more. Target 18 of Goal 8 (of the Millennium Development Goals) calls upon the states to:

> "*In cooperation with the private sector make available the benefits of new technologies, specifically information and communications.*"[9]

It is envisagable that the same can be extended to the ubiquitous technology, which is developed and adapted to the needs of men and women in developing countries. The challenges are obvious however this can be considered a positive thing in that by knowing the difficulties appropriate responses can be identified. We certainly need to take into account that a great amount of effort should go into the awareness raising and building of partnerships between industry and public sector which is not an easy task, but not an impossible one either. Examples exist that testify for successful partnerships e.g. as suggested by the case study from Italian Republic ITU 2004, efforts being made by UN Economic Commission for Africa in building up viable networks in Eastern part of the continent, as well as examples from the pharmaceutical industry of research financed partially by public sector in developing medications for illnesses typical to the developing world[10].

Regarding gender and ubiquitous technologies some of the challenges from the point of view of methodology would be:

- Insufficient attention to the need for integration of gender aspect in the research and development of new technologies especially in the context of developing countries. This requires a closer cooperation between specialists on gender and technology (ICT) and a stronger commitment to put into practice the commitments that are in place at this point in time;

- Insufficient gender sensitive information for making decisions at the policy level and especially at the meso (institutional) and micro (communities and individual level) particularly with regard to research and development of new technologies and their connection to networks. This certainly calls for a thorough use of the methodologies of gender analysis and the establishment of base line data that are reliable and usable by the industry;

- Unclear commitment to putting the technology to the service of users also in the countries in development. Understandably market and industry respond to the needs of its clients (who can pay) that is why it is of extreme importance to forge the public private partnerships that can foster the needs of the most disadvantaged women and men in order to allow them to benefit from the development of new technologies.

Need for adapting ubiquitous technologies to gender becomes clearer by use of gender analysis. It helps in detecting which are the existing gaps and how the ubiquitous technology can widen or bridge them and to which extend. The following hypothetical examples look into a typical setting in the developing countries concentrating mostly at the micro and meso level. Difficulties or existing gaps are in the left hand column and suggestions to overcoming them in the right hand column. It has already been mentioned that gender relations are ultimately power relations between men and women (perpetuated and embedded in the institutions and regulatory frameworks as well.) Thus whatever action is taken that may influence existing relations should take into consideration also the friction that may be caused by the changing forces.

Barriers	**Opportunities brought about by ubiquitous ICT**
Women are often times barred from use of technologies which are seen as giving a status that is out of reach for them.	Ubiquitous ICT and smart things are embedded into objects which can be designed to be used to assist in tasks that are generally performed by women.
In many cases the literacy level of women limits the skills needed for handing complicated devices	The use of simple and user friendly devices would help women overcome the issue of 'complicated science'. This will of course be accompanied by efforts to increase the technical skills of women
Limitations of access to networks and energy sources	The nature of some ubiquitous smart things by definition requires little energy and a large array of networking modules that not necessarily would rely on traditional land lines
Limitations of access to information; Lack of time needed to obtain skills through formal training as well as cultural and traditional barriers linked to the division of labour between men and women ('There are certain things that women cannot do!')	The mobility of smart things in combination with divulgation practices (e.g. entrusting health staff with training their patients on the use of smart detectors of symptoms of e.g. child health) can help break the information barriers – thus bringing information on ICT to users using traditional channels

Gender can help in developing user oriented ubiquitous technology if it is taken into account at each step of research and development and not as an added on element. Ubiquitous technology given its rapid evolution offers possibilities that may not be entirely envisaged in this given moment. Perhaps with the available information to date it is not yet possible to asses all the different uses and interactions of such technology with the gender relations, and one cannot design clearly what can be the punctual effects that it might have on the social fabric. However, judging from the experience with ICT where the interaction with gender has been explored more in detail, one would hope that there is a larger scope in the development of gender sensitive ubiquitous technology. The case studies that have taken into consideration gender and ICT have shown that:

- The rapid extension of employment thanks to services required for and from ICT has created great possibilities of employment for women. This has come along with concerns on the quality of employment, its protection, and the versatility of the skills that women obtain in such low profile low skills jobs. On the other hand it has shown that through employment in this new industry women have been able to change their surrounding environment and to break free certain restraints

- There is a concern with the content of the information that is made available to public in terms of substance and language in which it is imparted. The accessibility of information made possible by ICT has reached end users either directly or through human intermediaries. Men

and women have been using this information differently due to facility of physical access to for example connected computers (women's access in internet cafes for example is hampered due to the fact that these are places where men are in bigger numbers and because of the high incidence of pornographic material in the shared computers). The case of tele-centres help to understand that when services are made available to the communities women and men do use the opportunity differently due to prevailing situations and conceptions at the community.

- There are limited "role models" of women decision makers in the industry. ICT is seen as predominantly a male domain and so is the result of the products developed by and for it. Generally women are involved in processes that require fewer skills and positions that are more precarious than those of their male counterparts. This influences the perpetuation of stereotypes within the industry's pattern of employment but also lowers the chances for more variety of its outputs.

According to surveys from REGENTIC[11] in francophone countries in West Africa (Benin, Burkina Faso, Senegal, Mali, Mauritania, Cameroon) the gender gap is broader in skills and contents than in connectivity; women have 36% fewer ICT related opportunities and benefits than men; women have 1/3 of men's chances to participate in ICT decision making; and on the characteristics of uses of internet, cell phones women use them for personal and social use whereas men for professional and work related.[12]

The ubiquitous networks contribute to meet the specific needs of men and women increasing the potential for contribution to the economy in a longer term and to the market (as buyers) in midterm. It is obvious that ICT and ubiquitous devices and nets bring much potential to development work. This potential needs to be used with the cognizance of the difference that use of ICT can make in the quality, pace, and sustainability of development cooperation activities. Knowing the potential and the increase in quality that ubiquitous devices bring as experience shows leads to think of many useful ways in which these devices can be used – at least for a transitory period – to compensate for lack of services and capacities and certainly for increasing the quality of existing facilities.

ICT is a cross cutting topic, means, component of most of the aspects of life at present; as such collecting data on it should not obviously be a means in itself and at the same time the methodology for their collection can as well rely on the cross cutting character of the discourse. Certainly it does help to have the baseline data on which to rely for further assessments and comparisons, however for what regards the distribution, character and services that should be rendered especially by ubiquitous technology more qualitative and empirical data can be of help especially if located into a limited geographical area – this would theoretically provide not only the information for the needs of women and men in the particular area but will at the same time identify the connectivity that is available, or feasible to establish if necessary. For example: using sources of renewable energy and convenient distances for the use of RFID in the provision of medical services, training for farmers and other vocational training that would not be accessible otherwise to women and girls due to the limitation on their financial resources and mobility. Here we can mention the typical choice that the families with limited resources make on the education of boys over that of girls. Also with the increased burden of care for the household and child household headed families due to AIDS pandemic it becomes more important to use the distance learning and assistance to less developed regions within a country to compensate for very limited resources of these households and to avoid the social degeneration of the areas preventing orphans to fall prey of the urban poverty and criminality. Certainly such results cannot be reached with the exclusive use of ICT and ubiquitous technology but they will certainly assist be that through lower costs (time of the health care and social workers and educators etc) or through limited human resources increasing the number of services they can render in distance due to time saved from reduced travelling in remote areas. There need be larger efforts in making sure that policy makers and decision makers are aware of gender inequalities. Talking a common language is of importance in order to create the ground for further cooperation.

This paper is based on research available that is concentrated on ICT in general. In a situation where a case study would have been purposefully built on ubiquitous technology other suggestions could have

emerged. However, some ideas can be derived from existing work. They can be classified in two major clusters

1. The possible uses of ubiquitous technologies with a gender sensitive approach

2. The appropriate methodologies for integrating gender into the development of ubiquitous technologies

Let's consider these options

1. The possible uses of ubiquitous technologies with a gender sensitive approach

These indeed can be very varied. There are ICT examples that show that use of technology can create opportunities that women and men did not enjoy earlier. For example, distance education opportunities that allow people with limited mobility to attend studies at all levels. Experiences from industrialised countries (e.g. high education Australia) showed that a larger number of women attended these distance courses as compared to men even though Australia has a high rate of female enrolment in regular universities. In other countries in India or in Africa vocational training has been supported through distribution of course materials through the internet or e-mail, assisting thus the 'human interface' to update the information and provide students with necessary materials. This methodology can be used to train especially women on the use of upcoming ubiquitous technologies giving them the possibility to break the moulds of gender conceptions on capacities of men and women in handling technological items.

The information that can become available along with the ubiquitous items to women and men can increase the chances for empowerment since persons even in remote areas will be able to process information on their environment with the help of ubiquitous items such as control the state of their workable terrain, would be used to shorten the distances between remote villages and the rare health centres where the information on e.g. child health, epidemics, situation of chronic illnesses, especially progress of HIV infected persons can be monitored. It would be possible to allow the few doctors to monitor more often the state of health of their patients with fewer expenses. Women can be made responsible for such health technology since this is their domain, thus giving them one instrument that at the same time may enhance the possibilities that the assistance arrives in time and on the other will allow them to build confidence by using tools that they were not able to use before. The devices that may be designed for reaching a the end-users in countries with limited technology might be those pertaining to the *identification* (point of creation) and would ideally be simple to use (e.g. simple one touch or two colour control panel) in order to meet the requirements of a low skill woman that has not have a long term education and that has little time to absorb training on the used of technology.

Notwithstanding the continuation of efforts to provide the poorest of the poor with proper access and quality health services, the integration of existing human resources and ubiquitous networks/ devices may allow for an improvement of coverage of patients for the same number of available health care staff to the extend that at least the primary health care that can be managed without the presence of health care staff can be compensated by technology, such as correct self diagnosis that would subsequently be controlled and verified perhaps in a distance by qualified doctors.

The sensors for identification of atmospheric conditions would assist the farmers to foresee possible difficulties and take preventive measures or it would help the local government to provide food support or link with donors for planning humanitarian aid. Most importantly also linked to MDG on safe drinking water would be the use of nano-technology for ensuring the quality of water. Since it is women who are the main "managers" of the water for their families it is obviously crucial to involve then in developing, learning and managing this kind of technologies

Combining measures for access of women to financial facilities and income generation through information technologies (example of women owning mobile and setting up a village 'post office'). This model is bound to be short-lived given the expected increased penetration of mobile telephone

networks; nevertheless it creates possibilities to combine scarce resources (including scarce purchasing power of men and women in poor countries) with the technologies that are available to date to them.

After the development of ubiquitous items the marketing capabilities of women and their informal networks can be used as a means for empowerment through employment creation. The smart things, with affordable prices would go to women by women so addressing needs of the family mothers that are otherwise out of their control. Emphasis should be put to possibly provide the poor areas with remote control devices for services that are in traditional domain of women such as food processing, health care for children and elderly, clothing and cleaning, etc, that would allow them to spare effort, perhaps time and some money. This is however an issue that cannot be solved alone by the provision of the smart items; it would need to go along some interventions on empowerment of women (especially self confidence) of being users and masters of the new technologies.

2. The appropriate methodologies for integrating gender into the development of ubiquitous technologies

Gender analysis is a crucial tool that should be used to obtain base line data for the research and development of ubiquitous technology for developing countries as well as for feeding into the monitoring systems of the efficiency of investments. For example, analysing the division of labour between men and women will help to identify which is the contribution that smart things can specifically give to the improvement of life quality of men and women and making a decision on which of these items will have the biggest impact on a) the life of the women and men as individuals b) the impact on women and men in the context of their community ultimately giving priority to the improvement that has the widest impact but also at the same time is more sustainable.

Currently ITU is leading the work of researchers for formulation of measurable indicators for ICT. Partnership of UN bodies, including regional commissions, OECD and national statistical agencies, are seeking to close gaps in Information Society Statistics. Other examples of organisms that are working on gender and digital divide measurement are REGANTIC francophone West Africa (research on gender digital divide), ORBICOM (monitoring the digital divide 2005; chapter on gender digital divide). As literature shows, ubiquitous technologies can be rather unpredictable in the positive effects that they can unshackle. This means that indicators may became obsolete within a limited period of time or the conditions that allow for their measurement may change drastically. Certainly combining the upcoming indicators on gender and technology with case studies and other qualitative assessments of the reciprocal impact of ubiquitous technology and gender may help to adjust information to the need of research and development with a useful pace.

The extension and choice of networks is more a decision of the industry or government at some cases rather than an end-user driven choice. Even if there are certainly arguments to this approach, especially in developing countries it is crucial to involve in the widest possible consultation of men and women end-users and professionals and/ or their interest groups (community based organization, especially those for women) for identifying the issues linked especially with the capillarity of the networks so that the largest portion of population be covered with the most convenient possible solutions. Except for offering a variety of ideas this process will influence the involvement and ownership of the technologies and networks by population. (The utility of such approach can be taken from other sectors such as public water facilities where the participation of men and women in all steps for planning and implementation has increased sustainability). This has become an issue for example in the case of VoIP which would be very helpful for users that have limited resources. However as the case of South Africa has shown the companies that control the infrastructure would not allow for the distribution of this user's-pocket-friendly option since this would cause losses to them. Again, the issue of public private partnership may give a solution to this: A workable example of such partnership is given by Uganda Rural Communications Development Fund that is maintained by a contribution from telecom license (up to two percent). These funds are then used to spread access to the rural areas.[13]

5 SOME POINTS FOR REFLECTION INSTEAD OF CONCLUSIONS

5.1 Public private partnership

Taking an active approach in the promotion of UBI technologies and networks is also confirmed by the experience reflected in the Italian Case study[14] where the government would insist on public initiatives to stimulate demand for technologies. In the case of developing countries this initiatives could be concerted between government (preparation of policy and investment) and donors (technical assistance and funding). Coordination between bilateral and multilateral donors is crucial in attaining the best intentions and making them workable in situations of insufficient infrastructures and bleak services, taking especially into consideration the major shocks caused by the current international environment in terms of trade.

The driver for investing in development of gender sensitive ubiquitous network/ solutions is not of course profit, at least not in the first phase of the application. However, taking the example of the rapid expansion of mobile phone networks in developing countries one can expect that if the ubiquitous networks devices are able to meet the immediate (practical) needs of population in developing countries, paying specific attention to the differences between men's and women's needs, in a future not too far, there will be a demand for such products in these countries, enlarging as a result the potential market for the products.

It is certainly important to develop universal devices based on the industrialised world needs. However for the countries that still need to catch up with their information systems, collection and sharing of data it would be important to design items that serve also in the short term to meet needs that otherwise cost much money and effort. For example, basic devices that can indicate the amount of CO2 in dwellings that use open fires and that can give a signal to mothers to take children out of the house for fresh air in regular intervals and avoid health problems. This could be arranged using simple items (e.g. radio sensors) that do not require sources of energy but that work by the simple contact with the element that is being measured. In the first period research on such items and their provision to the end users can be financed by donors for the areas that most need them and be provided for a symbolic subsidised price thereafter. This indeed would require designing devices that are resistant to heat, humidity, and shock given that the poor communities where they would serve have less than optimal living conditions.

Independently from the priorities set by the countries donors would need to take a very proactive stance in the inclusion of the ubiquitous technologies in the assistance for development in order to bridge current gaps especially in access to information and services and in the longer term seeking to use these as vectors for empowerment of the most disadvantaged and poor, among which women are predominant. Suffices to remember that it is established and existing power relations (of which gender relations are a clear monitoring screen) that feed in the inequalities and discriminatory situations. It would be an enormous missed opportunity to ignore the value added it would bring to the planning, implementation, evaluation and progress of development assistance not taking into account the incisive role that gender relations have on the quality of aid delivery. This is to say that gender considerations should be used at all stages as a practical tool (for planning, assessment of needs, selection of delivery methods…. etc) to make sure that the possibilities that every individual benefits with the lower number of obstacles to the evolution of information society both as beneficiary and actor.

5.2 Benefits for men and women

In the industrialised countries the use of ICT and ubiquitous technologies has made a contribution to the increased quality of health services. Now medical doctors are able to accurately monitor the health of their patients in a distance by use of RFID and mobile telephones. How can the specialist envisage the use of such examples in a developing context? How can these technologies be adapted to the

conditions in which the primary health care is currently in most developing countries? What specific knowledge needs to be provided to women who are the main responsible for the health care and wellbeing of their families? How can such technologies help in supervising the spread of HIV virus and the monitoring of AIDS patients? How can women be made active players in developing these technologies given the big burden they carry for the care of the sick?

Gender analysis and planning needs to be endorsed and used in a proactive way. It will help to identify which are the underlying causes of inequality and how ubiquitous technology can target them. Also, envisaging the introduction of ICT education in the schools we can envisage that in the not so far future the conceptions of gender and power relations between men and women will change (see the example in India employment of young women and their increased mobility and independence from the families). This could be achieved both by:

- allowing for training on new ICT and ubiquitous devices use for both boys and girls, and where necessary using positive action to the inclusion of girls in technological courses both at the formal education system and in vocational training opportunities

- including ICT and ubiquitous devices in the current teaching methods in order to familiarise children of poor communities with their use independently from their being boys or girls

- objectively explain the value of the use of UBI devices at the same time demystifying their power to avoid that the existing gender patterns of access to resources and their use overtakes the advantages that would otherwise be available for women as well as for men. This extends beyond the purely practical arrangements to the regulatory level. The extension and availability of ICT employment etc has created possibilities for women to break seemingly insurmountable obstacles to their freedom and empowerment. However, given the instability and insecurity of such employment this opportunity can turn into a future constraint.

5.3 Benefits for the industry but not only…

The fundamental issue in reaching poor women is not one of profitability of models, but the creation of a set of technology-mediated services and products that allow women to be part of emerging opportunities.[15] Certainly it cannot be expected that investment in research and development of poor-friendly ubiquitous technology will have an immediate market interest for the industry however, considering the low level of the ICT access and use in most of the developing world one would expect it to increase along with the quality of services delivered to the poor also the demand for this high quality services, sustainability of results and in the near future the market demand for products and offer of services by higher educated audiences. This is an area that needs to be explored more in detail also to the benefit of R&D bringing diversification and innovation for overcoming challenges of insufficient infrastructures and dire conditions which can most likely be useful to the industry as such.

This should be done with due consideration to the infrastructure problem and the real possibilities of its wide extension. As put by the ITU report[16] ensuring access to villages might be a bigger challenge than expected. Also experience for developed world shows the same concern in reaching out remote communities. Ubiquitous technology could help partially in that information can be collected but the processing thus the reaction might take a longer time to become useful for the communities.

It will on the other hand facilitate the delivery of personalised aid not only for the donors but especially facilitate the service infrastructure for the governments of countries that most need it by facilitating the collection of data and the process of planning of scarce resources, making sure that optimal coverage is obtained. Gender analysis per se offers this kind of possibilities as literature has proven to date, combining it with appropriate technologies will increase the incisiveness and quality of collection of data, monitoring and evaluation.

5.4 Methodologies for combining gender and ubiquitous technology

According to specialists' assessment collecting gender disaggregated data is not simple and the means that are in place most likely do not provide enough are unhelpful for understanding more than the sex of the buyer and the type of product bought or the kind of internet site consulted and the frequency of the visits; for a proper analysis giving the qualitative information that would be necessary for a proper design of activities that would assist in closing gaps in the use and benefits from the ICT

Certainly as suggested by ITU the household surveys are the most appropriate means to collect information. Furthermore gender analysis conducted for purposes of profiling actions in a certain area can be helpful in providing necessary information; ICT interventions may buy in information from existing sources. Specialists of ICT and gender can focus in identifying which are the areas in which ICT can assist in achieving gender equality and on the other hand what are the opportunities offered by the discriminated position of women in society for infiltration of the new technologies the closer to the needs of the poorest communities. Except for sounding bizarre this approach can be a key to permeating areas that can bring improved service quality where the communities need them the most. It is evident from socio economic studies that women have their own networks of exchange and support especially in very poor communities; these "forums" can be used as venues for knowledge sharing on ICT and ubiquitous smart things use as well as the sources for financial support of the needs that the communities will have in the near future for such products and the services that they facilitate.

Interest for ubiquitous technology development is that there will be dire situations that need to be resolved in the poor countries that increase the probabilities for truly innovative solutions for other parts of the market. Envisage finding cheaper solutions for the poor with some interest as it has been shown so far that there will be public investment so assuring at least an initial return on the investment.

In addition to first hand ICT gender data collection the data obtained from other studies (social, economical, labour market, education, etc) should be in the focus of the specialists to make sure that interpretation of them is made in order to identify possible crossing points where gender and ICT not only interact but that should be considered more closely for optimising the quality of development interventions.

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