The software and information technology services industry

An opportunity for the economic autonomy of women in Latin America

United Nations
ECLAC
cooperación española
german cooperation
DEUTSCHE ZUSAMMENARBEIT

Project Document

The software and information technology services industry

An opportunity for the economic autonomy of women in Latin America

Economic Commission for Latin America and the Caribbean (ECLAC)

This document was prepared within the framework of the programme *Promoting low-carbon development and social cohesion in Latin America and the Caribbean*, carried out by the Economic Commission for Latin America and the Caribbean (ECLAC) in conjunction with the German Agency for International Cooperation (GIZ) and financed by the Federal Ministry for Economic Cooperation and Development (BMZ). Contributions for printing and layout of the English-language version of the document were gratefully received from the the Spanish Agency for International Development Cooperation (AECID). The report was coordinated by Lucía Scuro of the Division for Gender Affairs of the Economic Commission for Latin America and the Caribbean (ECLAC). The project research and preparation of the report were headed by Gloria Bonder (coordinator of the UNESCO Regional Chair on Women, Science and Technology in Latin America) under contract with GFA Consulting Group GmbH. The research team included Paula Magariños, Tania Pérez Bustos, Orietta Castillo and Anabella Benedetti. The report benefited from extensive comments by Néstor Bercovich.

LC/W.611
ORIGINAL: SPANISH
Copyright © United Nations, November 2014. All rights reserved
Printed at United Nations, Santiago, Chile

Contents

Introduction 5

I. Women in the IT field: why so few? 9
   A. Outlook and reality for women in the SIS industry 14
   B. Gender codes in open-source software 17

II. Those who made it: aspirations, conflicts and negotiations 21
   A. Gender patterns in SIS business structures and work processes 23
   B. Subjective implications of psychological contracts for labour relations and practices 33
      1. Compensation for passionate and transformative work 34
      2. Recognition of abilities: expected compensation 35
      3. The familiarity contract 36
      4. Small business owners: a display of courage and vision 37

III. Public policies in and for the SIS sector: an apparent neutrality 39
   A. Women's perception and position with regard to public policies promoting the SIS sector 40
   B. National women's/gender equality mechanisms: other spaces, other women 42

IV. Policies and programmes in multinational ICT companies 45
   A. Existing actions to retain and increase the number of women in SIS 49

V. European public policies and programmes for the development of the information and knowledge society 55
   A. The incorporation of a gender equality focus in ICT production policies and programmes 57

VI. Reflections and suggestions for gender equality in the SIS sector 65
   A. Europe and Latin America: progress and pending challenges 65
      1. What is the problem, and how should it be interpreted? 67
      2. What kind of measures or arguments predominate in both contexts, to address the limitations that incite the most concern? 67
      3. What strategies have been proposed for generating changes in the organizational culture and structure? 69
   B. Gender equality and the exercise of labour rights: two faces of the economic autonomy of women 71

C. Similar but different: guidelines for programmes and activities 74
1. Formative/educational actions 74
2. Communication campaigns 75
3. Mentorships 76
4. Formation of networks, groups or communities of practice 76
5. Recognition measures for people and companies 76
6. Strengthening the role of Institutional Mechanisms for the Advancement of Women 78

Bibliography 81

Tables

Table I.1 Gender breakdown of corporate boards of directors 11
Table I.2 Gender breakdown of mathematics majors in Argentina, 2005-2010 12
Table I.3 Women's participation in Argentine SIS firms by area and hierarchical level, 2003-2007 16
Table I.4 Wage gap in Argentine SIS firms by skill level, 2003-2007 16
Table IV.1 Discourse/principles of organizational cultures 47
Table IV.2 Initiatives to increase the number of women in SIS 49
Table V.1 Employment rate in Europe (27 countries), by activity and sex, 2011 56

Diagram

Diagram II.1 Territorialization of gender 24

Introduction

The ongoing rapid expansion, penetration and use of information and communication technologies (ICT) is producing a major transformation in all areas of society —including the work world, health services, education, production, trade, finances, politics and human relations— which is accelerating the trend towards globalization in the economic, social and cultural realms. The intensive, intelligent and efficient use of technological resources, such as mobile phones, the Internet and social networking websites, and the growing diffusion of numerous online activities, including e-commerce, electronic banking and content management, have become the driving force behind the new production and consumption dynamics that characterize the "digital economy" (ECLAC, 2013).

The degree of technological development and maturity of each country depends, to a large extent, on the level of broadband infrastructure (national and international connectivity, local access networks, public access points and affordability), the presence of ICT industries (hardware, software and application production) and the usage patterns of individuals, businesses and the government (ECLAC, 2013).

This transformation is critical for the future of Latin America and the Caribbean. As described by ECLAC (2013), the region is undergoing an auspicious economic and social transition, with positive effects in a large number of countries. Other countries, however, have not managed to take advantage of the opportunities offered by the rapid creation and expansion of this new paradigm.

There are many factors that limit or slow down the process in these countries, with varying degrees of importance. These include State policies, national and foreign investment, the production structure, the digital competence of the work force, the degree of access and the ICT usage patterns of citizens. The latter reflects digital gaps related to education level, income level, rural versus urban residence and ethnic, racial and generational divides. Gender differences and inequalities cut across all of these factors.

Consequently, while the digital economy has the potential to be a driving force for structural change with equality (ECLAC, 2013), it is critical that the policies in this sector be accompanied by and integrated with other State interventions aimed at overcoming the social and economic inequalities both within and between Latin American countries. The virtuous convergence of these policies will foster a relevant and effective response to the particular needs of different social groups, where one of the central objectives is full participation in the construction of an inclusive information and knowledge society (IKS) that promotes the development of human capacities.

For over a decade, research on this process has been generating a significant body of knowledge, especially with regard to women's participation in the IKS, their progress and the obstacles they face. While the early studies focused on developed countries, in recent years there has been a growing literature on other regions (Asia and Latin America and the Caribbean, in particular).

In Latin America, research on women's participation in the IKS began in the late 1990s and early 2000s. Early work focused on identifying, analysing and diffusing the existence of a gender-based digital gap in ICT access and showing the consequences of this inequality in terms of women's rights, social participation and economic autonomy and the damage that it causes for the development of the economy and the IKS.

Over time, the research expanded and became more complex in terms of both the issues analysed and the interpretation of manifestations of gender inequality. A plurality of gender gaps was revealed, related not only to access to high-quality equipment and connectivity, but also to usage patterns, women's participation in ICT careers and the creation of content and tools, and their representation in the industry (Bonder, 2005, 2008; Castaño 2008).

The findings of these studies and the growing interest in this issue among international and regional organizations, such as the International Telecommunication Union (ITU), the Economic Commission for Latin America and the Caribbean (ECLAC), and the European Union, make it clear that the basic challenge for advancing towards a truly inclusive, dynamic and innovative knowledge economy consists in planning and implementing measures that are not limited to responding to the basic needs of women as users —or, more precisely, as ICT consumers— but rather incorporate strategic interests and motivate women to operate in the digital world as active citizens who are informed about their rights and knowledgeable about the ICT architecture, its possibilities and the associated risks. The issue is thus that women must be treated as innovative, decisive agents in the productive processes of the ICT field and in the policies that promote and regulate the industry.

In sum, the spotlight shifts towards the need to implement systematic measures and strategies that, by fostering women's participation in the digital economy, contribute to optimizing the design, production and commercialization of ICTs and the integration of women's vision, needs, communication style, aesthetics and —especially— their demands for autonomy and a voice in decisions affecting the development of their communities and countries.

In this framework, the software and information services (SIS) industry[1] could provide some very promising opportunities for women's integration, as follows:

- It is a key driving sector for the development of the digital economy, with a strong capacity to generate value and continuous worldwide growth.
- Given its propensity for innovation, it plays an important role in the economic growth of Latin America and the Caribbean, for example, through the creation, transfer and diffusion of new technologies; the creation of high-skilled technical-professional jobs (which can directly or indirectly motivate young people to go into technical careers, thereby expanding the local human resources base[2] that can interpret the specific needs of each country

[1] According to the Organization for Economic Cooperation and Development (OECD, 1985), software is "the production of a structured set of instructions, procedures, programmes, rules and documentation contained in any types of physical support with the aim of making possible the use of electronic data processing equipment." It is produced by the information technology (IT) industries, which also encompass hardware and information services (including professionals involved in software installation, maintenance, development and integration, as well as hardware technical support). Its presence is invisible and intangible; software is everywhere. As Torrisi (1998) shows, it is an activity based on the codification of knowledge and information, with virtually immaterial products and services (inputs and outputs).

[2] A report by the United Nations Conference on Trade and Development (UNCTAD, 2012) warns that if local capacities are not generated for taking advantage of the opportunities presented by the sector, some countries could be left behind, giving rise to new economic and social inequalities.

and community and generate more appropriate solutions);[3] and the export of services (ECLAC, 2013).

- Its applications are crucial for improving performance in multiple areas, including the government, health, education, security, commerce, the productive sector, cultural creation and diffusion, and so on. In addition to requiring continuous innovation to address the full range of demands and projects, applications must provide solutions that take into account the sensibilities, interests and needs of diverse social groups; in other words, programming must be centred on the preferences and needs of both male and female users.
- The development of new products, the expansion of markets and the transformation of business models have created the space for new cooperation strategies and the emergence of a new generation of entrepreneurs. More women should be encouraged to participate in this movement.[4]

Is the SIS industry living up to its potential for offering opportunities to women?

Studies carried out in Latin America on women's participation in the SIS and computer industry reveal a scenario that is not very encouraging (Heller, 2010; Flórez-Estrada, 2007; Novick, Rojo and Castillo, 2008). They highlight the low share of women with IT degrees or with careers in the IT industry, together with the factors that limit their access, performance and promotion. These studies, which all present very similar findings, point the way for planning policies and programmes that could rectify this situation, although the region is still far from implementing systematic actions by the State and businesses to achieve this objective.

This overview, which might be called a diagnosis of obstacles, needs to be enriched or expanded with research into the experiences of women who, despite the obstacles diagnosed, have managed to insert themselves in the field of SIS production and, in particular, of women who hold senior management positions in large corporations or are business leaders.

There are few studies of women who hold high-level positions in modern productive sectors. According to an ECLAC report (Rico and Marco, 2009), this reflects the fact that for several decades, gender studies focused on identifying the determinants of gender discrimination in low-productivity and low-income sectors.

> "*While these studies are clearly important, it is also necessary to analyse inequality in privileged employment sectors, which are both sustainable and determinant for the economies, especially if they set trends followed by firms in other sectors*" (Rico and Marco, 2009).

Research on women in higher-income sectors that carry certain privileges can provide insight into how they process their ambitions, desires, pleasure and suffering, their relationship with power and their gender awareness, in an environment in which they are a minority. It is also important to understand their ties to proposed policies and programmes for increasing the inclusion and promotion of women in these areas.

One challenge for the design of effective policies is to shift the perspective to the "recipients" in order to gather their opinions, assessments and objections to existing initiatives and actions, together with their own interpretations of gender inequality in their fields and their demands for change.

---

[3] In this sense, the production of free or open-source software is especially important because, in contrast to proprietary software, it is freely available (that is, distributed free or at nominal cost) and allows the modification of the source code of the programmes and systems, which can thus be adapted to the needs and interests of different groups.

[4] According to ECLAC (2010a), "The creation and development of the software industry has taken place in what is called 'innovation clusters', with their exceptional mix of universities, technology excellence centres, leading companies, angel capital and venture capital funds within a culture of tolerance, entrepreneurship and creativity."

With an eye to this challenge, the objective of this report is to understand the rationality that underpins public and business policies for promoting the IT and SIS industries and to determine whether they incorporate gender equality and/or provide incentives for women's participation. The report also explores how this group of women is symbolically constructed within the firms, what issues are emphasized by the women themselves and what solutions or resources they propose for overcoming the problems. It then contrasts this discourse and intervention with the experiences, visions and demands of women leaders in the SIS sector.

For this purpose, the policies, programmes and best practices of Europe are analysed and compared with instruments currently in place in Latin America and the Caribbean, in terms of their specific characteristics and degree of progress. Special attention is given to the cases of Argentina, Costa Rica and Colombia.

In these three countries, in-depth interviews were carried out with the following sources: (i) women in high-level positions at large multinational software-development firms; (ii) founders or managers of small and medium-sized enterprises (SMEs) dedicated to the development and marketing of SIS; (iii) human resource managers at firms with the aforementioned characteristics; and (iv) key informants with knowledge of the industry's history in these countries and the participation of women therein.[5]

The report is organized into six chapters.

The first chapter reviews the literature and statistics on women's participation in ICT-related studies and careers at the regional and global levels. It analyses the main factors that limit women's entry and performance in this field, especially the SIS industry (including free software), as well as the outlook for opportunities in the sector to expand women's workforce options and strengthen their economic autonomy.

The second chapter describes the profile and work history of women who hold high-level jobs in SIS production or who head SMEs in this field, analysing their positioning with regard to gender inequality in the organizational culture. The chapter goes on to outline women's presence in different jobs/functions; the gender distribution of work processes; and the "psychological contracts" that women leaders usually make with companies and, in particular, with their superiors and colleagues.

The third chapter briefly reviews advances in public policies to promote software production in the three country studies, to determine whether they incorporate a gender equality perspective. It also explores the knowledge, perceptions and demands of the people interviewed with regard to these instruments and the institutional mechanisms for the advancement of women.

This line of analysis is deepened in the fourth chapter, which examines the approaches, proposals and actions used in existing policies and programmes, driven by large ICT firms, to foster women's entry and promotion in this industry. The focus here is on verifying the extent to which these measures respond to the demands expressed in the interviews.

For comparative purposes, the fifth chapter analyses the degree of progress and development of this type of instrument in Europe, with a particular focus on the characteristics, approaches and results of initiatives and measures considered to be best practices.

Based on the study's findings, the final chapter presents guidelines for designing programmes and policies that, in addition to encouraging more women to participate in SIS fields, seek to optimize their work conditions, facilitate the exercise of their rights and strengthen their economic autonomy.

[5] A total of 44 interviews were carried out in May, June and July 2013 in the cities of Buenos Aires (Argentina), Bogotá (Colombia) and San José (Costa Rica): 11 with women in large companies, 12 founders/managers of SMEs in the SIS industry, 8 human resources managers and 13 key informants.

I. Women in the IT field: why so few?

> *The history of computing and information technologies is full of important women, such as Ada Lovelace, the first programmer; Grace Murray Hopper, pioneer in the invention and development of compilers…; [and] Fran Allen, pioneer in optimizing compilers…. The fact that their central role in computer history has been largely silenced is striking and characteristic of the times.*
>
> *[They] developed the basis for computer programming: they created the first library routines and the first software applications. In 1997, despite the effort to exclude them from history, they were inducted into the Women in Technology International Hall of Fame.* (Ruiz, 2010)

Despite this promising start, the lack of women in computer science majors and their insertion and promotion in ICT companies remains a valid concern.

In North America and Europe, this problem —whether in schools, universities or industry— has been studied for decades by a range of disciplines, including psychology, sociology and anthropology. Although they use different theoretical and methodological approaches, the majority of the studies reach similar conclusions and make similar recommendations for overcoming the situation.

Although much more scarce, research carried out in Latin America and the Caribbean has, in many senses, produced similar results to the European and North American studies. The most significant findings include the following:

- Although the IT industry continues to create more work opportunities, interest in these fields and the decision to major in related subjects has fallen steadily over the last two decades. In the United States, for example, the number of students and graduates in these disciplines has been stable, but by 2018 local human resources (with a university education) will only cover half the available jobs. Similarly, the European Union[6] will have an estimated 900,000 vacant positions in 2015 (Tandon, 2012). For Latin America, forecasts point to the same trend: according to ITU (Tandon, 2012), Brazil will have a shortage of 200,000 workers with professional ICT training in 2013. At the world level, estimates indicate that the deficit of qualified professionals in this field exceeds two million.

[6] In this region, approximately 120,000 ICT jobs are created each year.

There are a few exceptions, however. In India, for example, women represented 31% of the labour force in 2009. In the Philippines, women hold a strong share of IT-related jobs (although the available information does not specify the type of jobs). There is also a surprising number of women in computer science majors in the Persian Gulf countries, especially Qatar and Oman, where in some universities 80% of registered students are women. Nevertheless, women continue to be a minority on the teaching staff in these disciplines.[7]

- The number of women who choose to major in these subjects is also in decline. In the United States, the percentage of computer science graduates who are women fell from 37% in 1984 to 25% in 2004 (Galladan, 2001).[8] This trend is repeated in a number of other countries. At the University of Costa Rica, women represented 30.4% of new computer science majors in 1981, but only 16.7% in 2007 (Barrantes and Chavarría, 2007). In Argentina, they accounted for 26% of ICT students in 2001 versus 19% in 2009.[9]
- Universities are still a long way from equal registration. In Costa Rica women computer science majors represent just 18% of the total.[10] In the Dominican Republic, 22% of ICT engineers were women in 2009 (ECLAC, 2012), with a similar share in Argentina in 2010.
- Women's participation in the IT industry is low at the international level, where they represent 25% of total technical and engineering personnel (Ashcraft and Blithe, 2010). In the European Union, of the seven million people who work in these fields, only 30% are women (ITU, 2012). The share is similar in countries such as Costa Rica (according to data from the Sulá Batsú Cooperativa, 2012).
- A significant percentage of women in technology change jobs mid-career or leave the industry altogether, including 56% of technologists and 39% of engineers (Hafkin and Taggart, 2001; Ashcraft and Blithe, 2010). Many of those who move to different companies leave technical jobs for positions in sales, administration, communication and finance.

Research carried out by Ashcraft and Blithe (2010) in the United States reveals that for women who leave their jobs in ICT companies, 49% continue to work in the field (22% in self-employment; 10% in their own start-up companies; and 17% in the government or non-governmental organizations), while 51% abandon the industry (24% move to non-technology-related jobs in different companies; 7% take non-technology-related jobs in the same company; and 20% leave the workforce). With regard to the last group, a study in Great Britain[11] finds that a large number of women in technology leave their jobs after the birth of their first child, and a significant share of women between the ages of 40 and 50 quit working after decades of experience.

The reasons behind this decision include relationships with supervisors and discriminatory promotion practices, such as the use of different performance evaluation measures, the assignment of tasks and the promotion of men and women.

- Of particular concern is the very low share of women in management and decision-making positions in ICT companies. For example, in Costa Rica[12] women hold 13.9% of management jobs, and only 9.6% of companies that are members of the sector's business chamber are headed by women.

---

7 More information is available online at http://gulfnews.com/.

8 Cited in Tomassini and Urquhart (2011), page 5.

9 The statistics on Argentina were elaborated by the authors, based on data from the Secretariat of University Policies for the 2001-2010 period.

10 Statistics provided by the Sulá Batsú Cooperativa (2012).

11 Cited in Haché, Cruels and Vergés (2011).

12 Report on the project "TIC-as: Creando oportunidades de empleo y trabajo para las mujeres en el sector productivo de las tecnologías de información y comunicación en Costa Rica," carried out by the Sulá Batsú Cooperativa with support from UN-Women.

Table I.1 presents the breakdown by gender of the corporate boards of directors of well-known multinational companies in this sector:

Table I.1
Gender breakdown of corporate boards of directors
(Number of people)

Company	Composition of the Board of Directors	
	Women	Men
Facebook	2	6
Google	3	7
Accenture	3	9
Microsoft	2	7
Intel	2	8
HP	3	9
Nokia	1	3
IBM	3	10
Yahoo	2	5
Cisco	2	12
Oracle	2	9
Total	**25**	**85**

Source: Prepared by the author on the basis of information from Empresa de Telecomunicaciones de Bogotá (ETB) [online] http://www.etb.com.co/nuestracom/includes/Estructura-1er.-Nivel-ETB-Marzo-2013.pdf [date of reference: 3 March 2013]; Net Serviços de Comunicação SA [online] http://www.netcombo.com.br/institucional/organograma [date of reference: 3 March 2013]; SYKES [online] http://www.sykes.com/CCS/regions/latin-america.aspx [date of reference: 3 Marche 2013]; ENTEL PCS [online] http://www.entelpcs.cl/internacional/welcome_02.iws [date of reference: 3 Marche 2013]; CISCO América Latina [online] http://www.cisco.com/web/LA/cisco/equipo/index.html [date of reference: 3 March 2013]; Dell América Latina [online] http://www1.la.dell.com/la/en/gen/df.aspx?refid=df&s=gen [date of reference: 3 March 2013].

According to *Catalyst Census* (Catalyst, 2011), of 113 Silicon Valley companies analysed, 42 did not have any women in these positions.

What factors explain the scenario described above?

With regard to the choice of major, the following obstacles are usually identified:

- The tendency to associate technology with the "masculine world". The traditional stereotypes, many of which are still in force, hold that women tend to be social/sociable/emotional, while men are perceived as technological/rational/empirical. Consequently, men are thought to be better suited to performing effectively in IT fields (Haché, Cruels and Vergés, 2011).

Tandon (2012) addresses how these stereotypes were constructed and reproduced: "In the Western world, right up to the 1960s, computer programming was perceived as a natural career choice for savvy young women. *Cosmopolitan Magazine* urged their fashionable female readership to consider careers in programming —describing the field as offering better job opportunities for women than many other professional careers."

In subsequent decades, the image of the computer programmer in Western countries became strongly associated with the stereotype of a "geek" or a "nerd".[13] As a result, women began to feel that they did not fit in the field. As SpiderAlex[14] argues,

[13] Other associated stereotypes include the founding hero, the inventor, the hacker, the benefactor: a man with few social skills who spends endless hours developing code.

[14] Cyberactivist and researcher for the LelaCoders project.

"In the 1980s, the first hacker movies depicted boys with acne, shut up in their room trying to break into the Pentagon. The nerd culture has a very masculine quality, and that has elicited a rejection among women" (cited in Muñoz, 2012).

Corneliussen further explores the stereotype:

"Images and discourse showed males as 'self-educated wizards' while women were portrayed as disinterested or frustrated by computers. For non-using males, computer literacy was portrayed as if it were a choice.... By contrast, for non-using females, computer literacy was portrayed as being linked to natural disinterest or even incompetence in computer science" (cited in Haché, Cruels and Vergés, 2011).

- ICTs are usually represented as essentially technical tools, dissociated from sociocultural and political processes, "value-neutral" and thus disconnected from gender patterns and representations.
- Lack of incentives from the family and the school, including an outdated curriculum or curricular content that is out of touch with the predominant interests among girls and overt or subtle attitudes among teachers, who not only fail to stimulate their students, but may also discourage girls who are drawn to this field.[15]

Consequently, women tend to believe that they do not have the necessary skills and personality traits to be successful in computer sciences, as shown by the results of a survey carried out by Supporting Women in Information Technology (SWIFT) (cited in Chan and others, 2000).[16]

In addition, there is a widely held belief that women are generally not interested in mathematics and, therefore, computer science. However, recent data on math students and graduates at national universities in Argentina show a higher share of women than men, although the share of female students and graduates fell around 10% between 2005 and 2010.[17]

Table I.2
Gender breakdown of mathematics majors in Argentina, 2005-2010
(Percentages)

Students			Graduates		
Year	Male	Female	Year	Male	Female
2005	32.4	67.6	2005	27.2	72.8
2006	31.8	68.2	2006	27.0	73.0
2007	41.1	58.9	2007	31.8	68.2
2008	40.8	59.2	2008	21.3	78.7
2009	41.2	58.8	2009	39.2	60.8
2010	41.8	58.2	2010	38.4	61.6
Change in 2005-2010		**-9.5**	**Change in 2005-2010**		**-11.3**

Source: Statistics on mathematics students and graduates at Argentine national universities, disaggregated by institution, locality and gender for the 2005-2010 cycle, were provided by the Secretariat of University Policies.

Based on interviews held over the course of this study, we can break the evolution of computer science degrees into three phases, at least in the countries of the region:

[15] Family relationships can encourage different ICT access and use for boys and girls —for example, by putting the computer in the brother's room (Haché, Cruels y Vergés, 2011).

[16] The survey interviewed 7,411 secondary students about their choice of majors (cited in Chan and others, 2000).

[17] This does not mean that everyone who likes mathematics will go into computer sciences, but it supports the argument for implementing policies and programmes that try to address this supposed limitation among girls.

- Start-up and launching. In the 1980s, the computer sciences were promoted as a new, "futurist" field, an option for "initiates" in an unknown, yet very promising area.[18] The number of women was relatively high.
- Formalization and consolidation of ICT training (a predominately male space, with a minority of women). One story told in the interviews spotlights some of the attitudes that women commonly face when they are a minority in a mostly male department, in this case a thinly veiled put-down wrapped in condescension:

"He [the professor] would show up and say ´girls, here's the key to the bathroom. Since this is electrical engineering, the women's bathroom is always locked, so here's the key in case you need it.

- The diffusion and penetration of ICTs in everyday life may have resulted in a degree of invisibility of the production process and thus a decline in professional interest. In other words, as ICT use has become more ordinary or familiar, there has been a drop in students of both sexes in technology majors, although this is not the only possible explanation for the decline. While there is some variation among countries, university statistics show that young people tend to prefer traditional disciplines like medicine, law or business administration and, increasingly, newer, more trendy options such as publicity, design and culinary studies.

It is therefore pertinent to examine interest in informatics among the new generations within a broader framework that takes into account which education options are more attractive and why and how they relate to students' attitudes towards work, free time and desirable versus unwanted lifestyles.[19] This analysis would support the delineation of expectations for integrating young people without the bias of focusing on their reluctance to choose computer science majors, but instead aiming to understand, without preconceptions, why they do choose them. Thus, if the goal is to encourage women to enter these majors, the message needs to be consonant with their interests and life goals.

With regard to the lack of women working in these fields, the biggest factors are as follows:

- The lack of role models, mentors and sponsors.
- Institutional cultures that explicitly or implicitly hinder the professional development of women in technology, the level of job satisfaction and the possibility for attaining decision-making positions, as well as the scarce recognition of women's achievements.
- Long work hours that impinge on their personal life.
- Lower salaries than men (with equivalent training and at the same level in the company).
- Employers' tendency to contract women mainly for sales/marketing, communication, administration or human resources.
- Inflexible work policies that are hard to balance with other responsibilities that mainly fall on women, such as caring for children and the elderly in the family.

[18] The first computer science major in Latin America was offered by the University of Buenos Aires, Argentina, in 1963. The University of Costa Rica founded its School of Computer Science and Informatics in 1981, when it merged its bachelor programmes in informatics and computing in response to the major shift in the field of informatics, as personal computers were just coming out on the market and organizations were starting to need professionals who could automate their business activities.

[19] Registration data for 2013 in Argentina show that only 12% of incoming students declared majors in science and technology, while one in three students chose majors in the humanities. Data for Colombia indicate that systems engineering is one of the most popular majors, followed by high-level culinary studies, which is attracting an increasing number of men.

The limitations or barriers that are hardest to detect and change are often related to unconscious biases. These pre-existing attitudes and beliefs about particular groups of people can inadvertently influence the perceptions, assessments, behaviours and decisions that lace through interpersonal relationships. When they become more systematic or are coded in business policies or practices, they are transformed into institutional barriers.

These are often expressed through "micro-inequities",[20] that is, the subtle, cumulative messages that are communicated through a look, a gesture, a tone of voice, jokes, rumours, and so on. Micro-inequalities undermine interest in the profession, affect work performance and employee relations and increase stress and insecurity. They can cause suffering, distancing and other suboptimal behaviours among personnel and can erode team cohesion.

An interesting example comes from research on recommendation letters and performance evaluations. References for men (written by both men and women) were longer and contained a lot more positive words (excellent, outstanding), whereas references for women were more likely to raise a doubt or warning ("she has a strong-willed personality") and describe qualities such as dedication, responsibility and meticulousness, which are not highly valued for senior positions (Barker, 2010).

The recognition of this type of issue highlights the need to pose new questions on the hidden aspects of the lack of women in majors and industries dedicated to ICT production.

The DonesTech group emphatically agrees, arguing that the dominant explanations need to be replaced, to the extent that they present women as "the problem" that needs to be fixed —by encouraging them, empowering them, raising their self-esteem and increasing their competence. Instead, the key issue that needs to be analysed is what is happening in the ICT field that does not attract and retain women.

This study tackles that question from the other side of the coin. Rather than analyse why women do not choose to go into this field or why there are so few women, especially at the highest levels of management, we ask what has happened to women who have received training in this field and achieved high-level positions or created start-up companies in an innovative, predominantly male sector. The study asked the following questions: What policy instruments, at both the State and business levels, are being implemented to strengthen women's access, retention, and promotion and the generation of more satisfactory work conditions? What are the results? How much do these "successful" women know about public and business policies that aim to improve gender equality in their work environment? What is their opinion or assessment of the policies, and what proposals can they offer for improving their work life and achieving a balance of opportunities for men and women?

Before discussing the responses, it is necessary to provide a brief review of the situation for women in this field of production.

A. Outlook and reality for women in the SIS industry

While few studies as yet focus on women's involvement in software production, the body of publications reviewed suggests that in contrast to other technology-based industries, SIS requires a variety of so-called soft skills,[21] such as collaboration, empathy, autonomy and communication skills (Flórez-Estrada, 2007), all of which are culturally attributed to women. In SIS, these skills are valued as a means for increasing efficiency in a highly flexible and creative work environment (Greco, 2005).

[20] Micro-inequities are the "automatized" reproduction of unconscious beliefs and stereotypes.

[21] See, for example, the Costa Rican Chamber of Software Producers (CAPROSOFT) (cited in Flórez-Estrada, 2007).

A recent article published by the *International Journal of Information Processing and Management* (IJIPM) argues that the skills that were necessary for successfully developing software 30 years ago are no longer advantageous in the present. Rather, an interdisciplinary approach is needed:

> *"Software design has become much more than manipulating formal or semi-formal notations, but rather revolves around the interaction between designers and users: namely, the designer's perception of what the user wants, and the user's perception of what he/she really needs. Today, successful software is developed after a tremendous amount of time has been spent with the user in the form of prototyping, experimentation and feedback* (Ahmed and others, 2013).

Both hard skills and soft skills are required throughout the project cycle, and all personnel, including both men and women, are expected to use them proficiently according to the specific phases of the work process. This study suggests that the success of these companies lies in the creation of work environments and collaborative groups that maximize both types of skills to achieve goals and targets.

The ITU report *A Bright Future in ICTs Opportunities for a New Generation of Women* (Tandon, 2012), characterizes the ICT sector as producing "hybrid jobs" that require both solid technical training and a lot of intuition and creativity in activities as diverse as the development of applications for the Internet, smart phones and cloud computing, which are heavily promoted by governments and the private sector and which foster international trade.

All of this suggests that the sector will offer women attractive jobs with great potential for professional growth. According to this report, the future is especially promising for women in bioengineering, power grid informatics, digital media and social and mobile application software, which "combine ICT with business of every imaginable field" and are being promoted by governments as a strategic response for economic development.

Despite this promising outlook, the data on women's actual participation are not so optimistic: women's insertion is still low, with strong variation among countries. In Argentina, the estimated ratio of women to men in the sector is one to three;[22] in Costa Rica, the share of women fluctuates between 7% and 17% (Flórez-Estrada, 2007).

The SIS industry retains a fairly traditional structure that perpetuates a number of different barriers, including the glass ceiling. In Argentina, for example, an ECLAC study carried out in conjunction with the Argentine Ministry of Labour, Employment and Social Security (Novick, Rojo and Castillo, 2008) explores women's insertion in the labour market, with a focus on four productive sectors, including software. The study identifies inequalities in the gender composition of total employees, management positions and boards of directors.

[22] Based on data provided by Paula Nahirñak, a researcher with the Mediterranean Foundation's Institute of Economic Studies on Argentine and Latin American Reality (IERAL) (cited in Pernas, 2012).

Table I.3
Women's participation in Argentine SIS firms by area and hierarchical level, 2003-2007
(Percentages)

Total employees	36
Total wage gap	32
By area	
Administration	62
Sales and marketing	50
Development (programming/design)	24
Implementation and testing	49
Technical support	16
By hierarchical level	
Directors and managers	21
Staff leaders and supervisors	41
Workers	36

Source: Prepared by the author, on the basis of Marta Novick, Sofía Rojo and Victoria Castillo (comps.), "El trabajo femenino en la post convertibilidad. Argentina 2003 – 2007", Project Document, No. 182 (LC/W.182), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2008 [based on data from Observatorio de Empleo y Dinámica Empresarial, Dirección General de Estudios y Estadísticas Laborales (DGEyEL), Subsecretaría de Programación Técnica y Estudios Laborales (SSPTyEL), Ministerio de Trabajo y Seguridad Social (MTEySS)].

In addition, the persistent wage gaps are widening to the extent that technical specialization is decreasing.

Table I.4
Wage gap in Argentine SIS firms by skill level, 2003-2007
(Percentages)

Total wage gap	32
By skill level	
Professional	20
Technical	8
Operational	18
Unskilled	54

Source: Prepared by the author, on the basis of Marta Novick, Sofía Rojo and Victoria Castillo (comps.), "El trabajo femenino en la post convertibilidad. Argentina 2003 – 2007", Project Document, No. 182 (LC/W.182), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), 2008 [based on data from Observatorio de Empleo y Dinámica Empresarial, Dirección General de Estudios y Estadísticas Laborales (DGEyEL), Subsecretaría de Programación Técnica y Estudios Laborales (SSPTyEL), Ministerio de Trabajo y Seguridad Social (MTEySS)].

It is generally held that the lack of women involved in SIS production undermines the sector's quality, productivity and capacity to enter new market niches. This has led many large firms to create programmes and implement measures that are described in the following sections.

At the same time, SIS development offers dynamic opportunities for entrepreneurship. While there is a wide literature on women's entrepreneurship in general, publications focusing on SIS in particular are sparse. Among the few studies dedicated to this area, "Women 2.0: Founding Startups" (cited in Bapat, 2012) suggests that technological entrepreneurial ventures led by women are more efficient in financial terms, generating a return on investment of 35% and 12% more than those led

by men. The literature consistently finds that women ICT entrepreneurs are highly likely to detect opportunities in different areas of production and to create solutions tailored to specific demands. However, women entrepreneurs in technological ventures are in the minority by far.

B. Gender codes in open-source software

Free or open-source software, in contrast to proprietary software, is freely available (that is, distributed free or at nominal cost) and allows the modification of the source code of the programmes and systems, which can thus be adapted to the needs and interests of different groups. Its production is based on collective learning, the social appropriation of knowledge and the promotion of a philosophy of inclusion, diversity and solidarity among the users, generating an alternative "culture" or "community" (Salas, 2006).

These general characteristics might lead one to think that the environment would be more open to women's participation, but studies and surveys show the opposite trend: in Europe, only 1.5% of the members of the open-source software community are women, versus 28% in proprietary software (Nafus, Leach and Krieger, 2006).

Lin (2006) and Pérez-Bustos (2010) both find that the culture of these companies, ventures and communities is predominantly male and does not favour the insertion and development of women. Consequently, the products that they generate, from the graphic interfaces to the types of applications, can be out of touch with women's tastes and needs.

Some community members maintain the opposite, however, parroting an argument that has yet to be fully eradicated:

> *"The simple fact of keeping the doors open and not putting up 'formal' barriers transfers the responsibility to women. 'If they don't come, it's because they don't want to!' and 'No woman has ever been denied entry!' are the classic justifications. We thus find groups of users with a female membership of one or two in the best of cases"* (Busaniche, 2006).

This situation is usually explained by the lack of female benchmarks in these communities, the invisibility and underrepresentation of women and the devaluation of the jobs they usually perform. Many women are dedicated mainly to interface development, translation, training, tutorials and documentation. These tasks are considered inferior to code writing, which is deemed the core work and is primarily carried out by men. As argued by Salas (2006), "When software creation is conceived as solely code writing, it ignores the important work done by many women."

In addition to the obstacles cited above, Lin (2006) highlights the absence of feminine viewpoints in software development, the predominance of a sexist and non-inclusive language and the competitive environment in which women are forced to perform if they are to be taken seriously and earn the sympathy of their male colleagues.

What factors explain this situation, and what can be done to increase the share of women in this area?

According to Lin (2006),

> *"The defenders of open-source software… tend to treat this community as a monolithic culture and pay more attention to the differences between groups than within groups. They are so desperate to unite around the fight for freedom of information that they give little or no recognition to the fact that these groups, like the societies in which they are inserted (to a greater or lesser degree), are characterized by gender divisions, with substantial differences in the power and advantages held by men and women."*

Open-source software has the potential to transform and optimize the way women relate to ICTs (greater control and skills for strategic uses). As warned by Cinco (cited in Salas, 2006), however, these benefits can only materialize if the contributions of both men and women are acknowledged and integrated equally. To this end, community members must be aware of the existence and manifestation of these inequalities and get involved in actions to reverse them.

To conclude this chapter, we summarize the main conclusions of a study carried out by Cambridge University (Nafus, Leach and Krieger, 2006), which provides important information on women's participation in this field:[23]

- Most participants in the open-source software community perceive technology as an activity centred on identifying and developing strictly technological solutions, in isolation from people's needs and interests. That is, they do not connect software applications with socio-cultural demands and issues.
- Open-source software is characterized by a voluntarist ethos which values autonomy and individual achievement. Consequently, those involved in its production —both men and women— do not believe that the developer's gender has any affect on his or her performance. Given their stance of "you can if you want to," there is no room to take into account limitations deriving from gender inequalities, so nothing needs to be done to offset them.
- According to this study, women "are actively (if unconsciously) excluded" by the intrinsic characteristics of the free software culture. For example, even today these communities maintain a sort of "hacker" ethic of a person dedicated to or "alienated" by the work, with few social ties or interest in establishing them. This lifestyle is not common among women, not only out of necessity, but also because it is not compatible with their subjective styles and desires. Interest in the social realm and sociability are, in fact, viewed as an impediment to dedication to a technical career, which is more closely associated with the male gender.
- Free or open-source software rewards the production of code. All other activities are not considered technical in a strict sense and are therefore less prestigious. Because women typically choose —or feel forced to choose— activities that are much more oriented towards addressing people's needs, demands and interests, their work is not as highly valued.
- Community members are assumed to have a long history with computer technology, whereas women tend to be viewed as having less experience, which contributes to their devaluation in an environment that respects very advanced skills and independent learning.
- Confrontational discussions or arguments are common in open-source software groups, where technicians use inflammatory language and aggressive posturing (called flaming) to build their reputation for being capable, confident and competent. According to the report, more established members of the community engage in these "flame wars" less often, but younger contributors use these tactics as a means to gain visibility and earn respect from their peers and superiors. The resulting environment is not very encouraging or friendly for less-experienced newcomers who either are unfamiliar with or reject these cultural codes and the established hierarchy. Women tend to be affected more strongly than men because in most cases they have a shorter history with computers, which can undermine their confidence to defend themselves in the technical arena, especially given the very competitive relationships and aggressive arguments. This conclusion is consistent with Busaniche (2006), who argues that "Participating in open-source software communities requires strong self-esteem, a strong and secure personality and the ability to argue and

[23] The study asked men and women about the need to increase the number of women working in open-source software development. Of the survey respondents, 66% of men and 85% of women stated that having more women in the field would benefit the community and could boost its growth.

defend one's own work in spaces where there is no head but there are many strong leaders and personalities that act as a 'guru' and/or 'benevolent dictator'."

- The reliance on long hours for writing code and the requirement of almost total availability in terms of time contributes to the higher participation of men than women: despite working in an environment characterized by innovation and an alternative culture, men continue to assume that it is "normal" to allocate caregiving responsibilities to women.

The data presented thus far provide a general description, which is by no means complete, of the situation of women in the SIS field, which is critical for understanding the findings to come out this research.

II. Those who made it: aspirations, conflicts and negotiations

Women who hold senior positions in the IT industry are part of a modern sector and an elite group; they make good salaries[24] and in some cases have more benefits than required by their country's labour code. However, many of the accounts given during the interviews for this study describe situations of inequality or what might be called micro-inequalities, which generally are not attributed to working conditions, although they are part of the organizational culture.

Many companies promote a work environment that values modernity, flexibility, the staff's well-being and attention to comfort and entertainment. While these conditions may seem favourable at first glance, they could contribute to a situation in which problems are not openly addressed and may even be considered individual issues that require personal solutions or isolated agreements with co-workers or superiors.

A study on women in finance presents similar findings:

> *"Studies show that some institutions more clearly exhibit inconsistencies between their modern non-discriminatory corporate discourse and actual practice, understood as attitudes and behaviours in which traditional male-female stereotypes are prevalent. Moreover, as Mauro (2004) argues, because this is a modern sector that is governed by professional and technical criteria and that rewards efficiency and work quality, workers may have a harder time perceiving and identifying the discrimination to which they are subject"* (Rico and Marco, 2009).

Women who work in modern sectors like SIS can have difficulty not only in recognizing discrimination, but also in perceiving themselves as workers with labour rights who are empowered when they demand compliance.

How, then, do they express their dissatisfaction? How do they negotiate their expectations or regulate their self-esteem? What compensation do they look for in the work environment to balance the stress and frustrations deriving from the real and symbolic space they occupy, as women, in masculine cultures where they are an exception?

[24] Professional jobs in the IT and information systems fields have always been among the 20 best-paid positions, along with surgeons, dentists, airline pilots and lawyers (ITU, 2012).

If public and corporate programmes and policies are to effectively address the obstacles that women face in terms of entering ICT production, advancing in their jobs and reaching decision-making levels (or, from another angle, the problems that IT companies have in recruiting, retaining and promoting women, especially in SIS), then these measures must not be based on an abstract idea of women (in general, as being eager for support or "protection" by the State, which might not reflect their reality) or use language that does not address them, motivate them or satisfy their deepest needs, as appears to be the case with many initiatives that are not achieving the desired results.

Therefore, prior to outlining and discussing policies aimed at women working in this field in both Europe and Latin America, it is necessary to analyse the profile and career paths of the women technologists interviewed. Although they work in very different environments (large companies versus SMEs), they share a set of common characteristics. Most are university graduates (some with post-graduate degrees) who majored in informatics, computing, systems and related subjects; many of the founders of SMEs took post-graduate business courses or earned a master's degree in business administration.

Despite their different educational paths, all the women expressed a strong affinity for subjects like mathematics from an early age, although not necessarily for computers (which only became available in the region in the late 1970s). Experiences vary by age. Older women (45 years and older) decided to study systems due to a fortuitous event or inspired by the interest or experience of a family member or close friend. Many point to their parents' influence and encouragement as a determining factor, highlighting the value they placed on their daughters' power to choose, the legitimacy of their ambition and their ability to succeed. As one woman stated:

> *"My mother finished high school and that was it, but she always told me, 'If others can, you can too; I didn't raise slackers.' I think that's the right attitude. I mean, if my mother had said, 'No, not that, don't do that; it's too hard,' then I think I probably would have dropped out."*

In contrast, younger women grew up in an era in which ICTs were beginning to be more widespread, and they could see the enormous possibilities.

Whatever the particular circumstances, these women were enthusiastic about pursuing an innovative career with promising opportunities. Some of the women interviewed seemed to need to justify their decision, however, to the extent that they made a non-traditional job choice for their gender. These findings are similar to Wendy Faulkner's (2006) study of women engineers, entitled *Genders in/of engineering: A research report*. Faulkner coins the term gender in/authenticity to explain how, for men, the choice of engineering (which can be extended to technology) is perceived as normal, natural or authentic, whereas all the women engineers interviewed "have a story to tell about why they made the choice" of an engineering career. They are perceived as exceptional and different from the norm, which has important implications for how they construct their subjectivity in the professional arena, how they are perceived relative not only to men, but also to women who chose other careers, and finally how they practice their profession.

In Argentina and Colombia, women who started university in the 1980s indicate that there were a lot of women in the technology departments, although no one really understood what the IT professions involved in terms of work. Younger women report that by the 1990s and especially in the early 2000s, few women were majoring in these subjects, which was mirrored when they entered the workplace.[25]

Some mentioned that their choice was influenced by financial incentives and economic security:

[25] See Marín, Barrantes and Chavarría (2007).

> *"I made my choice in part, although we still didn't know much about it, but I imagined that it would allow me to live comfortably"* (KI).[26]

The women interviewed for this study expressed deep satisfaction in fulfilling their vocational interests; almost all described their work as exciting and fascinating. The majority of the interviews mentioned passion as the driver or purpose of their work.[27] This symbolic valuation of work is critical for understanding why and how these women adapt to the existing work conditions, what satisfaction it brings them, what frustrations or anguish they bury and silence and how all that plays into the negotiation of their labour demands. They also emphasized that working in technology, especially in programming, gives them an exceptional and highly valued opportunity to create "something new" that broadens the horizon and generates concrete change:[28]

> *"These days I'm more involved in management, but I still work on a few isolated development projects. I love it, so I can't let it go…. I try to leave, but I always wind up getting my hands dirty"* (SME).

Once again there are parallels with the study on women in engineering (Faulkner, 2006), who talk about the pleasure, enthusiasm and pride in working in/with technology and creating things with practical uses, which drives them to seek out new challenges.[29]

In general, the managers and entrepreneurs interviewed believe that they have the necessary skills to do their jobs very well. They recognize that they have the knowledge and technical skills —in which they were trained and in which they have confidence— as well as the personal attributes for developing projects in the technological field and/or achieving high-level positions within the corporate structure. The most frequently mentioned qualities included responsibility, dedication and passion for this kind of work.[30]

A. Gender patterns in SIS business structures and work processes

Women's position within the organizational structure and the allocation of activities, in terms of the work process, are not neutral issues. This process comes up frequently in both the interviews and the literature, and it is not always possible to anticipate all the phases or the human/technological resources and time required to achieve the expected results.

---

[26] As mentioned earlier, the interviews were classified into four different groups based on the position held by the interviewee. The quotations include a citation in parentheses indicating the corresponding group, as follows: large companies (LC), small and medium-sized enterprises (SME), human resources managers (HR) and key informants (KI).

[27] One of the interviewees who works in upper management in a multinational company stated that when selecting personnel, she feels that "being passionate about their work is key."

[28] A study carried out by the company Accenture on women who are "successful" in technology finds that the following subject characteristics are common: ambition; clear role models and goals (57% mention a male role model and only 14% mention women); knowing how to ask for support (the need to have a mentor or "sponsor" within the company, someone who has faith in her talent and opinions, gives her credibility and helps her achieve her leadership goals); supporting other women; and interest in participating in leadership courses (48% had participated in this type of experience, and 37% had moved up in the company within a year of having done so).

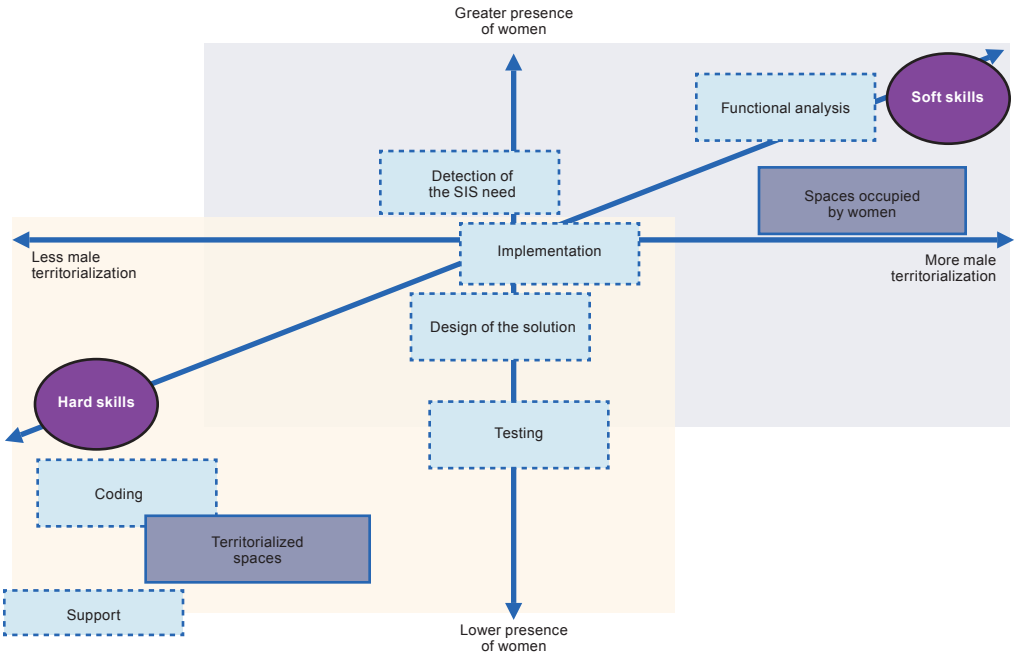
[29] Another interesting finding in Faulkner's study (2006) (which was not explicitly stated in the narratives of the women in SIS, but could be latent) is that both men and women engineers who work in/with technology feel that they live in a very different reality than people who do other types of work; they express a degree of sadness that their family and friends do not understand them, in terms of both what they do and how they feel about their work.

[30] Flórez-Estrada (2007) shows how women's symbolic valuation is based on generalized, assumed qualities like "a high level of dedication, the ability to do meticulous work and the willingness to give their all on highly difficult projects."

The phases of the process can be described schematically in situations involving different types of activity that require particular skills and, therefore, dictate specific roles. There are identifiable gender differences in the way tasks are assigned. In a predominantly male environment, spaces are organized by the type of skills required (hard/soft skills), and women experience different modes of inclusion/exclusion.

As illustrated in diagram II.1, areas that require a greater use of so-called hard skills are predominantly represented as male, while women tend to have a greater presence in areas that entail more soft skills.

Diagram II.1
Territorialization of gender



Source: Prepared by the author.

- Detection of the need/problem that requires an IT solution. This activity is perceived as "mixed", requiring a hybrid of technical and business skills. This phase of the process varies depending on whether it involves specific software packages or applications; existing products that need upgrades;[31] or customized solutions involving the design of an ad hoc programme for a specific order or the implementation of a technically complex, advanced tool that needs to be adjusted and adapted to the production and management characteristics of the user organization.[32] In addition to technical expertise, it requires business skills and creativity to innovate and interpret market needs or opportunities. It follows a strict hierarchy within the organizational structures of the sector.

[31] This includes mass-market Microsoft products, as well as other management products developed and sold by SMEs in the region.

[32] For example, SAP produces this type of software, and other large firms such as Accenture then carry out the adaptation and implementation for the process management of different vertical markets.

- Women who run SMEs or who hold senior positions in large companies or whose goal is to achieve that level all feel qualified to take on these roles and are very interested in doing so. They also recognize that unlike their male colleagues, women in these positions often run into resistance or conflict in client interactions. For example, women may be valued in terms of their ability to interpret demand and understand the problem, but they must contend with doubts or a lack of confidence in their planning skills or their ability to close the deal.

  The design of the solution is closely related to the first phase, and it similarly requires a high degree of creativity. Although some solutions are standardized to facilitate commercialization, the dynamic, innovative nature of the industry implies that even standardized solutions must be regularly upgraded, so design work is an ongoing part of the process. This phase involves the use of sophisticated technical skills and qualifications, which brings prestige to the worker in question. Here, the creative, innovative aspect of the technology is extremely important.This kind of work is very appealing to women, but while they may gain entry into this space, they rarely receive the same recognition as their male colleagues. Some small business owners recounted that they were sometimes questioned or their credibility was undermined in the awarding of creative merit.

- Functional analysis involves identifying and profiling the needs of users, assessing the solution (whether customized or standard) at different points in the design and verifying that it meets the functional requirements and that each step of the process is documented. It requires a lot of interaction with users. This phase clearly illustrates our earlier point about the value placed on so-called soft skills. While functional analytical skills are critical for adapting and optimizing the production process and its results, they are perceived as being more closely associated with or inherent to women (whether due to a natural tendency or cultural conditioning) and are less highly valued than hard skills. This may not be reflected in women's salaries, but it does affect their status within the corporate culture.

  When describing their career paths, some women indicate that they started out coding and then quickly moved into functional analysis or testing (the technical verification phase). In fact, small business owners tend to seek out women for these jobs:

"They're called functional analysts. So there's a relationship between technology and human relations, and women specialize in that. That's where they perform the best" (SME).

- Coding the solution or application consists in writing the programming code. It is human resource intensive, and it is clearly marked by gender differences. This is the stage of the work process that takes up the most time, and those who do it have total responsibility for the results: Preventing glitches in the code requires constant attention and involves taking work home and travelling unexpectedly to deal with critical situations. The symbolic representation of coding and coders is strongly male. Initially, and even today, it has dominated the social image of the IT profession as a whole.

All the women interviewed are technically trained and have the specific skills needed for the job, yet few stick with it. Many start their careers in coding and then, over time, move into and specialize in other jobs that require interaction with different areas of the firm or with clients, due to either their own personal interest or the company's decision.

"I did more coding than designing at first, because I got my jobs from a project manager who would give me part of the development and ask me to not just code it, but to fix the problem" (LC).

Most of the code developers in any given company are men. For example, in Argentine firms, women coders account for 24% of the coding staff (Novick, Rojo and Castillo, 2008).

Ciara Byrne, author of an interesting blog called "*The Loneliness of The Female Coder*", vividly describes her experience in this role:[33]

> *"It's the loneliness that I remember most. More than the joy of cracking a problem, the satisfaction of getting a tricky piece of code to run, of releasing version 1.0 of a product, of closing a million Euro deal by shipping on time, it's that feeling of isolation that I associate with my time of working in development teams, and of managing them. You feel lonely, you feel like a novelty, you feel like a fraud. You feel like you don't deserve a seat at the table."*

She adds that on earning "a seat at the table" with her colleagues:

> *"You feel happy and included. But when one of your co-workers makes a joke that is crude, even though it doesn't offend you at all and you haven't even had time to laugh, he turns to you and apologizes, because you are the only woman at the table and your delicate sensibilities must have been affronted. You feel lonely again. You feel like you're not supposed to be at the table."*

- Testing involves the technical verification that the designed system functions. The tests are designed to inform the user of possible errors. This area requires strong technical skills and has low status within the organization. There are usually more women in testing than in coding.
- The implementation phase combines a wide range of skills and abilities, including technical qualifications, business skills, team leadership, planning and organization. In this phase, the solution is installed in the client's organization, and the client's personnel are trained to use it. This task is mainly assigned to women. The share of women who work in functional analysis, testing and implementation is 49% in Argentine firms (Novick, Rojo and Castillo, 2008).
- Strictly speaking, support is not part of development, but all companies in the sector provide it. It is mostly a male activity: in Argentine SIS companies, women account for just 16% of the support staff (Novick, Rojo and Castillo, 2008).

Interviews with key informants in the sector reveal the existence of a "gendered division of labour" on two levels.

The first has to do with the divisions, areas or departments into which the firms are organized. Women predominate in human resources, administration, sales, marketing, institutional communication and social responsibility. This distribution is not questioned in the majority of the interviews, but rather is simply considered part of the reality of the company; it may reflect either the women's own interests and options or corporate decisions that placed them in these areas to utilize their "talents" to optimize the organization's functioning and growth.

Although primary data on salary differences are not available, some informants indicated that while the salaries and working conditions in human relations departments or other areas that are less technology oriented may be the same as equivalent positions dedicated specifically to research and technological development, the positions are less prestigious.

Women sometimes arrive at these human relations positions through a series of events that they themselves did not initiate, but rather were asked to do. They are asked to coordinate work groups, liaise with clients or oversee community relations, and once they start down that path, for many there is no going back. However, they still need to keep up to date on the latest technology (to maintain credibility, among other reasons), which is usually done outside of work hours.

[33] Available online at http://www.fastcolabs.com/3008216/tracking/minding-gap-how-your-company-can-woo-female-coders.

The second level has to do with the day-to-day aspects of the job and includes the gendered distribution of work within the technical areas described above.

As mentioned, women in SIS tend to be concentrated in jobs that require some of the skills that are culturally ascribed to women: openness and sensitivity in interpersonal relations; empathy with others and their work; communication skills; an integral and holistic approach to the processes; and patience and meticulousness for documentation and testing of the designed solutions. While knowledge and technical skills are a basic requirement for both women and men, women are also expected to have that "feminine touch" which to some extent would justify promoting them to prominent positions.[34]

In some of the interviews, soft skills were characterized as one of women's strengths, and they were sometimes described as a valuable complement to women's technical abilities. In other cases, however, the interviewee has moved away from using technical skills, referring to them as a holdover from her professional past when she started out in software, which is sometimes sorely missed.

While some of the interviewees reported that they had received recognition precisely for these qualities, they acknowledge that they are immersed in a cultural dynamic that crosscuts the organizations and reproduces gender dualism: men are technical; women are social.[35]

Flórez-Estrada (2007) finds that women's technical knowledge is underestimated, despite the fact that they receive the same training as their male peers. While the IT field may display an egalitarian discourse, in practice men tend to be preferred as programmers, based on gender stereotypes. According to the paper, women therefore "need to adjust their expectations downward; this is reflected in the fact that they do not hold the highest-paid positions, which are the ones with greater symbolic recognition, nor do they have the same opportunities for promotion as men." This is particularly true for programmers. Flórez-Estrada shows that in the narratives, especially among human relations managers, both men and women report that, "reading between the lines", social and technological skills are valued differently.

To expand on these assertions and better understand their implications for the professional development of women technologists, we need to answer the following question: What do career paths look like for these women?

---

[34] This division between women with soft skills (communication, better client relations) and men with hard skills (more technical and game-oriented, inclined to "play" with the latest technological tools, socially inept) is refuted by Faulkner (2006) in the context of a similar profession: engineering. Faulkner reports that some, but not all, of the people interviewed held this belief, while field observations did not support the stereotype: "With the possible exception of a few roles in research and development (R&D), all engineers have to interact with others, usually non-engineers as well as engineers.… For this reason, the majority become more extrovert as they gain confidence and experience professionally." She further clarifies that the vast majority takes great care to improve their social skills in terms of resolving conflicts, handling difficult work relationships, collaborating with clients and contractors, team building, motivating staff and working under pressure. In sum, the differences within a group of men and a group of women are greater than the differences between the two groups. For example, "many women engineers claim to be more comfortable with 'objectivity' than with 'subjectivity'; and there are 'gadget girls' as well as 'boys with no toys'." The traditional stereotype is simplistic, and some men find it humiliating or disturbing, and they distance themselves from it, while others directly embrace it or challenge it with the facts. Thus, although these representations continue operating as a stereotype, circulating in the discourse of both social and professional spheres and influencing men and women in a variety of ways, they do not represent real people.

[35] Faulkner (2006) emphasizes that the engineering stereotype is built around the dichotomy of technical=male/social=female, which operates as an exclusionary stereotype even when it does not correspond to the styles, skills and practices of the real men and women working in the field. The author insists on questioning the binary and hierarchical differences between male and female and highlighting the diversity within each gender, including both similarities and differences. Faulkner cites a memorable quote by Evelyn Fox Keller calling us to "count past two", in the sense of not crystalizing the existence of only two opposing genders, but rather visualizing a plurality of masculinities and femininities.

Based on the interviews, the following factors have the biggest influence on their daily work and personal experiences:

- The tension between loving their work and resolving the conflict that all women face in terms of organizing their time and balancing their work, caregiving, social and cultural life, recreation and studies.
- The interaction between representations of high technology —especially its production, its producers and its impact on society— and the subjective investment (emotion, enjoyment, values, expectations) attributed to the "elite" of its creators. This contributes to how the women technologists interviewed define their identity and, therefore, their expected satisfaction and their assessment of those who make it; and, finally, how all of that affects their daily lives.

With regard to the first point, one important issue involves the diffuse limits (Valenduc and others, 2004; PROMETEA, 2008) or porous boundaries between personal time and time dedicated to professional work. Long days, with a full agenda and a tight schedule, are a common source of stress, as they necessitate delicate negotiations and complex logistical organization in the family sphere. Rather than decreasing, this stress increases when women hold senior positions or work as entrepreneurs or executives. Here, there is an important distinction between women who have children and women who do not. For mothers, the conflict is resolved differently depending on how it unfolds during pregnancy, the first few months of motherhood and later as the children grow. The legislation on maternity leave and, in some companies, policies that extend the time allowed by national law, for both mothers and fathers, legitimate women's decision to prioritize carrying for their newborn. Nevertheless, several studies find that despite the existence of maternity leave, companies often "penalize" the use of these rights in a variety of ways.[36] Future research should more closely analyse the role played by the scarcity of qualified human resources for specific positions. It may be that companies are more understanding or gracious when highly valued, hard-to-replace women take medical leave, choose to work fewer days a week, work from home, and then decide to return to a full-time schedule, but these same companies may be less flexible when it comes to women who can be easily replaced.

According to Simard and others (2008), most women and some men report that they work early in the morning or at night, times that they would prefer to spend with their families. According to the study, many women report that choosing part-time work as a "solution" to care for their families has its disadvantages, even when they have the approval of their boss: it distances them from the work environment, with its dynamic of constant innovation, which can be an impediment to later promotions; this introduces an additional source of stress. Others claim that they usually end up working longer hours than originally agreed.

These accounts are consistent with Sennett's (1998) study on flexible schedules. Sennett holds that while flex time can be considered an improvement in working conditions, the company continues to exercise strict control over its flexible workers. The benefit induces great anxiety among employers, who fear losing control and suspect that those who are given flex time will abuse their freedom.

As Sennett states, "*The time of flexibility is the time of a new power. Flexibility begets disorder, but not freedom from restraint*" (Sennett, 1998).

Most of the interviews for this study suggest that while firms consider maternity leave to be an undisputed right that must be respected, they do not have the same attitude towards other needs related to childcare, families, or personal commitments. Several women emphasize the stress and effort involved in justifying themselves (including to themselves) and asking permission to finish work during more flexible hours or to leave the workplace during the day for personal reasons that are not fully justified. One woman, however, argued that young people have a more flexible attitude

[36] See Hakim (2004); Carter and Kirkup (1990).

and take care of their personal needs, and they have a degree of mobility that the other generations did not:[37]

> *"The new generation is different from us. They place a much higher value on free time —both men and women; I'm not just talking about women.... You just don't see anymore the man who enters a company to make his career and then kills himself to get the carrot. Young people today move from company to company, they don't value the career system, and they care a lot more about their personal time.... In twenty years, there probably won't be any more executives who work from sun up to sun down, and who only think about work"* (GE).

The majority are satisfied with their annual vacation leave, although some said they felt a degree of pressure, guilt or disloyalty when they used it, especially if it corresponded with an intense production period. A few women also reported that as new mothers, they had either worked from home during their maternity leave or cut their leave short, which they did on their own initiative. The subtext here is an excessive sense of responsibility; the need to maintain an image of dedication and to some extent omnipotence, which they feel improves their image within the company;[38] and an addiction to how their work makes them feel.[39]

As mentioned, many said they have a hard time justifying (to themselves and to others) the need to spend more time with their children after early infancy, during the childhood and teenage years, unless it is for reasons beyond their control. It is even harder to acknowledge their wish for more time to take care of personal matters that are not family related. All of these situations require delicate negotiations on the subjective level in order to be considered legitimate, especially if they happen during working hours or when the company or area is dealing with an operating emergency. Decision-making in this sense is not exempt from vacillation and distress.

According to some accounts, in some companies, getting "permission" to see their children in non-emergency situations (school plays, a special field trip, etc.) largely depends on the goodwill, personality or assessment of their superiors, even for women in decision-making positions. If the request is granted, the women are then grateful for the "favour".

Most multinationals implement explicit, formalized policies on working conditions, but even in those cases some of the women interviewed described subjective conflicts in trying to apply them (such as having to legitimize their needs, experiencing a sense of risk or threat to their job continuity and future promotions and feeling in conflict with their ideal of professional women in the IT field).

---

[37] The report *How Diversity Can Affect Your Business: Some Important Considerations* (Fox, n/d) identifies the profiles and lifestyles of the three age groups that make up the labour force in the United States. While there were variations reflecting the realities of the countries in which we conducted the interviews for this study, these characteristics were also mentioned by some of the people interviewed: (i) The "baby boomers" —born between 1946 and 1964— are optimistic and committed to their education and career; (ii) Generation X (or Gen X) —born between 1965 and 1981— grew up with the development of technology and thus are comfortable with it and are very independent; and (iii) Generation Y (or Gen Y, also called the millennials) —born between 1982 and 1995— are the most highly educated; they want to work for socially responsible companies and to do something to make a difference in the world; and they have a tendency to change jobs often and are very skilled in using technology.

[38] These attitudes and behaviours may be tied to the need to constantly prove themselves and the real or imagined threat of being replaced when they temporarily "leave the playing field".

[39] Marissa Mayer (CEO of Yahoo), who is held up as a role model for women as she seamlessly combines professional success with an ultra-feminine style on par with famous models (she even posed for Vogue magazine), returned to work just two weeks after the birth of her first child. In her words, "The baby's been way easier than everyone made it out to be. I think I've been really lucky that way but I had a very easy, healthy pregnancy" (cited in Carlson, 2013). Although other women are not expected to follow her example, she is undoubtedly setting the style for desirable or admirable behaviour.

A common characteristic among mothers is the high value they place on their strategies for "reconciling" their childcare responsibilities with their professional life. Although many acknowledge that they have been exhausted at times, and some describe going through a crisis and wondering whether or not to keep working, these women are mostly proud to have "made it", which reinforces the lack of questioning of working conditions that impose very high demands.

Only one woman gave an emotional account of how the extreme stress of her job in a small SIS business drove her to abandon the profession:

> *"We were often working under extremely stressful conditions… lots of stress, this has to get done, did you get it right or not, you have to do this. I lived that lifestyle, and I loved the work I was doing. When I had my daughter, I had a hard time leaving the house—you want to go home because your daughter is there, and you start to choke on that adrenaline that used to flow and was so beautiful and fun before. It starts getting mixed up with 'I have to go'. One day they called to tell me my daughter had cut her forehead and was in the hospital with the girl who takes care of her (my sister). And I said to myself, What am I doing here? It raised all those contradictions between what should I do, what do I have to do, what am I doing. That whole internal struggle… When I got pregnant with my second child, I left"* (KI).

Those who are involved in a relationship talk about negotiations —in some cases, difficult negotiations— over the division of household chores. Many emphasize that they have an "understanding" partner who supports them, a prize they hold up as one of their life achievements and a mark of distinction from other women who have not achieved it. A minority shyly alludes to conflicts and resistance to changing the traditional roles with their partners, allowing a glimpse of the dissatisfaction that is probably associated with the discrepancy between their image of a modern, successful professional and the assumption of conventional roles in their family life.

The interviewees who do not have children know that if they choose to become mothers, they will have to evaluate how to merge their personal needs with their professional life. They perceive the issue as an individual problematic that they will have to work out themselves. In this sense, they are not different from the women who are mothers, in terms of not seriously questioning the gender patterns in their working conditions, their marriages and their family life. Moreover, many stated that companies generally consider childless women to be much more available and flexible and therefore highly dedicated; these expectations are not easy to satisfy.

In the interviews, the fear of displaying a professional image of being incompetent, irresponsible or uncommitted, or of being an uncaring mother, or of having "weak or submissive" husband or partners, is a source of stress and affects the configuration of their subjectivity and their relationship with their work. Their ability to balance these tensions operates as a fundamental component of their self-esteem. This explains, in part, their opinions about other women who have not advanced in their professional careers or decided to remain in positions with less responsibility and recognition. Some women attribute these decisions to a lack of ambition and courage, others to the choice of a more comfortable career path that does not require getting involved in more complex tasks, and still others to an inability to reach satisfactory agreements with their partners.

Many of the interviews reveal a process of subjectification informed by an idealized stereotype of a modern "wonder woman" or a "Jill of all trades", maybe even ahead of her times, in terms of the type of work she performs, the intellectual challenges it presents, and her ability to achieve balance with other demands (maternal, social, cultural and personal, among others).

All of this contributes to the idea that the progression of one's professional career depends, fundamentally, on decisions, strategies and negotiations in the personal or interpersonal sphere. If firms offer instruments or resources that might favour women (part-time work, flexible schedules, remote

work, and other arrangements), some will take advantage of them, but what is striking is that such policies are not demanded. They are perceived as measures implemented by "friendly" companies that are interested in their employees' well-being in general, and not as a result of demands to expand employees' rights and improve their working conditions.

For instance, companies that have put in place so-called work-life balance policies are considered examples of modernity, innovation or even "goodness" on their part, which must be recognized and which evokes feelings of pride for belonging to this privileged group.

One high-level executive, on reflecting on the difficulties of meshing the exacting demands of her professional role and her family life, problematizes the stereotype of the omnipotent woman and comments on the invisible side of the subjectification, namely, personal suffering:

> *"The truth is that I have often gone to talks where professional women are speaking, and I would see them as so overadapted… and I would think, ah... that isn't the truth. I know that there are days when I climb into the taxi and just cry because I have to travel. That's how it really is"* (LC).

Despite these experiences, the same executive does not demand changes in the organization where she works, nor does she think that public policies or programmes are needed to transform extremely stressful work situations.

These mechanisms of adaptation, or overadaptation, end up being functional for the corporate culture and the existing work arrangements. They are a long way from thinking of business policies as a commitment to what the International Labour Organization (ILO) calls decent work, recognized as a universal right.

Here, the interviews with small business owners revealed some particularities. Many of these women admit that the boundaries between their work and their personal life are constantly shifting. The effort to stay organized is very demanding and requires a big time commitment, and they hope the situation will eventually change:

> *"So my daughters don't know that I apply Scrum, it's a methodology based on sticky notes … and I use it on them in my house"* (SME).

> *"…to organize your life: to be a mother, a teacher, a businesswoman all at the same time requires a huge personal effort, a lot of extra hours at work, and even if you like it, how long can you keep it up?"* (SME).

In general, they are understanding and empathetic with the needs of their employees and try to be flexible in accommodating their requests. The majority do not have formalized measures or rules on working conditions, but rather address any needs or demands as they come up.

With regard to the second level, the boundaries between the personal and work spheres are diffuse in subjective and symbolic terms. Work in this sector is associated with attributes of exceptionality and is a very important part of the lives of these women, although some recognize that women are subject to inequalities, which they tend to attribute to the effect of a "sexist" cultural order within their organizations. Consequently, the key "battlefield" for achieving greater equality is defined as education or culture (in a general or non-specific sense), and they challenge the new generations to fight to change the status quo, although it is not at all clear how this change would be produced. With a few exceptions, they do not imagine —let alone propose— deep transformations in business cultures and practices.

In terms of corporate policies, they highlight efforts to "empower" women, to increase their confidence and skills to compete within the organization and successfully develop their career. As examples, they point to successful women, who show that "yes, it can be done!" and to talks and conferences and women's networks —a range of activities that are being promoted and valued by a

number of companies. It is not surprising, then, that proposals like Sheryl Sandberg's are being so widely diffused and accepted.[40]

In their relationships with their male colleagues, different obstacles arise depending on the type of work. Gaining credibility in IT and earning the respect of people with more experience is almost always stressful for new professionals entering the industry (both women and men). But women not only have to pass the test of demonstrating the knowledge and skills necessary to adapt to the rhythm and time frame demanded by IT projects, but also to overcome other challenges related to their gender.

They have to show that they are just another member of the team, without questioning or calling attention to the fact that the team is mostly male and reproduces an androcentric culture (how they relate to colleagues and junior employees, the use of sexist language, the type of get-togethers outside of work, alliances, complicities, tacit assumptions, and so forth). This implies learning the codes and mapping out the roads and shortcuts to achieve recognition as an "equal" and, at the same time, as a woman who might prefer or be more used to certain styles of communication and interpersonal relationships that could benefit the company and, for some women, be more satisfying.

One set of accounts alludes to this situation, suggesting that for some women, "the somewhat protective attitude of many blue collar workers towards women engineers can mean they are given an easier ride than the men" (Faulkner, 2006).

Even after they have gained experience and moved up the corporate ladder, many women say they have to prove their credibility all over again with new stakeholders, whether they are clients, colleagues or even subordinates. They also describe how they had to overcome resistance based on stereotypes and prejudice, demonstrating their professional credentials and background to gain legitimacy. This is an additional investment that women have to make, often at the individual level. The formal position (manager, executive director) and the associated institutional validation do not inherently guarantee the recognition of women's skills and knowledge (as would be the case for men), especially in the technology industry. This is an additional source of dissatisfaction, exhaustion and fatigue, one that women assume as an intrinsic —or perhaps even natural— characteristic of a sector where women are the minority.[41]

> *"You have to earn the role, and you have to earn it a little more than men. Once you've earned it, they accept you"* (SME).
>
> *"In client relations, there is a difference in how they treat you; you sense a little discomfort from the men when it's a woman making the business decisions. She's the one who has the challenge of shifting the situation, and we have to show strong problem management skills"* (LC).

[40] Sheryl Sandberg is the number two executive at Facebook and former vice president of global operations at Google; she has degrees in economics and business from Harvard University, and in 2011 she was listed the sixth most powerful woman in the world by Forbes magazine (the first in technology). Her book, Lean In, addresses the lack of women in decision-making positions in the corporate world and argues that the solution is to develop women's self-confidence, their belief in their own abilities and especially the personal capacity to overcome obstacles. She argues that for those who want to improve their chances to "get to the top" in their careers, they must decisively take their place: "increasing our self-confidence ("sit at the table") [meaning the corporate decision-making table]; to get our partners to do more at home ("Make Your Partner a Real Partner), not holding ourselves to unattainable standards (The myth of Doing It All)" (Sandberg, 2012, p. 9). Available online at: https://my.cloudme.com/v1/ws/:himanshuleon/:Lean%20In%20-%20Sheryl%20Sandberg/Lean%20In%20-%20Sheryl%20Sandberg.pdf. She does not question the rules of the corporate world, but instead adopts a pragmatic position, proposing that women need to have ambitions, to overcome their insecurities and personal fears in order to get the position they want. Sandberg has become a sort of "guru" for women in IT and was mentioned with admiration by some of the women interviewed.

[41] Simard and others (2008) report similar findings. The following account is eloquent: "I had a couple of experiences where I worked with men and they had a hard time taking me seriously, until I had finally proven myself to them. They would interrupt me constantly, even people who weren't IT experts. If I suggested something, no one would pay any attention, but if a man made the same proposal, they would consider it."

"There are always doubts about a woman's decision-making, and they always wait for a man to step in and back her up" (LC).

"You can tell when they look at you and think, ´Ugh! A woman´,… but with time you earn their respect, and it gets easier.… But it doesn't bother me, because it's just a question of earning respect. It's like… paying your dues, which you have to do in any career" (LC).

"They have a way of telling you, ´you're no good with the abstract' and ´you're no good with business' and ´you're no good with creation´. I mean, abstract creation—design yes, but creation no" (SME).

In coding, extreme working conditions set the general tone in terms of hours spent keeping up to date on high-level technical skills and tools. When people move into executive or management positions, they stop programming and quickly become "outdated".

The lack of women in coding is striking. According to the interviews, women in general are good at functional analysis, which is why they tend to move out of coding and into the functional area or else are hired directly for functional analysis. The prototypical coder is a man, and women who try to fill that role have to maximize their production and confront prejudice.

"It's natural for women to move over to the other side.… For example, Liliana says to me, "I loved programming", so she starts out programming, but it's stronger than she is; she can't just do programming. So she does some customer service, and she's good at it, so let's see how it develops…" (SME).

"[talking about an on-site project with a client] I had to say: I'm here to work in developing, I'm a Java developer, I'm on this project to do this and this. They started to laugh, and they said, ´Oh, sorry, it just didn't occur to us because most of the women here are functional analysts or project managers" (LC).

"Women don't have enough credibility at first.… I think they don't believe a woman is going to call them on something or tell them it's bad. That's how they think, so that's how it is at first" (LC).

"[talking about what a client told her] …Thank you, that's been very useful. Let me just say this out loud: The day you arrived, I thought, 'They sent me this girl who is just going to be worthless'" (LC).

These stories reveal the gender prejudice and underestimation that underlie the harsh tests that women must pass. Those who went through it emphasize how they proved the establishment wrong, how they could be qualified even though they were young and female.

B. Subjective implications of psychological contracts for labour relations and practices

This chapter analyses the "psychological contracts"[42] that women in the SIS sector usually make with their companies and, especially, their superiors and peers.

[42] A psychological contract refers to the implicit aspects of a work relationship. It includes the contributions, benefits and recognition that the worker expects from the firm or organization for which he or she works, over and above the explicit elements, and what the company expects from the worker. Workers usually expect monetary incentives, promotions, job recognition, and decent, friendly treatment. The employer, in turn, might expect a commitment and dedication to the assigned work, a contribution to achieving good results and good relationships with co-workers, superiors and the company as a whole (Barrio Gándara, 2003).
Psychological contracts can also include abusive expectations, such as longer work hours or working from home without pay (Barrio Gándara, 2003).

According to a high-level human resources executive at a multinational company, psychological contracts can be described as follows:

> *"It is the combination of understanding what it is they want, their talent, being clear about how the organization can support and maintain compliance with that psychological contract, in which I as an employee see the possibility of growing in the organization, of not only enjoying a great working environment with a good benefits package, but knowing that I am fairly compensated for what I do, relative to both the external market and my co-workers…. For that, we have to have a clear performance policy and programme: we have to measure performance and communicate how we recognize achievement, how we differentiate by achievement and performance. What we do to encourage employee retention, how we lay out the organizational chart and the line of succession for critical positions, so that we can say, OK, if you have a career in this company, we invest in training and we prepare our personnel for professional and personal challenges, because we don't just work in the technical area; we also work on developing leadership skills and personal skills. All of this combined makes being part of our company a really positive experience. And at the end of the day, our people say: I think this is a great company to work for"* (HR).

This description shows that the implicit commitments that employees must make should, at the very least, demonstrate a strong sense of belonging and pride for being included in a place of privilege, while the company in all likelihood expects an attitude of reciprocity in line with its investment in its employees.

The rest of this section discusses the psychological contracts that are established unintentionally —probably unconsciously— as described in our interviews with women who work in large firms or run small businesses.

1. Compensation for passionate and transformative work

These contracts are closely related to the symbolic subjective valuation of their work and how it affects their connection to their profession. Almost all the interviews demonstrate an association between working in technology and feelings and emotions such as fascination, passion, creation, innovation, adrenaline, transformation, the challenge and the broadening of horizons. These same attributes are found in numerous studies of not only software, but technology work in general (Beraurd, 2008; van Oost, 2002; Birbaumer, Tolar and Wagner, 2004).[43]

Those who "write" the contract perceive themselves as a group of initiates in a promising field not only for professional development, but for its impact on personal lives and societies and the opportunity to leave their mark on the world. It is usually seen as a privilege that is rightly repaid with long work days, availability, responsibility and high personal standards, in addition to the other demands mentioned earlier.

> *"So I'm part of the creation, I mean, I'm taking part in the research on the latest technology, on how to do it"* (SME).

> *"I love programming. When I was a programmer, I really liked my work; programming is so creative, it's energizing …."* (SME).

> *"I'm in a place that is changing the world"* (LC).

[43] According to Birbaumer, Tolar and Wagner (2004): "Technology, in particular ICT,… is challenging work, offering the opportunity for learning and perfection, and for being creative. It is fascinating, satisfying the urge to solve riddles and generally the curiosity to get to the bottom of things. Being able to work with customers, translating their needs into software or a website —this may include a care-taking aspect. It is an open world, with a wide horizon. It offers jobs in a respectable area and status."

This contract brings into play their technical skills and acquired knowledge, as well as the experience of application and innovation —and especially the sense of belonging to a workplace that raises self-esteem and satisfies the desire for recognition, transcendence and the power of transformation.

In exchange, these women are willing to accept the majority of the organization's rules, and some even endorse working conditions that can be abusive or discriminatory. They justify it as being intrinsic to the job, and they resist problematizing their working conditions or imagining forms of production and professional lives that do not require the extreme time commitment or work pace, the constant updating and the never-ending search for new developments.

In this sense, there are similarities with Pekka Himanen's (2002) description of the hacker: "For hackers, [the word] passion describes the general tenor of their activity, though its fulfilment may not be sheer joyful play in all its aspects." The pleasure of living that passion justifies the sacrifices they make and the poor working conditions, in which the constitutive dimensions of the person are diluted and their identity is displaced towards their work.

> *"Well, you also stop doing things for yourself, don't you? Because you can't do everything, you have to make decisions in life. And I honestly don't regret a thing"* (SME).

> *"I sometimes compare programming with physical activity, when it burns, because it's hard to do what it takes now to get to that level of understanding of what you're doing. So you tend to stay. And you make the commitment, I love it, but the people above you are three times more committed. It was something like adrenaline, like something really special. When you're in the middle of it... I never watched the clock"* (KI).

They work hard to maintain a high level of performance, accepting what is expected of them even though it is not necessarily established. Consequently, their needs, feelings, communication and relationship styles, preferences and other priorities, which are related to their gender, go unnoticed and thus do not provide a source of potential capital that could be used to negotiate and achieve changes that benefit women.

From the perspective of the "masculine world" (as described by Faulkner, 2006), women tend to be perceived with a bias that handicaps them relative to their male colleagues, especially if the standard for evaluation is based on the skills and characteristics typically assigned to men.

2. Recognition of abilities: expected compensation

As evidenced in some of the interviews, women place a lot of importance on having their superiors and co-workers expressly recognize their technical abilities, as well as their management skills in running their areas or departments. Despite having been hired for these jobs or promoted into them, they feel that —because they are women— there is always a veil of doubt or reticence over their efficiency and skills for successfully doing their jobs. The terms of trade are as follows: if the company recognizes their ability by moving them up in the organization and praising their work through both formal promotions and informal discourse, in exchange they will guarantee their dedication and commitment, thereby proving that the company made the right choice in hiring them. However, this recognition is not confined to their position within the corporate structure, given that they frequently have to re-establish their credentials and knowledge with their colleagues, subordinates, bosses and clients.

These terms of trade, however, are usually subject to the character and opinion of their immediate boss, who is responsible for the performance reviews that are the basis for promotions and benefits. When the contract is broken, for example if promotions are delayed or stalled due to maternity leave or the use of flex time, the women feel betrayed. Yet their anger or reproach is generally directed not at the company, but at the superior who did not comply with the expectations of the implicit contract.

> *"One executive director penalized me for having taken maternity leave, but another supported me during that time. It really depends on the person you have to work with"* (LC)

While this attitude came up in a number of interviews, one case stands out as different: Only one of the women interviewed believes that the State should play a role in resolving labour conflicts. She argues that companies alone do not have the capacity to implement change, that the conditions of promotion should be standardized for men and women:

> *"The global policy can take years to develop, and even then it doesn't cover this. That's why there needs to be a regulatory framework that is much better thought out and more comprehensive"* (LC).

The rest of the interviewees attribute gender inequalities in the workplace to cultural conditioning that, one might say, "infiltrates" the company, such that structural change falls outside the company's sphere of influence.

> *"I have the feeling it's a cultural issue. If you're the CEO of a company and you want to have a family, then you have to have come to an agreement. If not, you physically won't be able to do it"* (SME).

3. The familiarity contract

This type of contract is found in accounts that describe labour relations in terms of primary affective ties that are more akin to family or friendships than the workplace. The authority figures in the company are portrayed with paternal characteristics, and they are expected to behave as such: They are credited for being permissive, protective and understanding, a mediator between institutional rules and professional needs, inclined to favour women.

The feeling of gratitude that emanates from this standpoint reinforces identification and solidarity with the organization. These women do not appear to identify as workers with recognized rights and demands that could lead to more rights.

> *"I'm going to be honest: they've been wonderful in that sense, because they've given me a lot of freedom, like with my first child…"*. (LC)

> *"One day I went to pick up my daughters, and they'd been invited to go to the park, but there were a lot of boys going and I didn't like the idea of just dropping them off with five boys…. So I called my boss to ask if I could take the afternoon off, using vacation time, but if not it was fine since I was the one being a flake—calling the same day! I told him it didn't matter, I didn't want to put him on the spot, it was ridiculous to be calling him at the last minute. So he asked me, What are you going to do? And I told him I wanted to go to the park with my girls for such and such a reason. And he said go—go and have fun. They weren't expecting it, and when it was time to pick them up, they said, 'Mommy, what are you doing here?', I'm going to the park, too. How can you? Well, I talked to my boss and he let me go with you. Ah, your boss is the best! They told me (laughing)"*. (LC)

Both of these accounts show how labour agreements can be transformed and "naturalized" as private, even interpersonal permission. Taken to the extreme, it could give rise to a situation in which women feel compelled to overjustify requests related to their personal life and especially their family, such as schedule changes and absences that would normally be covered under workers' rights or regulations. In high-level positions, it becomes an attribute of the person holding the position, and the subjective characteristics of the person who "authorizes" their leave is overvalued, thereby locking in the private nature of these relationships.

4. Small business owners: a display of courage and vision

This group of women shares many of the characteristics of executives in large corporations: the high valuation of work, the intense dedication, the pride in taking part in a new, powerful productive process with future potential. Their psychological contract is not made with an employer, with whom they negotiate benefits, satisfaction and compensation, but rather with themselves. This implies self-imposed demands, stress and frustration with the development of the business. This levels their self-esteem and triggers a longing for recognition of their entrepreneurial abilities by their closest circle and their community. The need to grow their business drives them to align with sectoral promotion policies, with their customers and their competitors. Demonstrating their entrepreneurial ability is basic to their self-assessment, sometimes including the discovery of skills they did not know or believe they had.

> *"I was taken by the possibility of constructing a future based on my own business, by learning about the experiences of others and of other entrepreneurs, who were also building a business under very favourable circumstances"* (SME).

> *"I love it because I'm in an area associated with creativity, entrepreneurship, innovation"* (SME).

These women entrepreneurs combine the pleasure of working in technology with the satisfaction of taking the risk of following their own path and achieving success independently. They see their business as their own creation, which needs attention and care (especially in the beginning), but which brings great satisfaction and the opportunity to grow —not only for themselves, but for their partners— which would be hard to find in other work environments. This leads them to invest long hours, even though it means sacrificing other activities associated with their personal lives. They are proud to have taken the risk, as women, of following that road in a sector that is not a common choice for their gender.

III. Public policies in and for the SIS sector: an apparent neutrality

Practically all the countries in the region are developing public policies that specifically address the promotion and advancement of the software industry (Dughera and others, 2012). These incentives are usually framed within more general digital agendas, which aim to foster the diffusion and use of information technology in public organizations, companies and the general public.

Based on their content, the SIS-promotion policies have three main orientations:[44]

(i) Strengthening the sector's capacities as an industrial activity;

(ii) Developing services and products for export in response to demand from external markets; and

(iii) Creating a digital environment that diffuses and expands the country's technological capacities to all areas.

These three orientations are present to different degrees in the policies of each of the three countries studied (Argentina, Colombia and Costa Rica). In all three cases, software is a strategic activity for economic development, with a strong propensity for innovation.

Bearing in mind these orientations, we find that the policies developed thus far are mainly focused on the following areas:

- Promoting the sector through legal and regulatory instruments governing sectoral activity, as well as the application of fiscal and tax incentives that improve conditions for job creation and facilitate the production, marketing and sales of products and services that meet international quality standards, address the needs of the State and the internal market, and exploit opportunities in the global market.

[44] In line with a study carried out in Argentina, these orientations can be framed within the concept of "productive development policies", which alludes to the economic bias of the instruments and the combination of actions in several different areas, and even more precisely —especially in the case of Argentina— the implementation of "industrial policies", at the micro level, to stimulate innovation and efficiency in businesses. There are also a number of vertical policies —aimed specifically at the SIS industry— whose underlying objective is to produce a horizontal impact on other sectors of the economy (Dughera and others, 2012).

- Meeting the State's growing demand for software, including the modernization and implementation of software in public organizations in accordance with their needs. In this framework, the agenda for public debate has begun to incorporate the discussion on the use of proprietary software versus open-source software.
- Increasing the available specialized human resources by promoting the entry, retention and graduation of students in related university majors and expanding the availability of non-university training courses.
- Facilitating the diffusion of access and use of ICT services and software by all productive and social sectors and the general public.

The content, focus and approaches embodied in these instruments are notable for the apparent absence of a gender perspective, which is also seen in industrial policies more generally.

Women are not regarded as a specific group. There is no perspective on their roles as businesswomen or entrepreneurs, highly trained IT professionals, workers in the industry, young people interested in the technological disciplines, students in university programmes or training courses.[45]

These policies focus on people, groups and institutions as they relate to the goals of the instruments, with no mention of other characteristics, such as economic activity (large companies or SMEs, workers/employees), disciplinary field (engineers and other informatics specialities) or institutional condition (governmental organizations, second-order associations, non-governmental organizations). In some cases, particular characteristics may be included that are relevant to the programme or project in question; in others, categories like "human capital" are used, which could be questioned due to their economistic bias.

Our review of these instruments uncovered no reference whatsoever to the gendered social relations that are interwoven with the construction of technology and thus of software. Consequently, they do not take into account the fact that ICTs are social productions marked by cultural patterns and values, including gender. Because the text of these public policies conceals women as important participants in this type of activity, they favour postures that consider the technology and software industry to be "gender neutral".

A. Women's perception and position with regard to public policies promoting the SIS sector

With a few exceptions, executives at large corporations are unaware of specific public policies aimed at the SIS sector, and they do not identify the State as an industry promoter and regulator. They are, however, informed about the different policies and programmes carried out by the firms in which they work and their relationships of collaboration or competition with other companies in the same field. They perceive "their" firm as a place where they belong professionally, where they have friendships and shared interests and where the working conditions are gradually improving.

In contrast, small business owners believe that they could potentially benefit from public policy instruments. The generally started out their businesses by investing their personal labour and their life savings or a family loan; they did not initially seek out support from the public sector. Partly out of ignorance, they created the project based on a somewhat heroic ideal, either together with a partner or as part of a family business, possibly with their spouse. Later, some came into contact with public policies

[45] The body of policies in Argentina includes only one instance in which being a parent is taken into account for the selection of beneficiaries: namely, the National Bicentennial Scholarship Programme for Scientific and Technical Disciplines, run by the Ministry of Education, considers mothers, fathers and/or pregnant women as a priority group within the programme. For more information on this initiative, see http://www.becasbicentenario.gov.ar/.

through their own initiative. They remain informed, and they are interested in expanding their networks and taking advantage of financing opportunities that could contribute to developing their businesses.

They do not believe that the fact that they are women has in any way influenced their dealings with the industry promotion schemes. Nor do they think that they should receive priority or special benefits due to their gender.

Opinions differ on the value of public policies depending on the area of application. There is generally support for promoting the diffusion of technology and the education of women in this discipline. However, when asked about the need to promote businesses led by women, the majority questioned the usefulness of differentiating by gender, arguing that it is not relevant for the development of the industry. They generally start from the belief, mentioned above, that ICT is a gender-neutral field, which leads to an attitude of alienation from the possibility that there would be policies oriented specifically towards women.

Because the three countries display different levels of knowledge and utilization, each country is analysed separately.

In Argentina, the diffusion of SIS was moved foreword with the approval in 2004 of Law 25,922 on the promotion of the software industry, which provides fiscal and tax incentives and also created a fund for granting subsidies for IT development (FONSOFT).[46] A number of other instruments also promote innovation and the advancement of high-technology industries, as well as the strengthening of human resources through technical training that benefits national IT companies. In the interviews for this study, most of the women expressed a positive opinion of the variety of instruments available, noting that they had stimulated the growth of the SIS industry:

> *"I don't think we've ever been better off than right now. And they're there to be used; I think they're really good."*
>
> *"We were able to develop our own product thanks to support from FONTAR*[47] *at just the right moment —and later we received two more subsidies."*
>
> *"So, the company covers 50% of the costs, and the Ministry of Science and Technology covers the other 50%. That's tremendous support for software companies. That and the software law."*

The women interviewed in this country have been working in IT for many years and have secure jobs. The question remains open on what diffusion mechanisms are needed to reach women who are just starting out in the field and who, evidence shows, do not draw on these resources in the early stages.

In Colombia, the interviews cited a few public policies aimed at SIS in general and made some references to gender equality, but not specifically related to this industry. With regard to the former, the women mentioned policies that target specific development, such as applications aimed at stimulating a technology consumer market, which on their own do not tend to strengthen the sector in a more structural sense. They deal with concrete products.[48] Other policies mentioned include training for ICT entrepreneurs or future human resources in technology at the undergraduate and graduate levels. These initiatives, which are mainly carried out by the Ministry of Technology, are limited in scope and diffusion.

Finally, there are two programmes with a gender focus: one raises the visibility of successful businesswomen; the other promotes the participation of civil society in the implementation of public policy using ICTs in the prevention and eradication of gender-based violence.

---

[46] The Software Industry Promotion Fund (*Fondo Fiduciario de Promoción de la Industria del Software*).

[47] Argentine Technology Fund (*Fondo Tecnológico Argentino*).

[48] For example, applications that are used by the government.

In Costa Rica, the women interviewed did not cite public policies focused on the software industry, but they did express a range of viewpoints on their importance. Some of the women argued that the lack of women in the profession is directly related to the lack of women studying ICT in universities. The number of new students of both sexes is low, which means that the number of graduates is also low, and women are in the minority. According to the interviews, measures need to be taken at the educational level to encourage young people to study related disciplines (mathematics, engineering, technology and so on):

> *"In Costa Rica, there is a surprising number of highly qualified women, although there is still an enormous gap. Women tend to choose certain majors, and IT isn't one of them"*

B. National women's/gender equality mechanisms: other spaces, other women

Do the interviewees know about the national gender equality machineries and the associated policies and programmes? Some express a complete lack of awareness or interest; others have a vague idea about their existence and general information on a few specific actions.

Among the latter, the women highlight work being done to improve the living conditions of more vulnerable women (such as programmes to help victims of gender-based violence or to provide assistance to poor women) or to increase the number of women in public or legislative positions (quota laws in Argentina), as well as measures to promote women in the armed forces or in public institutions.

A few mention programmes underway that are closer to their own sphere of action. In Colombia, iNNpulsa-Colombia, a unit of the national government, was created to promote business innovation and dynamic entrepreneurship as drivers of competitiveness and regional development. This unit held a meeting of women entrepreneurs in various areas of the economy to discuss how they could help other women who are implementing projects. One of the small business owners interviewed participated in this initiative, together with other software company owners. Incidentally, they were not invited to participate because of their work in the SIS field, but rather because they are entrepreneurs in a general sense.

The interviews from Costa Rica highlight the National Women's Institute (INAMU) which, in conjunction with the Business Development Association (AED), has created an initiative called Businesses for Gender Equality (AED, 2013). This work group aims to promote actions to protect and advance women's labour rights in companies, by fostering equality, equity and the elimination of gender gaps.

In addition to these experiences, some of the women applauded international programmes such as Women 2.0 and Ellas, which encourage women's business initiatives.

They do not perceive themselves as members of a social group that lives with discrimination, who could benefit from public policies aimed at rectifying that situation. Similarly, they do not expect to be taken into account by organizations dedicated to achieving gender equality.

They repeatedly state that their performance depends on their personal ability and effort and the support of colleagues or corporate policies; only a few businesswomen call on public policies to promote the IT sector. In short, they do not see what role State agencies dedicated to women's rights can play to promote equality in their work areas, nor do they ask for it:

> *"I don't think that these organizations make any direct contribution to the number of women studying technology. I think that going into these disciplines requires a willingness to never stop studying and to take on new challenges all the time, and it's often the women themselves who don't want to do that. But the few women who do take up the challenge do it very well"* (SME).

Others suggest that if these organizations are to be able to intervene, they will need more financial resources and especially a change of focus, which they deem "traditional". Although they do not say so outright, they appear to perceive these entities as peripheral within the State, with a limited agenda and scope. Many interviews suggest that there should be greater articulation with other institutions in the field, for example, the Ministry of Industry or Science and Technology with key areas such as education and, especially, the private sector.

This raises important challenges for these equality mechanisms. First, they must decide if they want to and/or are in a position to incorporate into their agenda (and thus their action plan) measures targeting women who work in the technology industry. If so, which group of people will be targeted (for example, only women or women and men; young women in the process of choosing their major; educators and educational institutions; women who are already working in the sector; women in high-level positions; women who are just starting their careers or who are already established; corporate management; and so on); which problems or obstacles will they try to address; what type of actions would be most relevant and effective for bringing about change; on what principles or arguments are they based (protection of rights, equality of opportunity, women's contributions to increasing their company's productivity and the quality of management, and so forth).

At the same time, an especially important point raised in the interviews has to do with the definition of the role that these machineries are to fill. What actors should be involved, and what messages should guide the interventions, so as to raise awareness and secure the participation of women who have not yet been heard with regard to these processes of change and with whom a dialogue has not yet been opened.

IV. Policies and programmes in multinational ICT companies

Multinational ICT companies (MICTC) have a strong presence in Latin America, although their local affiliates are more oriented towards sales and marketing and solution implementation than development:

> *"This is an IT company, but internally we have three broad areas: technology, sales and support.… In our region specifically, we don't do much engineering"* (HR-LC).

MICTCs are organized into business units (by type of product or service) and horizontal internal service areas (such as human resources, communications and marketing), where the global or regional management or executive board may be located in another country. As a result, the day-to-day activities of employees in a local affiliate are tied to and articulated with other people's work in distant regions of the world.

There are many layers or geographical strata in these companies' organizational charts, where the chain of command is such that an affiliate's activities and results are reported to and coordinated with a regional manager, who in turn answers to a global executive board. This means that a team's direct boss is usually located in another country. In order to understand this organizational dynamic and, in particular, how it manifests in the diversity policies in the selected countries, we interviewed key informants who work in nine global corporations in the sector[49] and two trans-Latin firms.[50] Their accounts confirm that the great majority run business units that manage more than one country; their direct bosses are not necessarily local:

> *"We have an operational structure in the company that has a matrix function, which can be difficult to explain at times, but it really works… So each area reports [to a functional manager] outside the country."* (HR-LC)

[49] Accenture (Argentina, Costa Rica), Google (Argentina), Intel (Costa Rica), HP (Costa Rica), IBM (Argentina, Colombia), Microsoft (Argentina, Costa Rica), Mozilla (Colombia), Nokia Siemens Networks (Argentina), Oracle (Colombia) and Unisys (Colombia).

[50] Globant (2,200 employees/LC Argentina) and GyLGroup (300 employees/SME Argentina).

The guidelines and policies for all areas are defined at the global level and then implemented in the regions and countries where the company has operations. They are applied taking into account the needs, specific business objectives and cultural characteristics of the local markets. These companies have global operations and are also internally organized with a global scope, creating multinational work spaces that operate in markets with important idiosyncratic differences that affect the business. They understand that in order to interpret and respond to these differences, as well as to improve their commercial performance, the staff should be made up of people who are representative of the market diversity. Attracting and retaining them after proving their "talents" thus becomes a strategic objective to improve the company's competitive capabilities, especially in a sector that is highly sensitive to changing demands, as is the case with technology (Cukier, 2007). The diversity programmes or policies that have been adopted by many of these firms stem from this objective. At least formally, they aspire to include people with diverse backgrounds, in terms of gender, age, race, sexual orientation, disabilities and cultural characteristics (language, religious belief, politics, nationality and so forth) (Shore and others, 2009).

Underlying this perspective is the idea that having a homogeneous staff could represent a commercial risk for expanding markets and remaining competitive with other firms.

> *"We believe in diversity for several reasons. It's not just the latest fashion. It really does generate value for the company because it gives us better options for solving problems, bringing in new ideas, fostering innovation; and at the end of the day, it's going to have an impact on the service we provide in the final product. Because the end market has a diverse makeup. So what happens if I only bring in people who studied at the same university, who all have the same gender or nationality? Well, they are going to make a specific product that reflects the way they all think"* (HR-LC).

> *"The company proposes and promotes diversity in all senses, and that creates a lot of opportunity. As a global company, we interact with people around the world, with different beliefs, educational backgrounds, cultures. That's the wonderful thing about this type of industry"* (HR-LC).

> *"Teams that are always made up of people with the same training, the same gender, the same everything… They have less capacity for innovation and performance than a more heterogeneous group. You can call it the gender component, the age component, professional background—it's like everyone is carrying a backpack that holds their contributions. If the group is heterogeneous—obviously with a base level of qualification—the end result tends to be better than if the people in the group are all the same, with the same thought processes or line of reasoning"* (HR-LC).

In this framework, specific programmes that have been implemented include initiatives to increase the share of women, people with disabilities and different sexual orientations:

> *"We have another diversity programme for different capacities or disabilities. We have that in the majority of the countries, and in Argentina in particular we have a programme called Without Barriers, which aims to include people with different abilities in the positions we have open in the company"* (HR-LC).

> *"Another diversity programme is called LGBT. LGBT is lesbian, gay, bisexual and transgender. Within the LGBT programme, there's another programme that has been in place for a couple of years, which includes straight people as programme participants. To design initiatives, to promote them, to ensure that there really is no discrimination for any reason"* (HR-LC).

From the discussion thus far, it is evident that gender inequality is not taken into account as a factor that cuts across all inequalities, but rather as a social determinant that identifies women as a homogeneous group.

Table IV.1
Discourse/principles of organizational cultures

Firm	Discourse/principles of organizational cultures
Accenture	"By embracing an inclusive culture that supports diverse talent, our people collaborate successfully and enable Accenture to compete effectively in the global marketplace" (Accenture, corporate website).
HP global	"Putting our differences to work" (HP, corporate website).
Microsoft	Microsoft expects its employees to comply with the following "ten values": 1. Believe in your ability to direct your life course. 2. Have the certainty that you possess the necessary aptitudes to achieve what you set out to do…: audacity, patience, drive, tenacity, insistence, optimism, discipline, etc. 3. Know that only you can make decisions about your future. 4. making a decision, take the time to think it through, to meditate and consider the issue, and once you have made a decision, throw yourself at your objectives. 5. Do not be satisfied with just any goal. 6. Accept adverse outcomes as a challenge to do better. 7. Know how to delay gratification for your work. 8. Use planning to break a big end objective into smaller goals. The goal should be large enough that you do not lose sight of it while working towards it, but small enough to be achievable. 9. Set measurable objectives and quantify them. 10. Be passionate about what you do, and it will infect those around you.
Google	The company's offices are designed to promote interaction among "Googlers" and to encourage conversation about both work and play. Google has set out a list of "Ten things we know to be true" (Google, corporate website): 1. Focus on the user and all else will follow. 2. It's best to do one thing really, really well. 3. Fast is better than slow. 4. Democracy on the web works. 5. You don't need to be at your desk to need an answer. 6. You can make money without doing evil. 7. There's always more information out there. 8. The need for information crosses all borders. 9. You can be serious without a suit. 10. Great just isn't good enough.
IBM	The IBM organizational culture has the following characteristics: • Incentives for employees to flourish, whether academically or otherwise, to prepare them to move up into better positions in the future. • Respect for the individual, whereby all employees are treated equally. • A code of ethics that must be followed to the letter of the law. An employee cannot be disloyal to the institutions or to his or her boss, co-workers or clients. • Loyalty above all; ethical behaviour. • Permission for employees to participate in a variety of cultural activities, to promote leisure and relaxation among the workers. • Awards for employees who excel at meeting the company's demands (Herrera, 2013).

Source: Prepared by the author on the basis of information provided by Accenture [online] http://www.accenture.com/us-en/company/people/diversity/Pages/index.aspx [date of reference: 3 March 2013]; HP [online] http://www8.hp.com/us/en/hp-information/about-hp/diversity/http://www.accenture.com/us-en/company/people/diversity/Pages/index.aspx [date of reference: 3 March 2013]; Microsoft [online] http://careers.microsoft.com/careers/en/ar/diversity.aspx [date of reference: 3 March 2013]; Google [online] http://www.google.com.ar/intl/es/about/company/philosophy/ [date of reference: 3 March 2013] and Héctor Herrera, "La cultura de IBM", Centro de Servicios y Gestión Empresarial, Sena Regional Antioquía, no date.

The concern for finding qualified human resources with training in IT is rising, and according to the interviews, the measures taken thus far have not produced the desired results:

"We have to say, 'let's try to get everyone to study technology.' On top of that, what's happening now… My recruiter came here to interview for people to go to the United States to work for three months. They take you there, they train you, they pay you a salary of 7,000 dollars a month. They pay your airfare, your housing, a car, everything. And we couldn't find people who even wanted to interview, which is really surprising" (LC).

"The education centres are not satisfying the market. We're not even talking about universities. I'm talking about community colleges and technical institutes. Unfortunately, there are fewer and fewer technical high schools, so at some point a few years ago, we were going out and trying to influence the fifth years, to convince them to choose technology-related studies—not to hire them right then, but to say, "look, if you choose technology, you'll have a lot of job options" (HR-LC).

Small business owners express the same concern:

"Every year, there are fewer women studying IT. Actually, every year there are fewer peopl studying IT. It starts there…" (SME).

In response to this problem and based on the premise of increasing the diversity of the staff, some of the companies interviewed have taken measures to attract more women, with varying degrees of success and ways to measure it.

Without disaggregating by type of job, the interviews showed that, for example, at Hewlett-Packard Costa Rica, 34% of the employees are women, and at Oracle Colombia the share is 43%. At Microsoft Costa Rica, women hold 25% of corporate-level positions[51] and 45% of sales and marketing jobs for local operations. At Accenture Argentina, the internal statistics are confidential, but the gender ratio is estimated to be about equal. While promising, these data do not identify how many women are actually working in software development or other technology jobs, or where they are on the organizational chart.

Most companies implement strategies to attract young people into technology, and in some cases they actively recruit graduates and even encourage professionals in other disciplines to specialize in technology. They are not achieving their objectives, however, and they do not appear to have found a satisfactory solution:

"In the technical areas, the universities these days have a ratio of 30/70, 35/65. The reality is that women still aren't choosing technical disciplines. It's much more common for men. So, in terms of technology issues, if we go to the source of just IT majors, well, the type of pyramid we get isn't going to be much different. Sometimes we manage to convert people, to seek out people in other disciplines or other types of study, and they switch over because those areas or that type of school doesn't have as many job opportunities. We put them through our little internal schools, and that's how we get them started working in technology" (HR-LC).

In the three countries studied, the inclusion of women in technology is a priority within diversity policies:

"Diversity and inclusion are one of the fundamental pillars within our global culture, and the idea is that each area within this pillar should be tied to specific policies and programmes that make it possible. First, we want to reflect the reality of the local market: if we are in a market where the working population is 30% women, then I would want 30% representation in our company" (HR-LC).

"Within diversity, there are a number of measures that we use, which have to do with a minimum number of women entering the organization over the course of the year.

[51] In some companies, there are regional or corporate positions that do not work directly in local operations.

Depending on the groups and the type of work they do, that target is not equal, but the objective is to ensure that we provide equality and that we encourage the different business units to hire women, because the gender mix definitely contributes to a better performance for the company" (HR-LC).

"With regard to gender diversity, we know that from the perspective of how people think,… women have some capacities that men don't, or that aren't as a strongly developed in one sex as the other. It's been proven that the gender mix improves performance" (HR-LC).

Corporate policies are designed and issued by the parent company at the global level. They are then implemented locally, according to three modalities: some companies offer a range of programmes, and the affiliate offices choose which ones best suit the characteristics of each country; others implement the same guidelines in all countries; or, more commonly, each affiliate designs specific actions that meet the criteria of the people in charge (human resources managers or other positions, depending on the case):

"Globally, they mostly implement their own initiatives, and later we share the experiences and practices of the different countries. You can take their experience and say, 'OK, I like this as is, and I'm going to copy it' or 'I think I'll copy 50% and then add some local flavour.' That way, we can really see the degree of acceptance or impact that we think the actions will have, either exactly as we get them or with some modifications. Sometimes they send us something, and we say, this won't have an impact, so let's not do it" (HR-LC).

The rest of this chapter describes the most widely accepted actions, which have been implemented to varying degrees in the companies interviewed.

A. Existing actions to retain and increase the number of women in SIS

Table IV.2 reports on initiatives aimed at people external to the company, with employee participation. They seek to convey the advantages of working in the IT field and in some cases to encourage women, in particular, to enter the profession.

Table IV.2
Initiatives to increase the number of women in SIS

Type of initiative	Description
Programmes aimed at encouraging girls and young women to study technology	These initiatives emphasize the attractions of a career in technology. For example, the DigiGirlz programme is part of Microsoft's larger diversity and inclusion policy; it is under the rubric of Youth Spark, a broader programme aimed at young people. Oriented towards high school girls, the programme provides information on technology career opportunities, describes the experiences of Microsoft employees and offers computer and technology workshops. The programme organizes activities in the countries included in this study, among others.
Dissemination of information on the companies as places to work	Companies carry out various activities to disseminate information on the characteristics and benefits of working in technology in order to attract candidates. This type of programme was mentioned in interviews at Accenture, Google and IBM. They include meetings, on-site conferences, online chats and camps: *"We have marketing programmes for special recruiting. We hold recruiting events for women, we invite candidates to International Women's Day, to participate in events that we do with a mix of internal employees and women candidates.* *…The objective is precisely to show what our practice is, to show the possibility of having a career, of personal development, and again that the company is specifically targeting inclusion"* (HR interview, Argentina).

Table IV.2 (concluded)

Type of initiative	Description
Actions to raise the visibility of women who work in technology	Mozilla disseminates information to women who work as open-source software developers.
Debates on the situation of women	These events explore women's issues on the public agenda such as gender violence and entrepreneurship, or spotlight activities carried out by women. For example, on International Women's Day, Google Argentina organized round table discussions and feature reports involving the participation of women with different occupations and degrees of public visibility, which were broadcast on the Google channel and YouTube for 48 hours.

Source: Prepared by the authors on the basis of interviews published in the Microsoft website [online] http://www.microsoft.com/en-us/diversity/programs/digigirlz/default.aspx [date of reference: 3 March 2013].

(i) Actions to increase women's presence at different corporate levels: only a couple of companies (Accenture Argentina and Microsoft Costa Rica) have formalized this type of initiative in quota policies; this facilitates the tracking of the percentage of women in different areas.

The most common strategy consists in recruiting women within the framework of diversity policies, while the assessment criteria indicate that candidates are chosen on the basis of their skills, training and professional merit, with no consideration of identity characteristics. This causes tension between objectives and criteria. As a possible solution, some firms have tried to improve the pool of women candidates by posting candidate searches in places that are supposedly more likely to be frequented by women:

> *"We're measuring how many men, how many women, and if women aren't applying, we are going to try to position announcements in places where we might know there are communities of female talent"* (HR-LC).

Other accounts reiterate one of the biggest obstacles to reversing gender inequality, namely, its negation or invisibility, which contributes to the belief that it has already been overcome in numerical terms, such that no further interventions are needed to address the expression of discrimination in these environments.

> *"At the lowest levels in general, we aim for a ratio of 50-50 on balance. As that starts to rise, what we look at are skills, competence, potential, adherence to the company's values. If we hid the name of the person on the CV, it wouldn't matter, because what we are looking at is the content, not the person's sex"* (HR-LC).

The following account describes an issue for which a satisfactory solution has yet to be found.

> *"What happens is that in certain roles, the markets don't have much of a supply of women. So the recruitment time can be a little slower, and that can sometimes put pressure on the business. What can we do to attract qualified women faster? That is one of the challenges for achieving success"* (HR-LC).

The majority of the human resources managers interviewed indicated that, formally, there are no gender barriers to holding any position:

> *"These days, no one will tell you I don't want a woman, or I would prefer a man, or I would prefer a women and I don't want a man for that job. That discussion doesn't happen any more"* (HR-LC).

The sharing and discussion that unfolds within companies can provide an interesting means for bringing to light stereotypes, resistance, discrimination and hidden grievances, but it works in subtle, yet persistent ways.

As proof of their intentions, some of the managers interviewed observe that they have also implemented training and awareness workshops to eliminate selection bias.

> *"In fact, we've had training sessions. Since the company is very committed to increasing the range of diversity, of women, we've had awareness training to ensure that the team leaders do not have any kind of bias when the time comes to choose. We've given them training exercises where we give them the same CV with a man's name and a woman's name. Maybe they won't notice. The contents are changed to see if when it's time to make a choice, they prefer men or women, so that they can work on what's called an unconscious selection bias"* (HR-LC).

Many of the companies disclose information on the staff and keep statistical records that are used to measure change over time.

> *"There are measures for that market. There are organizations that carry out that kind of survey, where they say that in Latin America the average is 27% or 35%. And those are our parameters for understanding how well or how poorly we are doing on the diversity issue"* (HR-LC).

(ii) Benefits and support programs: general company policies that are available for both men and women.

- Benefits: Benefits are available to all employees, but they are organized for and used by men and women differently, according to the companies. Some of these programmes consist in recreational activities and spaces: lunch rooms, music and games, sports and physical exercise, which are implemented according to local criteria and are usually different for men and women (for example, football/soccer for men; yoga for women). Other programmes include training workshops or talks on issues that the company considers of interest for improving the quality of working life.

> *"We have talks called Working Parents, which are actually attended by the working mothers. A psychologist comes and gives a talk on topics like youth, childhood, adolescence, issues that parents constantly face in their lives with children. These talks are given in the work area during the lunch hour. We also have yoga and Pilates classes in the office"* (HR-LC Argentina).

> *"We have sports-type benefits. We pay for a gym membership for all employees, and we have a few other things. And while it's available to both sexes, we know that in some cases it's mainly women who use the benefit the most"* (HR-LC Argentina).

- Policies on flexible scheduling and working at home are offered to all employees. The organizations establish general guidelines on the number of days per week or hours per day that can be used this way, and employees individually coordinate their schedule with their direct boss. Women with small children tend to take advantage of this benefit more than men. For example, at Google in Argentina, if the type of work allows it, they can work from home as much as three days a week, with two days in the office. Mentoring programmes: These programmes are widely used in the companies in the study. They are open to all employees, but they are especially promoted to women. The mentors are presented as an informal coach, someone with experience and history in the company who can guide and advise employees who are just starting out (IBM, Google, Microsoft and Intel in the three countries).
- Technical strengthening programmes: For example, *Women at Intel Network* (WIN) offers training workshops with experts (Costa Rica).
- Initiatives aimed at raising the public visibility of women in management positions (IBM Colombia).

- Promotion of women's leadership: For example, *Oracle Women's Leadership* (Colombia) holds motivational talks in this area, not just for women.
- Women's groups/committee, business resources groups, networking: These initiatives promote the generation of women's networks and communities within the firm. The company provides the infrastructure, and the groups propose and organize activities on "gender issues". The objectives are twofold: (i) to generate connections that foster sharing and collaboration; and (ii) to strengthen individual performance and career paths. Participation in these groups and nomination to coordinate or manage them are voluntary. They organize talks and conferences (not always on technology) with successful career women, as well as activities that are open to the general public. These groups share resources with international initiatives such as *Women in Technology*[52] and suggest mentors (both male and female) for the women who approach the group. The time spent is voluntary, which shows that the companies do not consider the groups to be part of the job description. Consequently, this work is not a priority for the women who organize, facilitate and participate in the activities (HP in Costa Rica, Google in Argentina). The groups try to promote the sharing and dissemination of women's experiences in the work world, in technology in general and in the company in particular:

> *"Last year we held a regional forum for women in Latin America, where we spent two whole days with panels on issues related to women, careers, personal branding, how to build your creative brand as a woman. We debated lots of interesting issues, about how to develop yourself. We talked about how the work world still has a more masculine resonance, let's say, and how women so often copied male role models in order to make their place, so that maybe they weren't being authentic about personal things. And as women start to feel more secure in their field, they can start to be themselves. So, creating communities of women, where they feel like they can talk about their issues and share them with others, helps each one be herself in the workplace"* (HR-LC).

This account stands out among the interviews in that it poses a fundamental problematic, albeit an invisible or dismissed one: the androcentric or masculine nature of the business culture in this sector and the effort to adapt —bordering on transvestism— that women have to make to be accepted.

(iii) Compliance with legal regulations on maternity, paternity and early childhood leave.

All the companies in the study apply the existing regulations in each country, and several extend their benefits beyond the minimum required by law. The main headquarters of Yahoo, for example, recently doubled the length of parental leave from 8 to 16 weeks for mothers and 8 weeks for fathers. This decision brings the company on par with Google (five months for mothers and seven weeks for fathers), Facebook (four months for both) and Microsoft, whose affiliate in Costa Rica gives a five-day leave to fathers, which is not required under the national regulation:

> *"There's a regulation, a law, the legislation, and then we look at how we can offer something more. Someone might say, OK, let's do what the law says, or we can decide that we want to go a little further than what the law requires, so that we can show our people why it's to their advantage to stay, why we want to attract you to our company, how if you leave, you lose this benefit, because the majority of the companies in the market are going to make you take a step backward…"* (HR-LC).

The advances that have been put into practice by some multinational companies, such as those included in this study, highlight the shortcomings of current public policies, which are not yet aligned with the agreements spearheaded by the ILO for decent work.

[52] Additional information on this initiative is available online at http://www.womenintechnology.org.

Only one of the people interviewed broached this subject. An executive at a large international corporation, when talking about the lack of women in management positions in the SIS industry, describes the need for public policies in depth:

> *"The government has to take positive action in order for this to change. Afterward, sure, go back to the free market. But until there's a radical change, there have to be positive actions for women's equality, for family planning, for flexibility in the workplace for women. All of this will allow women to participate more in the technology industry and to have access to different roles and higher positions, which they don't have right now. Because once women are in positions of authority, their skills and abilities will be more appreciated, more visible, the good and the bad, but there will be better measures for comparison between men and women"* (LC).

In general, women who hold management positions in large companies do not appear to be familiar with equality policies, nor to expect them to bring about improvements in their working conditions. They believe that this industry offers opportunities to all people who have the necessary technical training, independent of their gender, although some perceive inequalities in terms of promotions or salaries that need to be resolved for reasons of fairness and recognition, but from within the company.

They recognize that women are a minority, but many attribute this exclusively to the low number of graduates with technical degrees. When discussing why there are so few women in senior management positions, a frequent explanation is that women themselves impose self-limitations, tied to personal choices. This positioning is reflected in their evaluation of their own companies' programmes and initiatives targeting women, where opinions vary depending on whether the policies involve affirmative action policies, such as quotas, or actions for building self-esteem, confidence and leadership skills.

Quota policies and even less extreme measures that define women as a disadvantaged group elicit resistance. There is a sense that they are or could represent a sign of weakness, a shadow of a doubt over the great effort they have had to make to penetrate and advance in their professions. They believe in the meritocracy, although they have proof that the rules are not always followed.

Other difficult or worrisome situations described in the interviews involve having to prove their professional and technical credentials to their co-workers and superiors or at the start of a new working relationship with clients. While this is a source of stress and annoyance, the women do not cite proposals for institutional action to prevent it. They think that programmes and initiatives aimed at supporting women —such as women's groups or committees, mentorships, information sharing and conferences— are useful, especially for young women or women at risk of postponing their careers, but women who already hold management positions do not think such measures are necessary for their own well-being or outlook. They feel that they are already in a position to act as mentors and to provide an example of how women can be successful and achieve their objectives.

> *"[As women we have] a responsibility to contribute to helping other women break with paradigms and discover their full potential"* (LC).

They also place a high value on policies aimed at increasing the number of women studying technology at universities, which they consider necessary, together with initiatives to raise corporate social responsibility, some of which target women in vulnerable sectors:

> *"The stories in Girls Rising [a documentary produced by Intel] are proof of what research has shown over and again: that education is the road out of poverty, an escape from servitude, hunger and disease, and the promise of a better future, not only for girls, but for all of us"* (LC).

In the interviews, some of the younger women presented a different position, in particular those who lead programmes for women in the company. They are generally enthusiastic about these initiatives,

and they usually attend the associated functions, especially if the events are dynamic, attractive and interactive.

Those who are most favourable towards initiatives designed for women in the company suggest that they may have arisen as a result of the public debate, which progressively recognizes the inequalities in gender relations in numerous areas. In the business world, they represent a benefit that gives women a chance to share experiences and strategies for achieving a positive work-life balance.

They explain that flexible schedules and working from home are policies that benefit all employees, although they recognize that women and men do not take advantage of the option to the same extent.

There is also concern for the continuous exit of women from the IT industries. The explanations found in most studies allude to the difficulty women face in reconciling the intense commitment and time demands of the job with their caregiving responsibilities. Only a few cases highlight the negative contribution of the organizational climate and work arrangements in the IT sector, or the sexist attitudes and values (both explicit and implicit). These factors can discourage women, favouring their displacement to other work environments within or outside technology (from university teaching to jobs that are completely different from their prior work experience).

These initiatives are valued as a form of support from the company in their efforts to coordinate professional and personal obligations, but most women feel that the best way to balance these demands is to informally negotiate alternatives with their boss, so as not to have to conform to rules that require them to meet certain guidelines or to run the risk of incurring displeasure within the company.

V. European public policies and programmes for the development of the information and knowledge society

In recent decades, the countries of the European Union have been developing a broad and diverse set of policies to promote the ICT industries. Some of these initiatives specifically target software production, diffusion and export, with the understanding that this field has a lot of potential and, in the context of the current economic crisis, can help stimulate the recovery of economic growth in the countries.

The European Union has also displayed concern for the lack of qualified women entering ICT industries, and it has taken a proactive approach to encourage their participation in order to satisfy the steady demand.

To contextualize this issue, this chapter presents some general data on the situation of women in the European labour market. We then describe the policies and best practices that have been implanted to address the lack of women in IT fields, together with the measures and actions that recur over time. Finally, we identify which aspects have not contributed to achieving the desired results and which form the basis of so-called best practicesAccording to Eurostat, in 2011 the total employment rate of people from 20 to 64 years of age in the 27 countries of the European Union was 68.6%. For women, the rate was 62.3%, versus 75% for men.

Of the total population, 35.5% work in knowledge-intensive activities. The share is 43.8% for women and 28.7% for men. Of the total, 13.6% are in business industries; for men, 14.1%; for women, 13.2%.

Women more than men tend to work in knowledge-intensive activities that require higher education. However, only one out of every three of these jobs is in business industries, versus one out of two for men.

The unquestionable progress of women in the European labour market does not meet the objectives of the Europe 2020 strategy, which aims to record a 75% employment rate for both men and women. To reach this target, the European Union suggests encouraging the labour market participation of older women, women heads of household, women with disabilities, migrants and ethnic minorities; all these groups have a relatively low employment rate and face persistent obstacles to their integration. A report issued by the European Commission in 2010 contributes to understanding the context of

women's labour participation in that region. The share of women entrepreneurs is 33% (30% among recent entrants to that sector). This demonstrates that many women still do not consider entrepreneurship as a feasible economic option. The European Commission recommends that in order to promote female entrepreneurship, especially among young women, the development of entrepreneurial abilities should be integrated into formal education, so that they will have the skills they need should they choose to pursue that alternative (European Commission, 2010).

Table V.1
Employment rate in Europe (27 countries), by activity and sex, 2011
(Percentages)

	Employment rate for the population aged 20 to 64 years		
	Women	Men	Total
Total activities	62.3	75.0	68.6
Knowledge-intensive activities (KIA)	43.8	28.7	35.5
Knowledge-intensive activities —business industries (KIABI)	13.2	14.1	13.6

Source: Eurostat [online] http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tsdec420&language=en and http://ec.europa.eu/research/science-society/document_library/pdf_06/she-figures-2012_en.pdf [date of reference: 3 March 2013].

Despite the progress that women have made in the labour market, the dearth of women in the IT industries is especially worrisome. In particular, the share of women in highly specialized positions, far from increasing, has fallen or at best stagnated (OECD, 2007). In the most highly qualified positions, women account for only 10% to 20% of personnel, tending instead to be concentrated in administration, human relations, marketing and customer service. They are a minority in positions that are strictly related to technology production and an exception in senior management.

These promotional initiatives are based on two premises: equality of rights and opportunities for women to participate in all aspects of social and economic life; and/or the need to increase efficiency, growth and innovation in the sector, so as to achieve the design of new products and expand the number of consumers through the inclusion of professionals with diverse profiles (OECD, 2007). Policies that are founded on the latter argument are more accepted and widespread in the business world, and to some extent they also infuse the strategies and programmes promoted by the State, international agencies and women's organizations or networks.

The promotion of women as a "useful resource" for increasing business competitiveness and/or accelerating national development policies would appear to be the most commonly used argument, which could apparently generate a larger consensus or, from another angle, meet with less resistance than appealing to women's rights or equality/parity between men and women. Later we address the implications of invoking this option at the subjective level for female workers, as well as its impact on the corporate discourse.

In general, the main priority of the strategies or initiatives surveyed is to encourage young women to study technology, on the assumption that this will increase the number of women working in ICT-related jobs.[53] This would also lead to advances in terms of the diversity in the composition of firms' personnel.

[53] Although data on this phenomenon are not available for Europe, the interviews carried out for this study suggest that this assumption is not necessarily supported. Women who graduate with an IT degree do not always remain in the field: some go on to work in other fields or undertake post-graduate studies in other disciplines; others enter the ICT industry but then leave it for a variety of reasons.

According to Friedewald and Leimbach (2010), SIS is one of the most dynamic sectors in European industry. It has become a driver of the development of the information society at the regional and global levels, given its contribution to productivity growth and increased efficiency and transparency in management, sales and a wide range of services.

In 2006, this sector employed approximately 2.75 million people, creating a value added of 180 billion euros, with a forecast of strong, steady growth thereafter. The report underscores the importance of assessing national policies and programmes aimed at strengthening the SIS sector, with attention to the differences among the countries of the region.

There are strong interdependencies between the European level and the national level, as well as between the supply and demand for the policies, albeit with important differences among countries. However, all the member states have implemented policies, but not they have not been sufficiently active (Friedewald and Leimbach, 2010). Based on a comparative analytical framework,[54] the policies vary according to the structural conditions of the technology industry in each country, the policies related to SIS innovation, the business environment and the general policy framework on innovation. Most of the policies seek to stimulate the competitiveness of this industry, under the responsibility of national governments as established in the 2010 European Union initiative. These initiatives address a broad range of integral ICT programmes, but they are not specifically focused on SIS.

In general, the policy instruments are designed to promote innovation, increase diffusion and maintain a healthy business environment (basically investment attraction policies).

A. The incorporation of a gender equality focus in ICT production policies and programmes

The European policy on equality for men and women in different areas of society, especially work, is not new. As early as 1975, the principle of equal pay for work was adopted by the boards of directors of European firms, to further the recognition of women's participation in the labour market.

According to the paper *Strategy for Equality between Women and Men. 2010-2015* (European Commission, 2011), the region shows a rising trend in the number of women in the labour market, together with significant advances in education and training. Nevertheless, important gender gaps remain in various areas and sectors where women are overrepresented in lower-paying positions and underrepresented in high-income decision-making positions. They also continue to work more unpaid hours than men. Together with their family caregiving responsibilities and commitment, this has resulted in low growth of the female employment rate, below desirable levels.

The European Union addresses these issues from three complementary premises: (i) gender inequality violates fundamental rights; (ii) it imposes a cost on the economy and leads to an

[54] Based on a recent study (Friedewald and others, 2005), member countries can be classified into three groups:
Independent states have an established domestic ICT and software and software based services (SSBS) production sector that is technologically capable of developing and/or providing most of the required ICT products and services. It is a major supplier in both domestic and export markets. Examples include Finland, France, Germany, Italy, Holland, Sweden and Great Britain.
Intermediate states are mainly importers of ICT and SSBS goods and services (particularly goods), but they also receive substantial investments that support local production with high levels of domestic value added. As a result, countries in this group have significant domestic production and export capabilities in selected ICT and SSBS product/service areas. Countries in this group include Austria, Belgium, Denmark, Ireland and Spain.
Dependent states are mainly importers of ICT and SSBS goods and services (particularly goods) and receive investment mainly for lower value added ICT activities (manufacturing more than design). This group includes Bulgaria, Poland, Cyprus, Portugal, Czech Republic, Romania, Estonia, Malta, Greece, Slovenia, Hungary, Latvia, Lithuania, Luxembourg and Slovakia.

underutilization of talent; and (iii) achieving gender equality would generate an increase in economic benefits and business.

The Europe 2020 objectives of inclusive, intelligent and sustainable growth also allude very generally to the need to consider that women's talents must be used more broadly and efficiently.

As shown by Lee and Faulkner (2006), even when "good" policies are formally in place, it is extremely difficult to put them into practice in the business workplace and daily life. They are accepted as "politically correct", but that can hide deep and possibly unperceived resistance.

Nevertheless, some best practices for promoting women and gender equality are outlined in the report, *Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society* (European Commission, 2006), the European Commission's most recent study on this scale.

Based on an extensive literature review, the report contends that the ICT sector and professions need to be integrally "engendered"; that is, companies not only need to integrate a gender focus into their design, production, promotion, and uses, but they need to encourage women to actively participate in all these phases. In other words, they must be receptive and offer effective responses that take into account the similarities and differences between women and men, as well as the heterogeneity within each gender in terms of needs, economic possibilities, education level, cultural capital, preferences, skills and abilities in current technology use, aesthetic styles, contributions to improving different aspects of life and risks, and so on.

The European Commission's report proposes adopting a more complex, multidimensional conceptualization of the relationship between gender and technology than the mere identification of inclusion or exclusion of women in ICT access or the evaluation of their presence in technology production solely in numerical or percentage terms.

The report argues that in order to more precisely understand what is happening with women who work in these environments, in terms of both objective factors (general labour conditions, the required skills and demands of different tasks, position in the hierarchical structure, salaries, relationships with co-workers and superiors) and subjective factors (representations of identity, self-appraisal, satisfaction, ambitions, conflicts, etc.), it is necessary to differentiate the various activities that make up technology production (hardware programmers, software programmers, applications, content producers, designers, technical support, sales and marketing, etc.) and to study what the working life is like for women in each of these activities according to their different levels of responsibility (managers, supervisors, employees, etc.) (European Commission, 2006).

The international literature considers the SIS sector to represent an exceptional opportunity to increase the participation of women in the labour market. In particular, it has the potential to operate on the basis of a more flexible structure that privileges creativity, the joy of innovation and team work and is also in need of qualified personnel.

The countries of Europe have responded to these issues in very diverse ways. Therefore, this broad overview concludes with two levels of assessment. The first level differentiates between three types of organizations: (a) those that do not consider gender equality to be an important practice; (b) those that have in place official measures aimed at achieving this goal, but which are not applied or systematically evaluated (when an activity is carried out, it is generally spearheaded by motivated employees, but not supported by the institution with key resources, such as a budget); and (c) those that have put into practice well-developed, well-implemented policies to ensure gender equality, which are included in the company's budget and managed by a dedicated staff that implements the programmes and evaluates their impact.

The second is related to the professional life cycle. It centres on the analysis of the professional careers of women in technology over six stages:

(i) Education: In Europe, as well, there are few women studying computer sciences and technology, and companies therefore have difficulty finding and recruiting engineers and technology experts. The most frequent measures to reverse this situation involve mentoring programmes in secondary schools and universities and the dissemination of biographies and first-person accounts from high-profile women in the industry or technology research, to offer professional role models for young women.

(ii) Recruitment: This report also finds that women are inhibited by the prevailing representations of ICT work, which even today project certain stereotypes, both masculine (the nerd or geek, who is not very social, a loner, slovenly) and feminine (women with a limited personal and love life, absorbed in their work). The most widely accepted strategy for change is to disseminate motivational messages, but this approach has risks that are not always recognized. One "recipe" seen in some promotional campaigns is to show images of "feminine" women in ICT environments that are stimulating, fun, social and cutting-edge, which supposedly allows them to reconcile their needs; in sum, a discourse that slips towards reinforcing the so-called post-feminist female stereotypes of young, sexy women who are fashionable and highly trained, who have the economic means and ability for consumption, and who demonstrate affirmative attitudes in their personal lives, but avoid explicit confrontation with men and especially do not want to be perceived as "anti-men".[55]

Other approaches are to stimulate a transparent recruiting policy and to promote women's networks within the organization.

(iii) Career development has to do with women's experiences and chances of achieving desired positions within the company. The most commonly used instruments are coaching, career planning, self-assessment and mentoring between colleagues.

(iv) Management: it is well known that the gender gap is very wide in management and executive positions. This is due not only to discriminatory promotion practices, but also to working conditions that are not compatible with the caregiving roles that are generally assigned to women.

(v) Reinsertion after leave includes maternity leave, which varies from three months to three years or more in the different countries. For women who work in the IT field, returning to work is very problematic: IT innovation is constant and occurs very quickly, so it is difficult to remain up to date. This hurdle is particularly difficult for women who decide to take care of their children full time in the early years and then want to go back. The measures offered include short-term mentoring and training sessions to bring the worker up to speed.

(vi) Maturity programmes are aimed at adult women who, despite having the skills and employment history with the company, do not have the possibility of promotion. In these cases, the programmes encourage the women to consider options such as self-employment or entrepreneurship.

In terms of company policies, as described earlier for the three Latin American companies, many European companies absorb, or dilute, the goal of gender equality under so-called diversity and/or inclusion policies.

The argument is that diversity in the staff is a key factor for innovation, creativity and growth. Only a very few organizations —located primarily in Finland and Germany— pursue a comprehensive approach to gender equality, which takes into account all the phases of the professional life cycle.

[55] Some campaigns for changing social images carried out by international organizations or private companies, in both science and technology have been sharply criticized for using stereotypical images of sexy women, typical of show business culture, and for having a racist slant. A classic example is a video produced by the European Union, called *Science: It's a Girl's Thing*, which featured very skinny girls wearing expensive clothes and striking modelling poses. It was harshly criticized for being offensive and had to be withdrawn.

Others are more passive or conformist in this sense. They assume that inequality between men and women is determined by the limited availability of women technologists, a situation that will change with time.

Among the so-called horizontal issues, the European Union has a broad, consolidated body of laws prohibiting discrimination on the basis of gender, in both the workplace and other areas of daily life. In order for the legal framework and the associated policies to work, there must be mechanisms for monitoring, regular evaluation and revision, and especially an ongoing dialogue with companies, social organizations, equality organizations and representatives of civil society, so as to adapt the policies to effectively fulfil their objectives. A review of a variety of sources, including the aforementioned study (European Commission, 2006) revealed the following business and institutional experiences that demonstrate these attributions:

- TeliaSonera Finland (Finland): The corporate legal framework is favourable to gender equality. Working conditions are very family-friendly, for both women and men: 46% of fathers take parental leave. The company has implemented numerous support measures in this area, which has contributed to its excellent public image. Women and men are considered to have equal capacities, and the company develops strategies aimed at ensuring that they have the same opportunities in career development, with a general focus based on "learning by doing". There are also leadership programmes.
- University of Hannover (Germany): The university has an equality office run by a gender commissioner who works exclusively on gender issues, both within and outside the university. The strategy is to attract more students to the technology departments, create networks to support women during their academic activity and offer them other study opportunities after graduation. The university implements early training programmes in engineering in high schools, with the goal of increasing interest. Other programmes include coaching, training and the formation of student networks. In sum, the key elements of the strategy are to promote interest in ICTs, together with a constant questioning of gender stereotypes, and to increase students' knowledge of the characteristics of technology jobs.
- Fraunhofer Gesellschaft (Germany): This firm is a leader in ICT research in Europe. While there are few women in executive positions, the company has one of the most integrated approaches to gender equality. It starts with mentorships in schools, guides to motivate and inform girls, training for young women and doctoral programmes. The argument at the root of the policy is that as more women participate in technological research and development, quality will increase. In sum, the priorities are to generate gender consciousness and develop of projects that promote the active participation of women.
- General Electric (France): The gender equality strategy is tied to the firm's concept of diversity, understood as a synonym of business, prosperity and the growth of production. According to the report, the women's network at General Electric is one of the most active women's lobbies in France; it promotes mutual support, the generation of awareness and the transfer of knowledge among different women working at the company. The programme responds to the needs of both women and men.
- Motorola (Poland): The Polish culture is very traditional, with strong stereotypical attitudes about women and their participation in ICT, which has resulted in a significant lack of women in the IT labour market. To fight against these trends, Motorola has developed and implemented a university project with the goal of attracting more women. It gives an award to high school girls who learn to design and create their own web pages.
- Go MINT (Germany): This programme was implemented by the German Institute of Technology in conjunction with government organizations, companies and scientific institutes, and with the participation of the Federal Ministry of Education. This initiative,

which has acquired the status of a National Pact, aims to address the shortage of qualified workers by exploiting the potential of women in scientific and technological professions. The programme objectives are the following:

- Orient students towards careers in science, technology, engineering and mathematics (STEM).
- Increase the share of women hired in this industry.
- Increase their number in leadership positions in universities, research institutions and companies.

- Bundesweite Gründerinnenagentur (Germany): This programme was recommended by the European Union as a successful model. Since 2004, it brings together all the support opportunities for women entrepreneurs. It provides information of productive sectors, consulting, training and opportunities to join networks. There are branches in 16 regions and connections to industry, education, politics and the communications media. It is constantly growing and currently has 1,900 regional partners. It acts as a think tank, taking into account the specific nature of the technological ventures launched by women.
- ICT trainers' network (Germany): This model project was designed to attract more women to the ICT disciplines. It was developed by INBAS GmbH, a professional training institute, and received supportfrom the Federal Ministry of Education and Research. The programme centred on courses for professional women in ICT, with the goal of training trainers who could then act as role models to attract more women into the field. The courses were held in four cities (Potsdam, Offenbach, Dresden and Saarbrücken) between 2000 and 2002, in cooperation with regional education and labour institutions. The curriculum included modules addressing the problems faced by women working in ICT and sought to raise awareness on their underrepresentation. One outcome was the formation of a virtual network, with a forum for exchange and discussion.
- Informatica Feminale (Germany): This summer programme for women was started by the University of Bremen in 1998, when it became evident that the culture and structure of universities, as well as the content of computer science programmes, do not meet the needs of women, nor do they offer female role models or take into account women's particular interests. The programme is aimed at computer science students and others interested in IT, encouraging them to develop their own ideas about the field and to build networks. It includes theoretical, practical and technical computer classes, as well as sociology, interdisciplinary studies and discussions tied to gender equality issues. In sum, it attempts to change the teaching curriculum in computer science to incorporate women's perspectives and a gender focus.
- International Women's Degree Programme in Computer Science (Germany) : Started in 2000 by the Women's Department at the Hochschule Bremen (University of Applied Sciences), this programme seeks to provide a high-quality education in technology, exclusively for women. It is based on the principles of single-sex education, an applied curriculum, studies in other countries and online components.
- Deutsche Telekom (Germany): The largest telecommunications company in Germany has announced that for 2015, 30% of middle and senior management positions will be held by women. When the policy was introduced in 2011, women accounted for 30% of all employees at Deutsche Telekom, but only 13% of upper management.
- Girls' Day-Future Projects for Girls (Germany): Once a year, a wide range of German institutions participate in an "open house" oriented towards girls aged 10 to 15 years, to give them an opportunity to learn about the work life in technological environments. Cooperating institutions include technology firms (or companies with a technical department), universities and research centres.

- Orange-France (France): The Deputy Chief Executive Officer of this telecommunications company underscores the advantages of establishing a quota of 35% women at every management level, in all departments. A Diversity Committee was established to propose changes in recruitment practices, for example, by setting up partnerships with engineering schools and adopting non-discriminatory management practices that reflect the diverse needs and work styles of both genders and take into account the pressures on their time nd availability.
- Rails Girls (Finland): Although not a public or corporate policy, this international programme created by young women in Finland in 2010 has achieved widespread diffusion and popularity in a short time. The objective is to motivate young women to develop programming skills. The programme puts on short events, often on the weekend, with a festive, cooperative and creative atmosphere.[56] It has grown into a global movement that organizes free programming workshops, using open-source software, in over 90 countries in Asia, Europe and Latin America and the Caribbean.
- Organic Law for Effective Equality between Men and Women (Spain): Passed in Spain in 2008, this law urges public authorities to apply the principle of equal opportunity to all dimensions of the information society. It provided for the implementation of specific programmes to ensure ICT access and training for all women and, in particular, groups at risk of exclusion and/or in rural areas. It promotes the creation of digital content and requires the use of non-sexist language and approaches in all actions financed with public funds.

The European Commission's strategy for the telecommunications industry and Internet companies centres on encouraging them to attract more "cyberellas" or women with ICT skills. In this framework, seven of the largest companies in the ICT sector[57] signed a *Code of Best Practices*[58] in 2009, in which they commit to transforming jobs in the technology field. The goal is to make these jobs more attractive to women and to promote women's potential to participate in ICT production. The signing companies committed to implement the following measures: (a) computer clubs or laboratories for girls, to develop their self-esteem and teach them to use ICTs to design web sites, create music or produce online magazines; (b) mentoring programmes during maternity leave, to help women stay current with the latest technological developments; (c) measures to make progress towards achieving a balance between work and family life;[59] (d) ICT forums and networks for women, to provide support during job searches, advice and mentorships;[60] and (e) the establishment of targets for recruiting and promoting women ICT professionals at all levels and monitoring compliance.[61]

The European Commission will evaluate the implementation of the Code and its results. According to Commissioner Viviane Reding:

> *"Such good practices need to be complemented by firm targets. One practical way to do this is to boost the representation of women in the Boards of ICT companies.... Today only 7% of board members in the 116 major ICT companies are women. Therefore, let's set ourselves a target to double this by 2015".*[62]

---

56 The first event was held in Helsinki in November 2010 and was attended by about 100 girls.

57 Alcatel, Lucent, IMEC, Orange-France, Telecom Group, Microsoft and Motorola.

58 The code was the result of a series of conferences and conversations with Commissioner Reding, on International Women's Day in 2008.

59 Companies like IMEC already offer flexible schedules and working from home.

60 Alcatel, Lucent, Microsoft and Motorola have prior experience in this area.

61 Orange leaves recruitment open until it receives an application from a woman.

62 See *Five major high-tech firms pledge to promote more "Cyberellas"* [online] http://europa.eu/rapid/press-release_IP-09-344_en.htm.

Another important initiative announced by the European Commission is the creation of a *Directory of European Organizations* that uses an interactive platform to connect numerous working groups in Europe in order to advance the participation of women in ICT. It provides information on legislation, jobs, mentors and other resources that facilitate the formation of networks and the exchange of knowledge, among other aspects.

In the initiatives described above, the majority of the strategies and activities follow similar models. However, they can be clearly classified into three groups: (a) initiatives that start by recognizing the existence of sexist stereotypes and values or discriminatory practices in the corporate structure and culture and in the design, content, language or publicity of technological products; (b) initiatives that seek to transform the work environment, basically to improve employee satisfaction; and (c) initiatives that minimize these issues or bury them under certain benefits where the ultimate goal is to include more women as a function of their contributions to productivity, but without proposing any changes to the organizational culture.

VI. Reflections and suggestions for gender equality in the SIS sector

The SIS sector is key for accelerating the participation of Latin America and the Caribbean in the digital economy and fostering an inclusive, sustainable and innovative development. That is, it represents a productive area with the potential to improve people's quality of life, increase their aspirations, boost the transparency and efficiency of institutions and organizations, promote innovation in all spheres, provide marginalized groups with possibilities for expression and facilitate interaction and communication without borders —in short, to engender deep transformations that, for many, signal the change of an era.

It is clear that the information and knowledge society has not fully lived up to its promise, in part due to political and economic conditions. There is even a tension between, on the one hand, the desire for liberty, recognition and justice that has been reinvigorated by digital access and use and, on the other, the control mechanisms that affect privacy and freedom of expression, which often go unnoticed.

Women are demonstrating their interest and ability to occupy spaces as users. A fundamental challenge, however, is to ensure that they have a voice and decision-making power in the production and development of the technology that is transforming people's way of life.

This report reviews the opportunities that SIS could offer women in a key productive sector of the digital economy. This does not simply imply achieving numerical parity between men and women at all levels in technology companies. The objective is much broader: it implies that these environments, processes and products must fully reflect women's sensibilities, interests, imagination and visions of a desirable and possible future, and value women equally for their abilities and contributions.

A. Europe and Latin America: progress and pending challenges

The above review uncovers a notable difference in the quantity, diversity, invested resources, duration, and knowledge generation of the general initiatives for SIS and ICT promotion in the European Union versus Latin America and the Caribbean. This difference is related to the degree of economic development and institutional capacity (in particular, the proactive role of the State in this area), the incentives for training qualified human resources, the productive structures and the role given to science, technology

and innovation in the European development strategies. Over the decades, however, the European Union has not achieved the desired results from a range of initiatives based on similar objectives and actions.

In Latin America, in turn, most countries are advancing very quickly in the formulation and implementation of policies to promote technology, including some instruments aimed specifically at the SIS sector.

Most of the region has embraced a proposal for economic, social and political development that centres on social inclusion, growth with equality and the role of ICT in both economic and social innovation. It is remarkable and worrisome, however, that none of the countries have formulated strong, consistent government policies or programmes to stimulate and support women's participation in the production of technology, especially SIS.

The general statistics on ICT access indicate that men and women have very similar user levels, and in some cases women surpass men in the use of certain applications, such as social networks. However, an ITU report confirms that in Latin America and the Caribbean, there is a lack of general and single-sex programmes for the development of professional computer skills or the promotion of ICT careers among young women (Tandon, 2012). With a few notable exceptions, most of the existing programmes and research on related issues ignore gender differences: they basically focus on analysing and increasing universal Internet access, narrowing the digital gap in general, creating a national ICT infrastructure, designing and implementing a regulatory environment, promoting digital content and developing ICT applications for health, education and public administration.

The instruments identified in the three countries included in this study make practically no reference to any social group and, in that sense, are put forward as "neutral". This homogeneous "universalist" perspective derives from a technicist conception of ICT; that is, these tools are characterized and promoted as abstracted from their socio-historical, cultural and political context.

This policy deficiency conflicts with the significant advances made with gender equality policies in the region in other spheres such as politics, education, health and even labour. It also diverges from the consistent manifestations of commitment to women's rights by the region's governments. Similarly, the declarations and initiatives of multilateral, international and academic agencies and women's organizations working on gender and ICT projects or the information and knowledge society do not appear to have had a substantive impact on State technology policies in terms of introducing a gender equality approach.

This could reflect the fact that, thus far, the labour sectors with the highest pay scale and the highest social and professional status have not been a priority for the women's movement or the institutions dedicated to the defence of women's rights and the achievement of equality and autonomy. Therefore, only a very small group of researchers and non-governmental organizations (NGOs) working on the diffusion and utilization of ICTs by women and activists have intermittently demanded gender equality measures in the information society, and only on a few specific topics such as Internet governance or free software. For the rest, demands are generally focalized on ICT access and appropriation by women and, in very few cases, on their role as creators/producers.

The lack of active gender equality policies for the SIS sector and ICT in general is also seen throughout the discussion process for the Plan of Action for the Information and Knowledge Society in Latin America and the Caribbean (eLAC2015). Only two areas of the Plan explicitly refer to gender equality: education; and productive development and innovation. Thus, while the Working Group on Gender and ICT was created within eLAC in 2005, the group's efforts have not been reflected in the implementation of national policies with a gender equality perspective.

A recent study commissioned by that group (Camacho, 2013) on the integration of a gender equality perspective in the digital agendas of 11 Latin American and Caribbean countries confirms that the issue is barely mentioned in their announcements, and when it is, it has two fundamental objectives:

"(1) the need for men and women to participate equally in the information society; and (2) the use of ICTs as tools for achieving equality." That is, the goals are general in nature and add a "gender touch" to the report introductions and frameworks, but —with very few exceptions— they do not translate into proposals or strategies for action.

1. What is the problem, and how should it be interpreted?

There is a strong correlation in the characterization of the problems women face in participating in the IT industry and, in particular, the SIS sector.

These could be summarized as the lack of women in computer science majors and careers in the industry and their limited presence in decision-making positions in corporations, among entrepreneurs and in policy formulation and implementation institutions.

A closer look reveals two perspectives on the same phenomenon. On the one hand, there are those who see women as "the problem" that needs to be addressed in order for them to overcome obstacles or inhibitions deriving from gender stereotypes that permeate culture and infiltrate or underlie relationships and institutions. On the other, there are those who emphasize reviewing and changing the patriarchal and sexist characteristics of both educational and business institutions, calling for progressive, continual change in their cultures, rules and practices.

2. What kind of measures or arguments predominate in both contexts, to address the limitations that incite the most concern?

- Anti-discriminatory or gender justice initiatives. The main argument is that women should not be deprived, due to discriminatory mechanisms and practices, of the possibility of accessing, contributing to or having an influence on ICT development and utilization. This discourse is prominent in international organizations like the European Union and in women's networks and organizations.
- Equal opportunity in ICT access and use and in technology production and distribution. These measures appeal to the need to recognize and guarantee women's right to make use of these resources to improve their living conditions and, especially, to obtain work in an area of the labour market that offers good opportunities for professional and economic growth. This argument is found in reports from international and multilateral agencies and in some state and corporate instruments.
- Women are a necessary human resource for contributing to increasing productivity, quality and competitiveness in the sector (for example, the opening of new market niches for technology products). This discourse explicitly claims —sometimes backed up by data (Barsh and Jee, 2011; European commission, 2010) or other evidence— that the failure to utilize women's scientific and technological talents generates losses in economic and social development that must be overcome. In particular, it is the basis for some corporate policies and the initiatives of cooperation agencies.
- Unsatisfied demand for qualified personnel to fill positions in the ICT industry. This situation has given rise to incentives for young women to choose careers in this field, which are mainly found in some company messages.
- Recently, some hybrid discourses have been adopted by corporations, international and State agencies and women's networks and groups. They combine, to different degrees, references to equal opportunity for women, the value of diversity as an ethical-political

principle and/or as a means to improvement, productivity and, in some cases, the supposed benefits of the "feminine perspective" for improving labour relations and society in general.[63]

Many of these messages associate ICT careers with women's success, empowerment, leadership opportunities, the fulfilment of social and economic dreams and ambitions and a position in an elite group.

- Finally, in the policy guidelines arising from research supported by the European Union (PROMETEA, 2008; Faulkner, 2004, Oost Van, 2002), gender studies experts from European universities and feminist groups emphasize the need to reveal and transform the symbolic representations and explicit and implicit practices of gender discrimination in the current economic and political order, which are reflected in institutional cultures and practices. They argue that this is an essential condition for ensuring fair and satisfactory working conditions for women and, by extension, all workers in the sector.

The cyber-feminist research group, Lela Coders/Donestech, takes this position. They explain the lack of women in ICT production, especially open-source software coding, through structural factors characteristic of patriarchal capitalist societies.

Among the barriers that limit women's options for working in SIS, the aforementioned group cites "a lack of union and student structures to support collective transformations of working conditions" (Haché, Cruels and Vergés, 2011).

The reference to this situation draws attention to how working conditions are regulated in this industry. The lack of union organizations and instruments such as collective bargaining agreements has implications for women's self-awareness and work performance. The executives interviewed for this study do not identify as workers protected by rights and public labour regulations. The business and corporate environments in which they work or create or direct are their only spheres for negotiating their working conditions.

One issue that continues to raise controversy is quota policies. According to various studies (PROMETEA, 2008; Misa, 2010; Nafus, Leach and Krieger 2006) including our own research, these measures generally provoke resistance or questioning from women who work in upper management, as well as human relations managers (of both genders). Female managers and businesswomen feel that the application of a quota policy threatens their capacity for professional growth, despite recognizing that merit-based agreements and codes are often not enforced and their aspirations of "climbing the ladder" must be postponed or frozen. Some fear that the application of quotas will stigmatize them as feminists or devalue their skills and, especially, their personal efforts to achieve their position in a highly competitive, predominately male area. With few exceptions, companies do not consider it advantageous to differentiate between men and women because, according to their criteria, it would be even more detrimental to the recognition of women's abilities.

On identifying this resistance, some studies (Nafus, Leach and Krieger, 2006) suggest implementing "neutral" policies, on the assumption that they will be more attractive and more highly valued by the staff (flexible schedules, working from home, longer maternity and paternity leave, and so on).

[63] In the words of Jacqueline Fuller, director of corporate giving for Google Inc.: "Women and girls are chronically underrepresented in computer science and technology education programmes and careers —this is the global challenge. The world needs the minds, skills and ideas of women to help spur new innovation and vision in the tech sector." She adds that the Women Enhancing Technology (WeTech) consortium "is supporting new programmes to ensure we are not only sparking interest in technology careers, but helping women ultimately flourish on that path" (1991).

This position also has its risks: while a general treatment of the demands of all employees for better working conditions can be positive in some situations, it also conceals manifestations of inequality that affect women in particular and thus normalizes androcentric or sexist discourses and practices, which are often subtle or cloaked in the bonds of the organizational culture, to which women usually adapt or overadapt (Wajcman, 1991; Gill and Grint, 1995, Faulkner, 2004).

Other opinions assume that the tension between universalist policies and policies that target women as a disadvantaged group requires a practical solution. They recommend against using a combative rhetoric, which is usually associated with feminist activism, to avoid the possibility of instantaneous rejection, and instead to design "public actions with gender in mind, but based on the needs of the community and in a language that the community will read as legitimate" (Nafus, Leach, and Krieger, 2006). This proposal is interesting but very difficult to put in practice, both on the discursive level and in the design of interventions that respond to the demands of the full staff, without abandoning or diluting the need to address the specificity of expressions of gender inequality in this area, while also taking into account how it crosses and is crossed by other forms of discrimination and the consequences in the lives of men and women.

Diversity policies —which are very costly to firms— are not new. They were first promoted by affirmative action laws in the 1960s. Later, they became increasingly widespread to address the principle of social justice, and they were extended to new groups (based on gender, race, ethnicity, age, sexual orientation and physical ability).

In the current phase of the highly competitive globalized capitalist economy, this interpretation of diversity has taken on new meaning. It is generally associated with the benefits that a multicultural labour force, with diverse experiences, sensibilities and points of view, brings to production. A company with a staff of workers from different social and cultural sectors is expected to have a greater capacity for understanding the demographic characteristics of the market and capturing their interest in their products.

3. What strategies have been proposed for generating changes in the organizational culture and structure?

Tatli and Özbilgin (2009) identify three types:

(i) Liberal. This type of strategy consists in establishing formal rules to guarantee equal opportunities for all people. One of its weaknesses, according to Jewson and Mason (1986), is that it does not affect the informal aspects of the job, the group affinities, the implicit messages, the prejudices and deeply held values. In short, they may be politically correct but have no impact on the heart of the cultures, relationships and labour practices.

(ii) Radical. These strategies try to intervene directly in labour rules and structures so as to ensure the formation of a balanced peer group of workers that is representative of all the dimensions of diversity; to ensure that they are valued equally for their abilities; and to avoid wage discrimination. This group of strategies includes quota policies, which are the subject of much debate, as mentioned earlier.

(iii) Transformative. Transformative strategies include both short- and long-term solutions. In principle, they propose the implementation of measures to minimize the gender biases that are currently present in procedures such as recruiting and promotion. In the medium and long terms, they aim to transform organizations by raising employee awareness of gender inequalities and its discriminatory manifestations in this area, promoting debate on the phenomenon and creating the conditions for accepting the values of equality and solidarity that can reverse the current power systems. Although these strategies have yet

to be realized, they take into account the complexity of the necessary change and outline a series of imaginative and courageous initiatives.

This latter framework combines actions aimed at achieving compliance on justice targets in the workplace with other measures related to problematizing and trying to change the economic model and its modes of production. Lin (2005) discusses the need to distinguish the implications of the different interpretations and strategies and to encourage a questioning of both public and corporate initiatives that, framed in the discourse on diversity, stimulate the inclusion or perhaps the adaptation of women in the SIS industries, prioritizing their contribution to return on capital over the viability of gender and social justice.

Other critics highlight the instrumentalist bias of these strategies within the SIS sector, which is sometimes overshadowed or moderated by the overvaluation of employee benefits, in contrast to other labour sectors, which contributes to the symbolic construction of these companies as a sort of "benevolent" and exceptional entity. This discourages the problematization of the frames of reference that are interiorized on participating in a given organizational culture and climate, giving way to naturalized (and therefore invisible) practices, as detected in many of the accounts collected in this study.

This can throw light on the motives that induce women to participate in the psychological contracts described earlier. According to Dejours (1998), understanding the work experience requires taking into account that the symbolic recompense accorded through recognition may make sense in relation to the subjective expectations of the realization of self and be entered as a gain on the balance sheet of identity.

As argued earlier, these gains in symbolic recognition, especially if obtained through interpersonal relations or in a small group within the company, can lead to a loss of power to exercise labour rights, because the process implies a conflict of interest, is a source of dissention and stress, and can threaten the proven codes of behaviour for obtaining acceptance and promotion.

In some cases, corporate policies reinforce an epic discourse that values the ideals of solidarity among women, particularly with those who are—or will be in the future—in this productive sector and only rarely with economically disadvantaged girls and young women, under corporate social responsibility policies. In general, women executives consider these proposals to be positive and display an interest in acting as a role model or mentor to young women and girls in order to spark their interest in studying technology and to support their professional growth. According to some of the women interviewed, this contributes to strengthening their sense of belonging to the organization, of participating in a mission whose goal is to attract more women into joining a pioneering elite, which is crucial for building the corporation's future.

The acquisition of extensive knowledge on the economic, cultural and political rationality that underlies the gender order in modern corporations is essential, so that women who enter the SIS sector can identify both the obvious and subtle manifestations and be aware of the consequences of these practices in their lives. They will then be able to use their expertise to contribute to connecting IT development —in this case, software— to improvements in their living and working conditions (including their own working environment) and pushing for more equitable and solidary gender relations, both within and outside their corporations.

Hess (2007) expands on this idea, arguing that "*design differences can mean a lot to industries, firms, social classes, genders, user groups and ethnic groups*" (emphasis added). According to Hess, from this perspective "*the understanding that design decisions and technological choices have a social and political dimension [sets the stage] for developing a critique of technical efficiency as the primary driver of technological change.*" One might add that it would also contribute to the creation of responsible technological devices that augment the well-being of people and their communities.

B. Gender equality and the exercise of labour rights: two faces of the economic autonomy of women

As mentioned in the introduction, the objective of this report has been to analyse and compare the institutional, cultural and political conditions that can facilitate the formulation and implementation of public policies on gender equality or justice in the IT field, especially SIS, taking into account not only the supply of these instruments, but also the needs and demands of the target groups.

In contrast with female small business owners, almost all of the female executives interviewed were unfamiliar with the policies to promote the SIS sector in their countries and were even less aware of the policies and institutional structures that fight to ensure equal rights and opportunities for women in the workplace. Furthermore, they expressed a degree of indifference or incredulity regarding the ability of public policies to influence the development of the sector or to somehow benefit women's career paths and daily lives.

This universe of women in management does not self-identify as a member of a social group interested in demanding that the State implement policies or programmes to stimulate women's participation or improve their working conditions. When they recognize the need to change aspects of the corporate culture or the organization of work in order to overcome discriminatory practices, they defer to their company as the decision maker, independent of the public realm. It is important to bear in mind that the women who hold these senior positions have "arrived" at this level via personal strategies and negotiations that cultivate a biased view of the process implied therein.

A different behaviour is prevalent among small business owners and managers, who express interest in and satisfaction with the specific benefits afforded by the State, such as access to credit with favourable conditions, which in general they received during the growth phase of their business.

It is clearly very important to expand the number of countries and women interviewed in order to gather more experiences and opinions from women who hold positions lower down in the organizational chart, so as to establish differences by age, marital status and other variables. This would produce a more complete and possibly more diverse characterization of the opinions and assessments of existing policies and potential demand for new regulations and tools to balance gender disparities in the SIS sector. It would contribute to a much-needed debate on the state of women's economic autonomy and the social, cultural, legal and institutional conditions that facilitate the exercise of labour rights, the raising of awareness and the practice of labour citizenship.[64]

Two aspects of this idea are especially important. First, it assumes the articulation of respect for individual rights with collective rights, combining the shared attributes of work communities with respect for differences. Second, it closely links the exercise of citizenship with quality of life in the workplace, not only in terms of living standards, which are tied to material well-being, but also subjective and social dimensions that contribute to people's satisfaction.

While this may seem a utopia, given the current conditions of capitalism, the erosion of basic labour rights and the persistence of informality and precariousness, it is critical that the definition of and proposals for the economic autonomy of women incorporate the exercise of labour citizenship.

[64] This idea was developed based on ILO conventions, which establish an international framework for labour rights with an equivalent status to the United Nations human rights (ILO, 1998 and 2000). The ILO seeks to "underscore that labour relations are not reduced to an individual arrangement between private agents, but have a dimension in the public sphere, which implies that there are rights and responsibilities that labour actors have to respect" (Morris, 2002, p. 10).

This position is present in "Decent Work in the Americas: An Agenda for the Hemisphere, 2006-2015", approved by the ILO in 2006 in Brasilia.[65]

It was also formalized in the sessions of the Regional Conference on Women in Latin America and the Caribbean, convened by ECLAC. Both the Brasilia Consensus of 2010 and the Santo Domingo Consensus of 2013 agreed to create and enforce laws that ensure gender equality in the workplace, eliminate discrimination in decision-making and in the wage distribution (equal pay for equal work for men and women and among women) and impose sanctions for sexual harassment practices.

The Santo Domingo Consensus refers specifically to technology production:

> *"Promote improvements in women's access to decent employment, redistributing care work between the State, market and society, and between men and women, facilitating training and the use of technology, self-employment and business creation in the science and technology sector, and increase the proportion of women in areas where they are underrepresented, for example, in academia and the fields of science and technology, including information and communication technologies"*(Santo Domingo Consensus, 2013).

Why is it so difficult to translate good policies into good practices? This key question stems from an extensive review of European policies implemented in the last three decades for the inclusion and promotion of women in engineering, including technological engineering.

One recent study concludes that the impact of these measures has thus far been limited, imperceptible or unequal, depending on the country and type of organization (Faulkner and Lee, 2010). These meagre results are mainly explained by the following factors:

- Limitations within organizations (organizational, of prepared personnel, of resources).
- Little or no perception of explicit or implicit gender discrimination practices.
- Lack of knowledge, conviction and thus commitment, on the part of personnel and management, to change the process required by these policies.
- Little diffusion or promotion of these initiatives to stimulate their utilization.
- Managers and supervisors (often in human resources, usually men) have a very decisive influence —positive or negative— on the professional careers of women. In this sense, informal connections could take priority over compliance with institutional measures (for example, for recommendations, promotions or permissions).
- The most accepted and highly valued activities in the organizations are aimed at strengthening women's self-esteem and confidence (experience sharing, networks, mentoring). The underlying assumption is that women need to develop competences in order to integrate in an environment where they are a minority, exercise leadership functions and demonstrate self-assurance. While strengthening these capacities can be useful and may even be necessary given current business cultures, it can overshadow the development of other competences that are necessary for identifying and understanding gender bias in corporate standards and practices and in society in general and coming up with alternatives to transform them.
- Maternity leave and early childcare is called "family friendly" in some firms, although they are actually understood as "women's issues". They are usually considered "proof" of the company's interest in and commitment to equality between men and women, as well as a measure for promoting work-life balance, which is especially necessary for caregivers.

[65] In this report, gender equality and the elimination of discrimination is conceived as a universal objective, related to two strategic proposals: "economic growth that promotes decent work for men and women; and the effective application of fundamental principles and rights at work."

- Returning from maternity leave can imply costs in terms of a woman's position within the corporate structure and her promotion. Only some European initiatives develop actions to address this situation.
- According to this and other reports, labour practices offering flexible schedules and work hours have not had a significant impact on the culture of long work days (DTI, 2004; Kodz, 1998) or on expectations of availability and on-site presence (Valenduc and others, 2004), and employees who take advantage of these policies may be looked down on.
- Resistance to changes in the organization of work, however minor, in particular those that imply modifying unpredictable daily work schedules and building an ethic in which working longer hours than normal is frowned upon.
- The lack of monitoring and assessment of the implementation of equity and diversity policies and their effects/impact, so as to identify best practices that can be diffused within the company and to other organizations.
- Finally, implementing measures to include more women, ensure equal rights in the workplace and/or carry out diversity policies requires money and qualified human resources allocated to designing, implementing, and evaluating initiatives. "The lack of funding and other resources remains a major obstacle" to the implementation of good practices (Faulkner and Lee, 2010).

Before concluding this section, a few caveats are in order on the notion of "good practices" in labour relations, their implantation in the business world and their connection or disconnection to public laws and policies protecting workers' rights. In this regard, Pautassi and Gherardi (ECLAC, 2010c) formulate the following questions: Where is the goodness of these practices? To what extent are they "practices" as opposed to obligations that are legally imposed by current regulations?

In answering these questions, the authors differentiate between a "recommended" employment practice and a legal obligation, which is what determines the effective incorporation of material or structural equality in all sectors. This idea of equality implies:

> *"The need to provide differentiated treatment when the circumstances affecting a disadvantaged group mean that equal treatment can only be achieved by restricting or worsening access to a service or good, or the exercise of a right… (Abramovich and Pautassi, 2009, cited in ECLAC, 2010c). This is especially important in terms of guaranteeing opportunities not only for access, for example, a job, but also in relation to the equality of career paths in the work world, which necessarily must be reflected in the area of positioning in the social security system"* (ECLAC, 2010c).

This comprehensive approach is very far from the realities of policies and good practices in the region.

The conclusion to the work cited above includes another key contribution to the characterization of good employment practices, defining them as "those practices centred on a rights-based approach and implying the full enjoyment thereof, allowing full access to given public services; the recognition of differences and specific contexts; democratic equality as a horizon for action and a new social contract; and so on." This advanced position is not found in the examples given earlier, especially the last point.

The next section offers some proposals for programmes and activities oriented towards optimizing women's participation in the SIS industry within a framework of rights and gender justice.

C. Similar but different: guidelines for programmes and activities

Any debate on proposals must take into account the policies and especially the practices that have been carried out in Europe and in the Latin American countries chosen for this study, which demonstrate a relatively limited repertoire of recurring strategies and actions. The most important difference in the two contexts has to do with the fact that in Europe, most of the initiatives are spearheaded and actively and sustainably supported by international organizations such as the European Union, governments and established institutions. Another important difference is that, in general, the European Union attains effective cooperation between a range of institutions with diverse profiles (academic, business, governmental, networks), and policy implementation comprises medium- and long-term goals and an evaluation of the results. All of these conditions are important for transforming the initiatives from a formal contingent level to concrete, sustainable practices. Even so, the European policies are slow to produce results, although they do illustrate the importance of having procedures and support in place to guarantee continuity and learning throughout the processes so as to achieve complex change.

These programmes and actions can be grouped in the following categories. The discussion includes proposals for better alternatives.

1. Formative/educational actions

Specific programmes or courses at different educational levels, including camps, workshops and other activities, whose main objective is to motivate girls and young women, stimulate their interest in IT careers and, in some cases, develop advanced skills in programming, robotics and other innovations.

Many accounts illustrate the enthusiasm and creativity of the participants, but the groups are small, and these innovative activities are generally alternative in nature. That is, they are not usually integrated in the education system of the countries where they are held or, if they are included, they are fairly marginalized.

This represents an important challenge that calls for rethinking how much is gained and how much is lost by including a new "subject" or content in education systems that are resistant to change and, in many cases, permeated with gender stereotypes.

ICT training clearly needs to be present in the curriculum, since it involves competences that should be developed by all students (both male and female), given their application in all areas of work and social life. And yet, how? Based on which methodologies and goals?

With regard to courses aimed at women or that prioritize training women so they can then enter the sector, in our opinion, instead of going down roads already taken with little or no effect, it is time to make changes in the characterization of the problem, in the definition of possible solutions, and to create curricular content that suits the mode of participation necessary to engage in the transformations described herein. Examples include stimulating an understanding of ICTs as social productions, critically analysing their connection to economic and political interests, identifying gender biases (and class and ethnic biases), debating issues of privacy and property and learning to create applications and content that contribute to the generation of an inclusive information and knowledge society, nourished by diversity and committed to complying with citizens' rights.[66]

The International Telecommunication Union (ITU) offers excellent recommendations for education policies that motivate women, as well as men, to study technology, based on a more

[66] In their study of computer science students at Carnegie Mellon University, Margolis and Fisher (2002) find that the reasons women give for majoring in computer science are strongly related to its applications and uses. They are not "hacking for hacking's sake." Instead, they are motivated by a real social context: "They need their computing to be useful for society."

comprehensive understanding and a forward-looking vision of the development of this sector (Tandon, 2012).

The ITU report argues that governments should make the development of ICT skills a priority from primary education through university, reforming the curriculum at all levels, organizing computer camps in primary and secondary schools, offering classes on ICT use for collaborative work in higher education and promoting mentorships and sponsorships. Working in conjunction with the private sector, these initiatives should complement ongoing education and training in the workplace, to promote a range of advanced skills that go beyond the basic requirements of traditional IT occupations (such as programmers), so as to train "business/ICT specialists, highly specialized ICT areas (such as micro-computing or quantum-computing) and multidisciplinary ICT occupations (such as bioinformatics and industrial design)" (Tandon, 2012). To achieve these goals, the education system needs to be restructured on several levels. The ITU report highlights four fundamental changes:

(i) Provide more comprehensive training that combines industry, science and the arts in an integrated curriculum: "ICT courses need to be 'hybrid' into all curricula offered by community colleges and technical schools" (Tandon, 2012).

(ii) Substantially improve the quality of education and the teaching approach, in order to stimulate hands-on learning, team work and problem-solving teaching methods.

(iii) Ensure that students understand and analyse the evolving nature of the digital economy and its relationship to development, encouraging them to engage in continuous training after their formal education is complete and throughout their professional career.

(iv) Allocate more funds or subsidies for technical training and incubation programmes.

In our opinion, it is also necessary to integrate the following:

- Foster understanding of the interrelation between gender, ICT and development, providing access to related studies and data and promoting the debate on the present and future of the information and knowledge society. Encourage students to explore their experiences and the experiences of other people and groups with regard to the modalities for accessing, using and appropriating different applications and support. Identify the needs of different social groups that could be satisfied with technological applications.
- Become informed on the contemporary debates on Internet governance, privacy, property, violence, rights and other issues.

2. Communication campaigns

As described earlier, this type of initiative often falls into undesirable sexist stereotypes, in an effort to attract young women into technology disciplines. Fortunately, there are other examples that highlight aspects such as creativity and the social contributions of ICT, and feature a diverse group of ordinary women in everyday situations. Thus, this instrument can be effective if the content is appropriate.

However, the impact of these campaigns has not been formally evaluated. While this task is difficult, it needs to be undertaken so that future campaigns can learn from past experience and choose the most appropriate messages and means of communicating them.[67]

[67] A recently launched global campaign called Gender InSite (Gender in Science, Innovation, Technology and Engineering) proposes to start by gathering information on the profiles of the groups to which it will be directed, so as to define messages that combine characteristics of youth cultures with motivational yet realistic content. For more information, see http://owsd.ictp.it/genderinsite-1.

3. Mentorships

Before discussing mentorships, which are sometimes managed as a formal programme, it is useful to take a moment to address them from a particular angle.

What are mentorships? The fact that a person with experience in the industry or in academia agrees to accompany or advise someone who is just starting out in her education or work does not guarantee that the process will be carried out under conditions that ensure a respectful relationship that is non-invasive and non-authoritarian, that does not distort the objectives (a mentor is neither a psychologist nor a friend) and that achieves the goals established with the "mentored" person.

Another issue to consider is what messages are being transmitted by the mentor. For an extreme example, trying to inspire confidence, self-esteem, ambition and determination is not the same as collaborating with someone to develop their ability to:

- Understand the many factors related to gender codes that are brought into play in education and the workplace; and
- Develop a strategy for addressing them without either slipping into docile acceptance of naturalized rules that can be changed, or getting drawn into an individualist, very competitive project that rejects precisely the principles of solidarity and commitment with a generic group in order to guarantee equal rights, equal opportunities and better working conditions.

That is, mentorships should be coordinated and oriented to ensure that the mediation is appropriate. Peer mentoring can also be a positive action for sharing experiences and looking for or exchanging solutions to difficult situations.

4. Formation of networks, groups or communities of practice

There are many networks of women in technology,[68] but they do not all pursue the same objectives or adopt the same practices. Some aim to "empower" women to help them move up in the organizational hierarchy, by increasing their contacts, access to information and resources.

Others focus on promoting the exchange of ideas and reflection on the structural causes of the difficulties experienced by women in IT environments, sharing lectures and other resources to disentangle the "micro-inequalities" of gender and their effect on work and personal lives.

Knowledge of current policies and legislation on ICTs and gender equality should also be considered a matter for debate, where one of the objectives should be to point women towards exercising their right to decent work.

5. Recognition measures for people and companies

There are a number of inspiring initiatives that could be adapted and applied specifically to the IT sector, such as Pacts, Seals and Certifications for equality, quality and productivity in businesses, which are being developed since 2000.

A first reference in this area is the United Nations Global Compact, which seeks to promote corporate responsibility for sustainable development. Although not legally binding, the programme

[68] Examples include Femmes et Sciences, the Cambridge Association for Women in Science and Engineering (AWiSE), SETWomen, the German Association of Women Engineers, Greek Women's Engineering Association (EDEM), Women in Physics Group (IOP), Network of Informatics, Mathematics and Physics, Research Group Women in Research Centres, Asociación de Mujeres Investigadoras y Tecnólogas (AMIT) and Womenalia.

urges companies to align their strategies and operations with ten universally accepted principles, derived from specific declarations and conventions endorsed the United Nations, in the areas of human rights, labour standards, the environment and anti-corruption. The Compact does not provide a seal of approval, nor is it a performance evaluation instrument. Rather, it establishes a reliability agreement with participating companies.[69]

In 2010, the UN Global Compact reached an agreement with UN-Women to include seven principles based on international conventions and declarations[70] (complementary to the ten principles mentioned above) oriented specifically to empowering women in business practices and encouraging a commitment to respecting and supporting women's rights.

The arguments incorporate three perspectives, which in reality are difficult to reconcile: (i) the so-called business case for corporate action, which promotes gender equality as a means to increase a company's productivity and economic gain; (ii) gender equality as a condition that contributes to corporate sustainability; and (iii) the economic empowerment of women and their contribution to development.

In 2013, 100 best practices were selected, 13 of which are in the IT production or services sector and only one (Accenture) integrates all the women's empowerment principles.[71]

Another initiative on this level is the Certification Programme for Gender Equality Management Systems, which proposes to reverse the gender gap in the workplace by transforming work structures and human resources management (UNDP, 2010).

This public policy emerged from the Institutional Mechanisms for the Advancement of Women to provide a "Gender Equality Seal"[72] to certify companies that have adopted a Gender Equality Management System (GEMS), in accordance with the established requirements and following an independent assessment. It is applied in the selection and recruitment of personnel, salaries, career development, work evaluation, decision-making, the "reconciliation" of work and family, and workplace improvements. Although this programme is not aimed specifically at the IT industry, it could be an interesting strategy to apply in technology firms.[73]

Finally, in 2009, the UNDP Regional Centre for Latin America and the Caribbean (through the Gender Practical Area and Knowledge Management Unit) created the "Gender Equality Seal Community"[74] in the framework of the "Knowledge Sharing for Development Project" and in conjunction with its partners in the Quality Management with Gender Equality Model Project (INMUJERES and UNIFEM, now UN-Women). The community includes 11 participating countries in the region.[75]

---

69 There are around 8,000 participating companies and other organizations in over 135 countries.

70 Such as the Convention on the Elimination of All Forms of Discrimination against Women (adopted by the General Assembly in 1979 and ratified by 187 member states), ILO Convention Nº 111 on discrimination in employment and occupation and the ILO Declaration on Fundamental Principles and Rights at Work (1998).

71 Detailed information on this initiative at the global level is available online at http://www.unglobalcompact.org/.

72 According to UNDP (2010), the Seal "confirms the adequate adoption of requirements for the systematic reduction of gender gaps in the workplace. It can be used in company products and services, for its institutional image-building and in any other applications that show its commitment to gender equality in work environments."..]

73 Six countries in Latin America (Argentina, Brazil, Chile, Costa Rica, Mexico and Uruguay) have developed initiatives within this framework and have already certified 671 organizations (309 private firms and 63 public companies), which represents a benefit for over 400,000 workers.

74 More information on this initiative is available online at http://www.americalatinagenera.org/es/index.php?option=com_content&view=article&id=77:sello-de-certificacion-portada&catid=51:publico&Itemid=68 (in Spanish).

75 Brazil, Chile, Colombia, Costa Rica, Dominican Republic, El Salvador, Honduras, Mexico, Nicaragua, Panama and Uruguay.

The main objective is to exchange experiences and learning so as to transfer knowledge on the Seal methodology to new countries through south/south exchange and cooperation.[76]

6. Strengthening the role of Institutional Mechanisms for the Advancement of Women

The vast majority of these agencies have equal opportunity plans, which include the measures defined in the countries to incorporate gender in public policies and establish links with the different State powers. In general, they promote the mainstreaming of the gender approach in all policy areas and its implementation at the subnational (states, provinces or regions) and municipal levels (ECLAC/FAO/UN-Women/UNDP/ILO, 2013).

In the latter work, the authors indicate that there has been substantial progress in these areas in the last ten years, which has resulted in a "second generation of equality policies" starting in the mid-2000s. These policies emphasize the need to ensure women's economic autonomy by "protecting and guaranteeing the economic rights of women in terms of access to employment with decent working conditions, an idea that has been incorporated in many equal opportunity plans under different definitions" (ECLAC/FAO/UN-Women/UNDP/ILO, 2013).

According to this report, this change in perspective should allow the dovetailing of gender equality policies and labour policies in key areas, the guarantee of rights and the confronting of gender-based discrimination in the workplace.

One concern is to improve women's access to high-quality jobs in the labour market and to avoid their segregation into traditionally female jobs. To this end, women are advised to broaden and strengthen their professional training and education in predominantly male sectors (such as mining in Bolivia or the electric energy sector in Brazil).

Another important programmatic framework for designing policies for the productive sector is ILO Convention Nº 156, which includes the valuation of care work, the fostering of women's representation and participation in union organizations and the formation of business associations and networks.

Only a minority of equality plans proposes positive actions to address vertical segregation in the private sector. Furthermore, "very few plans propose encouraging the unionization of workers, although the proposed actions have a limited scope" (ECLAC/FAO/UN-Women/UNDP/ILO, 2013).[77]

One report that moves in this direction, which is notable for its institutional value and orientation, was published in 2013 by an alliance of regional and international organizations (ECLAC/

[76] Some important examples of national application include the following: the Guide to Best Practices in Reconciliation with Social Responsibility in Firms (Uruguay); the Certification Programme carried out in Colombia through an agreement with the Ministry of Labour and the High Commission on Women's Issues; the Gender Equality Management System (Costa Rica); the Public consultation on the Gender Equality Management System Guidelines (Honduras); the Gender Equality Model seeking to empower workers and construct mechanisms for health care and industrial security (Mexico); the implementation of the Law on the Protection of Women (El Salvador); the Pro-Gender Equality Seal (Brazil); and the "Iguala Seal" project (Chile).

[77] The Costa Rica plan proposes establishing a minimum percentage of women in management positions. Paraguay and Peru propose positive actions to ensure women's access and tenure in the highest levels of administration and management; Peru also aims to incorporate women entrepreneurs in the planning, budget definition and participatory management of local and regional economic development. Costa Rica, Ecuador and Honduras foresee the generation of incentives for companies and institutions that respect women's labour rights and eliminate discriminatory labour practices. The majority of the equal opportunity plans propose guaranteeing the reduction of the gender wage gap and applying the principle of "equal pay for equal work." Many also include the protection of women against sexual harassment.

FAO/UN-Women/UNDP/ILO, 2013).[78] While the report does not extensively cover women in the IT industry, it does propose expanding the range of occupations open to women, especially in occupational segments that have historically been considered male, including hardware and software production, and it recommends training women in technical and technological areas.

An earlier section mentioned the challenges that must be faced by the Institutional Machineries for the Advancement of Women in order to promote gender equality integration policies in the SIS industry within the framework of gender justice and the right to decent work. We have also described the main actions that have been applied in various contexts to achieve some of the associated goals and suggested some orientations to link them more closely to the principles of gender equality. In addition, these organizations need to establish mechanisms for consultation and coordination with State areas related to technology policies (ministries or secretaries), as well as with firms in the industry, universities, research centres, networks and non-governmental organizations involved in ICTs and their contribution to improving women's quality of life, gender equality and development. It is joint work that generates the orientations and commitment to further gender equality policies and programmes in and from ICTs.

Finally, with regard to the methodology for the design, implementation and evaluation of these policies and programmes, a number of useful recommendations came out of the International Meeting on Good Practices in Public Policy for the Gender Equality Observatory for Latin America and the Caribbean (ECLAC, 2010c). In the conclusion, the report recommends that these policies start with diagnostic studies on the "division and use of time by all individuals, including time dedicated to work, caregiving and leisure"; and consider community-based alternatives to the caregiving strategies that are usually pursued by families and women.

In our opinion, it is critical that the planning of these policies and action plans take place as a deliberative and participatory practice. Taking into account the needs, perceptions, experiences and knowledge of the women who participate in the sector in question, and generating support or alliances in the policy management processes, contributes not only to women's autonomy, but also "to the consolidation of democratic processes in the State apparatus." In concrete terms, the public presentation of policy proposals can stimulate horizontal dialogue and prompt observations and contributions from various key actors. In other words, the issue is not to create policies or programmes for women who work in the SIS sector, but rather to design them in conjunction with women, recognizing their problems, tensions, resistance and desire for greater satisfaction and better quality of work, personal and family life.

[78] The International Labour Organization (ILO), UN-Women, United Nations Development Programme (UNDP), ECLAC and the Food and Agriculture Organization of the United Nations (FAO).

Bibliography

AED (Asociación Empresarial para el Desarrollo) (2013), "Empresas por la igualdad de género" [online] http://www.aedcr.com/proyectos_detalle.php?id=62 [date of reference: 3 March 2013].

Ahmed, Faheem and others (2013), "Soft skills and software development: a reflection from software industry", *International Journal of Information Processing and Management* (IJIPM), vol. 4, No. 3 [online] http://www.eng.uwo.ca/people/lcapretz/Faheem-IJIPM-v2.pdf [date of reference: 3 February 2014].

Anglade, Amelie (2013), "Berlin Geekettes can hack and should tell!" [online], *Berlin Geekettes* [online] http://berlingeekettes.com/blog/2013/6/24/berlin-geekettes-can-hack-and-should-tell [date of reference: 3 March 2013].

Ashcraft, Catherine and Sarah Blithe (2010), "Women in IT: the facts, NCWIT (National Center for Women & Information Technology" [online] http://www.ncwit.org/resources/women-it-facts [date of reference: 3 March 2013].

Australia, Department of Broadband, Communications and the Digital Economy (2011), "What is the digital economy?" [online] http://www.dbcde.gov.au/digital_economy/what_is_the_digital_economy [date of reference: 3 March 2013].

Bapat, Neesha (2012), *Women 2.0* [online] http://women2.com/new-kauffman-and-stanford-study-on-women-entrepreneurs-seeks-survey-participants/ [date of reference: 3 February 2014].

Barker, Lecia (2010), "Avoiding Unintended Gender Bias in Letters of Recommendation (Case Study 1). Reducing Unconscious Bias to Increase Women's Success in IT", Promising Practices, National Center for Women and Information Technology [online] http://www.ncwit.org/sites/default/files/resources/avoidingunintendedgenderbiaslettersrecommendation.pdf [date of reference: 3 February 2014].

Barsh, Joanna and Lareina Yee (2011), *Unlocking the Full Potential of Women in the US Economy*, McKinsey & Company [online] http://www.mckinsey.com/client_service/organization/latest_thinking/unlocking_the_full_potential [date of reference: 3 February 2014].

Birbaumer, Andrea, Marianne Tolar and Ina Wagner (2004), "Professional trajectories and biographies", *Widening Women´s Work in Information and Communication Technology*, París, Institute for Technology Design and Assessment, Technological University.

Bonder, Gloria (2008), "Igualdad en la innovación, innovación para la igualdad", *Actas del Congreso Internacional Igualdad en la Innovación para la Igualdad*, Instituto Vasco de la Mujer, Vitoria-Gasteiz, España.

_____(2006), "Equidad de género y cultura de la innovación colaborativa: nutrientes para fortalecer la sociedad del conocimiento", paper presented at the International Conference on Know How 2006, Mexico City, National Autonomous University of Mexico (UNAM), 23-25 August.

Bourdieu, Pierre (1972), *Esquisse d'une théorie de la pratique*, París, Droz.

Busaniche, Beatriz (2006), "El software libre y las mujeres. ¿Por qué hay semejante brecha de género en nuestra comunidad? Y qué podemos hacer con ella" [online] http://liminar.com.ar/txt/busaniche.rtf [date of reference: 3 March 2013].

Byrne, Ciara (2013), *The Loneliness of the Female Coder* [online] http://www.fastcolabs.com/3008216/tracking/minding-gap-how-your-company-can-woo-female-coders [date of reference: 3 February 2014].

Camacho, Kemly (2013), "Análisis de la integración de la perspectiva de género en las agendas y políticas digitales de Latinoamérica y el Caribe", *Project Document*, No. 541 (LC/W.541), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC).

Carlson, Nicholas (2013), "Marissa Mayer doubles Yahoo's paid maternity leave, gives dads eight weeks off", *Business Insider*, 30 April [online] http://www.businessinsider.com/marissa-mayer-doubles-the-length-of-yahoos-paid-maternity-leave-gives-new-dads-eight-weeks-off-2013-4#ixzz2fMu1konU [date of reference: 3 March 2013].

Carter, Ruth and Gill Kirkup (1990), *Women in Engineering: A good place to be?*, Basingstoke, Macmillan.

Castaño, Cecilia (2008), *La segunda brecha digital*, Madrid, Cátedra.

Catalyst (2011), "Catalyst Census: Fortune 500 Women Board Directors" [online] http://www.catalyst.org/knowledge/2011-catalyst-census-fortune-500-women-board-directors [date of reference: 3 March 2013].

Chan, Vania and others (2000), "Gender differences in Vancouver secondary students' interests related to information technology careers", *Women, Work and Computerization: Charting a Course to the Future*, Ellen Balka and Richard Smith (eds.), Klower, Academic Publishers.

Cheryan, Sapna and others (2010), "Explaining women's underrepresentation in computer science: the role of gender stereotypes", presentation [online] http://research.microsoft.com/apps/video/dl.aspx?id=142993 [date of reference: 3 March 2013].

Cukier, Wendy (2007), "Diversity, the Competitive Edge: Implications for the ICT Labour Market", Information and Communications Technology Council, The Diversity Institute, Ryerson University, Toronto [online] http://www.ryerson.ca/content/dam/diversity/reports/Competitive-Edge_2007.pdf [date of reference: 3 March 2013].

d'Ouville, Laurence and Isabelle Collet (2004), "Widening women's work in information and communication technology. Inventory of good practices", *Deliverable* No. 8, Information Society Technologies Programme (IST) [online] http://www.ftu-namur.org/fichiers/D8-final. pdf [date of reference: 3 March 2013].

Dejours, C. (1998), *El factor humano*, Buenos Aires, Lumen.

del Barrio Gándara, Victoria (coord.) (2003), *Evaluación psicológica aplicada a diferentes contextos*, Madrid, Universidad Nacional de Educación a Distancia.

DTI (Department of Trade and Industry) (2004), "Flexible working in the it industry: long hours and work-life balance at the margins?", Women in IT Forum, London.

Dughera, Lucila and others (2012), "Las políticas públicas y el subsector del software y los servicios informáticos en la Argentina: una introducción", paper presented at the ninth "Jornadas Latinoamericanas de Estudios Sociales de la Ciencia y la Tecnología (Esocite 2012), Mexico City, 5 - 8 June.

ECLAC/FAO/UN-Women/UNDP/ILO (Economic Commission for Latin America and the Caribbean/Food and Agriculture Organization of the United Nations/ United Nations Entity for Gender Equality and the Empowerment of Women/ United Nations Development Programme/International Labour Organization) (2013), Decent work and gender equality. Policies to improve employment access and quality for women in Latin America and the Caribbean, Santiago, Chile.

ECLAC (Economic Commission for Latin America and the Caribbean) (2013), *The digital economy for structural change and equality* (LC/L.3602), Santiago, Chile.

_____(2012), "Igualdad de género, empoderamiento económico de las mujeres y tecnologías de la información y la comunicación" [online], presentation at the forty-seventh meeting of the Presiding Officers of the Regional Conference on Women in Latin America and the Caribbean, Panama City, 3 - 4 May [online] http://www.cepal.org/mujer/noticias/noticias/2/46202/2-Para_Mesa_V3.pptx [date of reference: 3 March 2013].

_____(2010a), "Foreign direct investment in the software industry in Latin America", *Foreign Direct Investment in Latin America and the Caribbean*, 2010 (LC/G.2494-P), Santiago, Chile. United Nations publication, Sales No. E.11.II.G.4.

_____(2010b), *Plan of Action for the Information and Knowledge Society in Latin America and the Caribbean (eLAC2015)*, adopted at the third Ministerial Conference on the Information Society in Latin America and the Caribbean, Lima, 21-23 November [online] http://www.cepal.org/socinfo/noticias/documentosdetrabajo/5/41775/2010-820-eLAC-Plan_of_Action.pdf [date of reference: 3 March 2013].

_____(2010c), "Hacia políticas de igualdad que promuevan la autonomía económica de las mujeres", *Reunión internacional sobre buenas prácticas de políticas públicas del Observatorio de igualdad de género de América Latina y el Caribe, Memoria*, Mujer y Desarrollo series, No. 104 (LC/L.3231-P), Santiago, Chile. United Nations publication, Sales No. S.10.II.G.34.

_____(2004), *Productive Development in Open Economies* (LC/G.2234(SES.30/3)), Santiago, Chile.

European Commission (2011), *Strategy for Equality between Women and Men 2010-2015*, Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Luxembourg.

_____(2010), *More Women in Senior Positions. Key to economic stability and growth*, Luxembourg.

_____(2006), *Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society. Study Final Report*, Brussels.

Faulkner, Wendy (2006), "Genders in/of engineering: A research report" [online] University of Edinburgh http://www.aog.ed.ac.uk/__data/assets/pdf_file/0020/4862/FaulknerGendersinEngineeringreport.pdf [date of reference: 3 March 2013].

_____(2004), *Strategies of Inclusion: Gender and the Information Society*, Final project report SIGIS, ISSTI/University of Edinburgh.

Faulkner, Wendy and Lisa Lee (2010), "Turning good policies into good practice: why is it so difficult?", *International Journal of Gender*, vol.2, No. 1.

_____(2006), "PROMETEA Report on women in engineering and technology research in the United Kingdom".

Flórez-Estrada, María (2007), *Economía del género: el valor simbólico y económico de las mujeres*, serie Instituto de Investigaciones Sociales, San José, Editorial UCR.

Friedewald, Michael and Timo Leimbach (2010), "Assessing national policies to support software in Europe", *Info: The Journal of Policy, Regulation and Strategy*, vol. 12, No. 6.

Friedewald, M. and others (2005), *Benchmarking National and Regional Policies in Support of the Competitiveness of the ICT Sector in the EU*, Stuttgart, Fraunhofer IRB Verlag.

Fox, Sherry (n/d), "How diversity can affect your business: some important considerations", [online] http://www.witi.com/wire/articles/225/Workforce-Diversity:-Meeting-the-Challenges-Head-On/print/ [date of reference: 3 March 2013].

Gha, Dharam (2003), "Decent work: Concepts and indicators", *International Labour Review*, vol. 142, No. 2.

Globant (2012), "Globant Sustainability Report 2011" [online] http://www.globant.com/sites/default/files/content/sustainability_report_2011_final_en.pdf [date of reference: 3 March 2013].

Greco, Lidia (2005), "Knowledge-intensive organizations: women's promised land? The case of the Irish software companies", *Irish Journal of Sociology*, vol. 14.1.

Grint, Keith and Gill, Rosalind (1995), *The Gender-Technology Relation: Contemporary Theory and Research*, London, Taylor and Francis.

Haché, Alex, Eva Cruels and Núria Vergés (2011), "Mujeres programadoras y mujeres hackers. Una aproximación desde Lela Coders" [online] http://www.rebelion.org/docs/141550.pdf [date of reference: 3 March 2013].

Hafkin, Nancy and Nancy Taggart (2001), "Gender, information technology and developing countries", Academy for Educational Development, Washington, D.C. [online] http://learnlink.aed.org/Publications/Gender_Book/Home.htm [Date of reference: 3 March 2013].

Hakim, Catherine (2004), *Key Issues in Women's Work: Female Diversity and the Polarization of Women's Employment*, London, GlassHouse Press.

Heller, Lidia (2010), "Mujeres emprendedoras en América Latina y el Caribe: realidades, obstáculos y desafíos", *Mujer y Desarrollo series*, No. 93 (LC/L.3116-P/E), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC). United Nations publication, Sales No. S.09.II.G.95.

Hess, David (2007), *Alternative Pathways in Science and Industry. Activism, Innovation, and the Environment in an Era of Globalization*, Cambridge, The MIT Press.

Himanen, Pekka (2002), *La ética del hacker y el espíritu de la era de la información*, Barcelona, Ediciones Destino.

ILO (International Labour Organization) (2011), "Trabajo digno: Una meta en común de la juventud y los sindicatos" [online] http://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/--- actrav/documents/publication/wcms_079316.pdf [date of reference: 3 March 2013].

_____(1998), "ILO Declaration on Fundamental Principles and Rights at Work", Geneva [online] http://ilo.org/declaration/thedeclaration/textdeclaration/lang--en/index.htm.

_____(2000), *Your Voice at Work. Global report under the follow-up to the ILO Declaration on fundamental principles and rights at work. Report of the Director-General*, Geneva, May.

IST (Information Society Technologies Programme) (2002), "Widening Women's Work in Information and Communication Technology. Inventory of good practices" [online] http://www.ftu-namur.org/www-ict/#art [Date of reference: 3 March 2013].

ITU (International Telecommunication Union) (2012), "ITU launches Girls in ICT web portal", Press Release [online] http://www.itu.int/net/pressoffice/press_releases/2012/06.aspx [date of reference: 3 February 2014].

Jewson, Nick and David Mason (1986), "The theory and practice of equal opportunities policies: liberal and radical approaches", *Sociological Review*, vol. 34, No. 2, May.

Jiménez, Marianella (2013), "Cooperativa lanza proyecto para acercar mujeres a las TIC desde temprana edad", *El Financiero*, 9 May [online] http://www.elfinancierocr.com/pymes/Cooperativa-proyecto-acercar-TIC-temprana_0_207579936.html [date of reference: 30 May 2013].

Johnson, Gerry (1987), *Strategic Change and the Management Process*, Oxford, Blackwell.

Kodz, J. and others (1998), "Breaking the long hours culture", *IES Report*, No. 352, Brighton, Institute for Employment Studies (IES).

Lin, Yuwei (2005), "Dimensiones de género en el desarrollo del software libre (FLOSS)", [online] http://culturarwx.net/rwx1/rwx1_genero.pdf [date of reference: 3 March 2013].

Liff, Sonia and Ivy Cameron (1997), "Changing equality cultures to move beyond 'women's problems', *Gender, Work and Organization*, vol. 4, No. 1.

Marín, Gabriela, Gabriela Barrantes and Silvia Chavarría (2007), ¿Se estarán extinguiendo las mujeres de la carrera de Computación e Informática?, San Pedro, Universidad de Costa Rica.

Margolis, Jane and Allan Fisher (2002), *Unlocking the Clubhouse: Women in Computing*, London, The MIT Press.

Matrajt, M. (2002), "Subjetividad, trabajo e institución" [online] http://www.psicologiagrupal.cl/documentos/articulos/subtrainti.html [date of reference: 3 March 2013].

Mauro, Amalia (2004), "Trayectorias laborales en el sector financiero. Recorridos de las mujeres", *Mujer y Desarrollo series*, No. 59 (LC/L.2177-P/E), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC). United Nations publication, Sales No. S.04.II.G.104.

Mermet, Emmanuel and Steffen Lehndorff (2001), *New Forms of Employment and Working Time in the Service Economy (NESY). Country case studies conducted in five service sectors*, document prepared by the European Trade Union, Brussels, 26-27 April [online] http://www.iaq.uni-due.de/aktuell/veroeff/am/lehndorff01cc.pdf [date of reference: 3 March 2013].

Misa, Thomas J. (2010), *Gender Codes: Why Women Are Leaving Computing*, Wiley, IEEE Computer Society Press.

Montero, Cecilia and Pablo Morris (2001), "La ciudadanía laboral: un imperativo de equidad", *Proposiciones*, No. 32, July.

Morris, Pablo (2002), "Transformaciones en el imaginario sindical: una mirada de la ciudadanía laboral desde los sujetos", *Aportes al Debate Laboral*, No. 10, Santiago, Chile, Research Department, Labour Directorate, Sur, Corporación de Estudios Sociales y Educación, December.

Muñoz, Alba (2012), "Mujeres de hoy al ciberpoder", 25 May [online] http://www.20minutos.es/noticia/1467636/0/mujeres/ciberpoder/tecnologia/ [date of reference: 3 March 2013].

Nafus, D., J. Leach and B. Krieger (2006), *Free/Libre and Open Source Software: Policy Support* (FLOSSPOLS), Cambridge, Cambridge University.

Novick, Marta, Sofía Rojo and Victoria Castillo (comps.) (2008), "El trabajo femenino en la post convertibilidad. Argentina 2003-2007", *Project Document*, No. 182 (LC/W.182), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC).

OECD (Organization for Economic Cooperation and Development) (2007), *ICTs and Gender. Working Party on the Information Economy*, Paris.

_____(1985), "Software: an emerging industry", *Information Computer Communications Policy series*, Paris.

Pérez-Bustos, Tania (2010), "Construyendo espacios de exclusividad: una aproximación etnográfica al papel y la experiencia de mujeres indias y colombianas en las comunidades locales de Software Libre", *Universitas Humanística*, No. 69.

Pernas, Mariana (2012), "Quiénes son las principales mujeres del mercado IT de la Argentina", Information Technology, 20 November [online] http://www.infotechnology.com/Internet/Quienes-son-las-principales-mujeres-del-mercado-IT-de-la-Argentina-20121120-0002.html [date of reference: 3 March 2013].

Piscitelli, Alejandro (2013), "Software takes command de Lev Manovich. Tercera parte. Dime que software (y como lo) usas y te diré quién eres" [online], http://conectarlab.com.ar/software-takes-command-de-lev-manovich-tercera-parte/ [date of reference: 3 February 2014].

PROMETEA (2008), "Empowering Women Engineers in Industrial and Academic Research", Deliverable, No. 20, Periodic Progress Report on WP7 Results, Transversal integrating analysis and interpretation, Science and Society - Area: Women and Science.

Rico, María Nieves and Flavia Marco (2009) (eds.), "Privilegiadas y discriminadas: las trabajadoras del sector financiero", Cuadernos de la CEPAL, No. 93 (LC/G.2403-P), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC). United Nations publication, Sales No. S.08.II.G.100.

Rovira, Sebastián and Giovanni Stumpo (comp.) (2013), *Entre mitos y realidades: TIC, políticas públicas y desarrollo productivo en América Latina* (LC/L.3600), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC).

Ruiz, Miriam (2010), "La importancia de las mujeres en el desarrollo de las TIC", Random thoughts on technology and life, 10 November [online] http://www.miriamruiz.es/weblog/?p=621 [date of reference: March 2013].

Sainsaulieu, R. (1998), *La identidad y el trabajo*, Paris, Presses de la Fondation des Sciencies Politiques.

Salas, Margarita (2006), *Género y software libre en América Latina. Un estudio de caso* [online] www.sulabatsu.com/voces/docuemntos/genero.pdf [date of reference: 3 March 2013].

Sandberg, Sheryl (2012), *Lean in: Women, work and the will to lead*, Toronto, Lean in Foundation.

Schroeder, Klaus (2010), "Gender Dimensions of Product Design" (EGM/ST/2010/EP.13), Gender, Science, and Technology Expert Group meeting of the United Nations Division for the Advancement of Women, 28 September-1 October [online] http://www.un.org/womenwatch/daw/egm/gst_2010/Schroeder-EP.13-EGM-ST.pdf.

Sennett, Richard (1998), *La corrosión del carácter. Las consecuencias personales del trabajo en el nuevo capitalismo*, Colección Argumentos, Barcelona, Editorial Anagrama.

Sharpe, M., (2009), "Playing to win in the new software market - Software 2.0: Winning for Europe", Report of an industry expert group on European software strategy, Brussels.

Shore, Lynn and others (2009), "Diversity in organizations: Where are we now and where are we going?", *Human Resource Management Review*, No. 19.

Simard, Caroline and others (2008), "Climbing the Technical Ladder: Obstacles and solutions for mid-level women in technology", Michelle R. Clayman Institute for Gender Research, Stanford University, Anita Borg Institute for Women and Technology [online] http://anitaborg.org/wp-content/uploads/2013/12/Climbing_the_Technical_Ladder.pdf [date of reference: 3 March 2013].

Spertus, Ellen (1991), "Why are there so few female computer scientists?", MIT Artificial Intelligence Laboratory Technical Report, No. 1315 [online] http://people.mills.edu/spertus/Gender/pap/pap.html [date of reference: 3 March 2013].

Sulá Batsú Cooperativa R. L. (2012), "Recursos" [online] http://sulabatsu.com/ [date of reference: March 2013].

Tandon, Nidhi (2012), *A Bright Future in ICT Opportunities for a New Generation of Women*, Digital Inclusion, International Telecommunication Union (ITU) [online] http://www.itu.int/ITU-D/sis/Gender/Documents/ITUBrightFutureforWomeninICT-English.pdf [date of reference: 3 March 2013].

Tatli, Ahu and Mustafa Ozbilgin (2009), "Understanding diversity managers' role in organizational change: towards a conceptual framework", *Canadian Journal of Administrative Sciences*, No. 26.

Thaler, Anita (2005), "Influence of gender and country-specific differences on success in engineering education", Proceedings of the Fourth European Conference on Gender Equality in Higher Education [CD-Rom] 31 August - 3 September, Oxford.

Thaler, Anita and Christine Wächter (eds.) (2005), "Conference Proceedings of the International Conference 'Creating Cultures of Success for Women Engineers'", Graz, IFZ Eigenverlag, 6-8 October.

Tomassini, Cecilia and María E. Urquhart (2011), "Mujeres e Ingeniería en Computación de la UDELAR. Uruguay: Cambios y permanencias", *Reporte Técnico*, No. RT 11-08, Programa de Desarrollo de Ciencias Básicas (PEDECIBA), Montevideo, Instituto de Computación, Facultad de Ingeniería, Universidad de la República.

Torrisi, Salvatore (1998), *Industrial Organization and Innovation: An international study of the software industry*, Edward Elgar Publishing.

UNCTAD (United Nations Conference on Trade and Development) (2012), *Information Economy Reprot 2012. The Software Industry and Developing Countries* (UNCTAD/IER/2012), Geneva. United Nations publication, Sales No. E.12.IID.14.

UNDP (United Nations Development Program) (2010), Gender Equality in the Workplace: How to make progress with a Certification Programme for Gender Equality Management Systems [online] http://www.americalatinagenera.org/es/documentos/Gender-Equality-in-the-Workplace.pdf [date of reference: 24 September 2014].

Valenduc, Gérard and others (2004), *Widening Women's Work in Information and Communication Technologies*, final synthesis report, Brussels, European Commission, Fondation Travail-Université.

van Oost, Ellen (2002), "Gender and ICT in the Netherlands: review of statistics and literature, Deliverable Number: D02_Part 7", *Gender and the Information Society Report (SIGIS)*, [online] http://doc.utwente.nl/79315/ [date of reference: 3 March 2013].

Wacjman, Judy (1991), *Feminism Confronts Technology*, Cambridge, Polity Press.

ECLAC

Economic Commission for Latin America and the Caribbean (ECLAC)
Comisión Económica para América Latina y el Caribe (CEPAL)
www.eclac.org