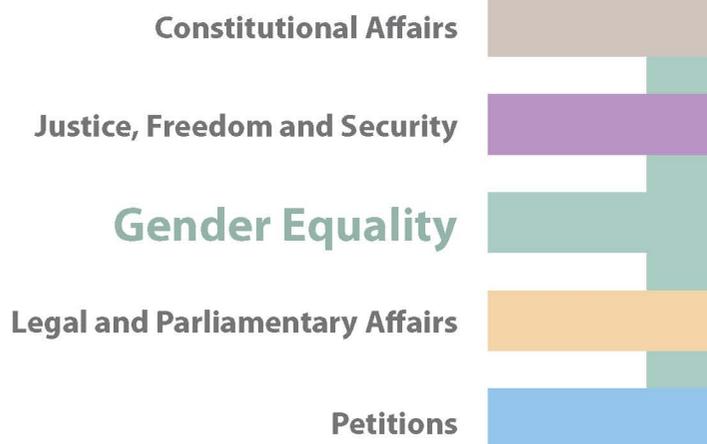


DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT **C**
CITIZENS' RIGHTS AND CONSTITUTIONAL AFFAIRS



Women in ICT

NOTE



DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT C: CITIZENS' RIGHTS AND
CONSTITUTIONAL AFFAIRS

GENDER EQUALITY

Women in ICT

NOTE

Abstract

The information and communication technologies sector is of increasing importance to virtually every sector of the economy. There is a high demand for highly-qualified workers to fill the increasing demand of this expanding sector and women, due to their currently low presence in ICT, constitute a pool of potential candidates.

This briefing paper presents a brief overview of selected literature and best-practice cases proposed by the European Commission on the issue of how to attract more women into ICT-related courses and consequently to a career in ICT. Two approaches are thus taken: firstly, an analysis of the presence of girls and young women in ICT-related courses and best practices on how to encourage them to pursue such academic path; secondly, an overview of the obstacles female workers face in their work and progression in ICT companies, and best-practice cases on how to attract more female qualified workers into the sector, how to ensure there is fair progression in their careers, and a good work-life balance.

This document was requested by the European Parliament's Committee on Women's Rights and Gender Equality.

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EXECUTIVE SUMMARY

The ICT sector has a transversal importance to every sector in an economy. Its impressive growth in recent years and the exponential expansion projected for the future will entail an increasing demand for highly-qualified workers. Women, due to their small presence in ICT, could constitute an important pool of potential candidates to enter this sector.

In order to attract women to ICT-related courses and into the working field of information and communication technologies, some obstacles should firstly be countered. These can be divided into two different sets: one regarding education and the other regarding employment of women in ICT.

Education has two different phases that demand different approaches in order to successfully encourage girls to pursue courses in the field of ICT. In high school, a range of incentives should be established in order to counter myths of girls having untechnical minds and the bias of teaching materials and techniques; in higher education, the attention should be focused on young women who have chosen ICT-related courses in order to encourage them to pursue a career in this field, through the setting up of mentoring schemes with female role models, for instance.

In terms of employment, Motorola Poland is a good example of a company which has designed a project to engage girls within the ICT sector. The **Diversity Project** aims to show girls that science and computing do not have to be male-driven and can be whatever one makes of it. It has the added value of boosting girls' confidence in their ICT skills.

Regarding the other set of obstacles faced by women pursuing an ICT career, there is the phenomenon of mid-career women in ICT jobs abandoning the field, entitled "the leaky pipeline". In order to address this issue, three phases can be considered differently: recruitment, career development and work-life balance.

RTÉ is an example of a broadcasting company highlighted by the European Commission as a best practice in terms of recruitment policy. In order to ensure a balanced turn-out of female and male candidates, the Irish broadcaster makes explicit in its recruitment ads the policy of equal opportunities. Questionnaires are filled by every candidate in order to ensure that those considered are fully qualified and, finally, positive discrimination is used in departments where women are underrepresented.

In terms of career development, **Telia Sonera** was highlighted by the European Commission as an example of best practice. Its managerial programme aims to assess employees in their leadership skills, putting a special emphasis in equality of opportunities and on gender balance. Through the participation in this programme, female employees realise their potential in management and might be encouraged to apply for promotions to managerial positions.

Finally, in what concerns work-life balance, the Commission considers the practice of the **Fraunhofer Gesellschaft as a good example**. By simultaneously encouraging its employees, both male and female, to choose flexible working arrangements and by providing on-site childcare and after-school activities for children, this German research institute has been able to achieve 30% of women among its researchers (the average percentage of female researchers in German institutes is only 17%).

1. THE PRESENCE OF WOMEN IN THE ICT SECTOR

The Information and Communication Technologies (ICT) is an increasingly important economic sector in Europe and they constitute a field that has flourished in recent decades. In technical terms, it can be defined as follows:

"The ICT sector includes the manufacturing and services related to computing and telecommunications equipment and machines."¹

The ICT sector is comprised by the following areas:

- "The traditional core of 'informatics': occupations in design and engineering of IT systems, software, networks; in the development of software applications, programming and coding, functional analysis, quality monitoring, software parameterisation; in hardware and software maintenance, assistance to users and help-desk.
- The new and increasingly diversified web and multimedia occupations, which combine technical skills in computers, software and networks with communication skills and/or skills in arts or graphic design.
- The emerging jobs linked to specific application fields, for example medical informatics, scientific informatics, e-commerce platforms, enterprise resource planning systems, (ERP), supply chain management systems (SCM), customer relationships management systems (CRM)."²

It is not only a sector important in itself but a fundamental part of virtually every field of the economy and of people's everyday lives. This transversal importance means that a successful and dynamic ICT sector will help an economy to flourish while a shortage of information and communication technologies bears the potential to disrupt it.

It is therefore a reason for concern that the development of the ICT sector in Europe is currently under pressure due to a shortage of qualified workers for employment in ICT. Furthermore, the increasing importance and expected rapid expansion of this field means rather that more people with ICT-related qualifications will be needed in the short- and medium-term.

Looking for possible resources to fill these needs, the ICT sector is paying more and more attention to women, who constitute only a small part of it³. The reasons for low presence of women in ICT are complex. A small number of women in ICT-related courses, such as information technologies and computer science, combined with professional and stereotypical obstacles faced by women willing to pursue a career in ICT, account for the low share of female workers in this field⁴.

Precisely due to their scarce presence in ICT, women are seen as a potential pool of unused skills and resources that can have an important contribution to solving the shortage of

¹ Women in ICT - Status Report 2009 (European Commission).

² Valenduc (2009) p. 484-485

³ In 2007, the OECD published an overview of the gender distribution of ICT and ICT-related employment in OECD countries, unfortunately the data haven't been updated since then.

Available at: <http://www.oecd.org/dataoecd/16/33/38332121.pdf>

⁴ Castaño et al (2009) p. 8

qualified candidates in ICT. Female workers would increase the diversity of ideas and experiences in the field of information and communication technologies which is seen as an added value for the sector. The gender pay gap could also be successfully narrowed by raising the number of women in better paid jobs in the ICT sector. Moreover, some studies suggest that companies that have more women in top-level management positions are the ones which perform best⁵. Finally, the moral issue of increasing equity and fairness as well as providing true opportunities for all is also a strong motivation to turn ICT jobs more appealing to female workers and science and engineering courses more attractive to girl students.

In short, encouraging young girls to pursue courses in this area and women to pursue careers in the ICT sector is not only a matter of social justice or increasing diversity but an economic necessity. This briefing paper presents a review of relevant literature regarding how to optimise and encourage women's presence in the information and technologies sector and how a win-win situation can be created for all stakeholders, the highly-qualified women, the talented young girls and the ICT industries and services.

For this purpose, the two major questions that this briefing will focus on are:

- *How to encourage young girls to pursue academic and technological courses related to the ICT sector?*

Even though women now constitute more than half (55.2%)⁶ of university graduates, they continue to be underrepresented in ICT-related courses. The percentage of female graduates in mathematics, sciences and technical disciplines is only 40.2%⁷. What is more, this percentage decreases at post-graduate levels, which seems to suggest that many women do not complete their courses or do not pursue higher-level studies in these fields.

- *How to attract highly-qualified women to this sector and how to keep them in ICT-related employment?*

Across the European Union, women occupy less than 30% of the ICT sector jobs⁸. There is a variation in percentage according to different occupations, from just 8% in software engineers to 54% in the lower skill-level computer operator group⁹. Women are also underrepresented in decision-making positions in the ICT field, as is the case with many other fields. Moreover, despite growth in this sector being very remarkable across the EU in recent years, the share of female workers in the ICT workforce has actually fallen¹⁰.

⁵ Women Matter - Gender diversity, a corporate performance driver (McKinsey & company) 2007, available at: http://www.mckinsey.com/locations/swiss/news_publications/pdf/women_matter_english.pdf ; Mainstreaming a Gender Perspective in Science, Technology and Innovation Policy (UN) 2011

⁶ ECWT Position Paper on Gender and Technologies: Lining Up for a Gender Action-Plan for the Digital Agenda (data from 2008).

⁷ Proportion of female graduates and male graduates of all graduates in mathematics, the sciences and technical disciplines (tertiary education) (European Institute for Gender Equality, data from 2009).

⁸ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006).

⁹ *ibid.*

¹⁰ Valenduc (2009) p. 488

2. BARRIERS AND MISCONCEPTIONS

Women's low presence in jobs in the ICT sector is due to factors external to their abilities, level of qualifications and motivation. There are effective barriers that need to be acknowledged so that successful solutions and practices can be found to integrate women and girls in education, training and employment in ICT.

The first set of obstacles concerns women's perspective of and expectations towards the ICT sector. These start to develop at an early age, during education, and can be translated into the following interrogation:

Why don't girls usually pursue scientific courses?

The answer is found in a combination of long-held stereotypes, misconceptions on girls' aptitudes and a certain bias in teaching materials and pedagogy. It has been effectively proven that there are very few differences on aptitude in maths and science between girls and boys¹¹. One of the main factors in girls de-motivation in choosing science and technology studies in school lies with the bias present in teaching materials such as school-books and assessment forms, as well as the way teachers motivate girls and boys differently for different subjects.¹² Parents also tend to discourage girls from pursuing a career path in technology. Boys are usually channelled into exploratory interests and technologies, while girls are usually encouraged to explore their communication skills¹³. The caricaturisation by the media of the occupational culture and the type of people who work there, although at odds with reality, tend to appeal more to boys.¹⁴

Another very important factor in girls de-motivation in choosing scientific courses is the serious lack of female role models. This has consequences at two levels: the insufficient number of women at the highest levels of hierarchy both in ICT-related courses and in the ICT sector means that there are very few opportunities of mentoring for young women. The lack of women and visible female cases of success in this sector reinforces the stereotype that ICT is a male-driven field. Thus, a combination of stereotypes and lack of role models seriously hampers girls' choices to pursue technology courses that would qualify them for a career in the sector of information and communication technologies¹⁵.

Why do women drop out of their ICT careers?

The second set of obstacles faced by women concerns a phenomenon usually described in the literature as the 'leaky pipeline'. Besides the fact that ICT is a sector with a low share of female workers, additionally a great number of women drops out of their ICT careers. Four main reasons account for this worrying trend:

- **poor work-life balance:** the ICT sector is perceived as a sector with harsh working conditions which include long working hours and a work-pattern that can often be very unpredictable. Working during weekends and late into the evening is not unusual and thus there is a bias towards employment of young men who seem to be more

¹¹ ECWT Position Paper on Gender and Technologies: Lining Up for a Gender Action-Plan for the Digital Agenda (p. 3).

¹² Women in ICT (Gras-Velazquez et al, 2009, p. 4).

¹³ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society; 2006, p. 21.

¹⁴ Valenduc (2009) p. 494

¹⁵ Code of Best Practices for Women and ICT (p.7); Mainstreaming a Gender Perspective in Science, Technology and Innovation Policy (p.8); Women and ICT - Status Report (European Commission, 2009, p. 10).

willing to commit their available time to their jobs¹⁶. This leads women more than men to feel that they will have to make a choice between parenthood and a career in ICT;

- **organisational constraints:** besides the perceived bias in employment of young men, the ICT sector is often segregated into women's jobs and men's jobs, with the former being more related to communication and lower-paid functions, while the latter is more usually concerned with technological and better-paid jobs;
- **male-dominated environment:** in a sector which has predominantly male workers, the generated networks and organisational culture are ones that implicitly or explicitly tend to exclude women¹⁷;
- **lack of role models:** the situation of shortage of women in leadership positions in the ICT sector is also a problem for maintaining women in ICT careers. With no examples of successful women who reached the top of the ladder in this sector and most female workers concentrated in low-paid jobs, women tend to feel discouraged and to believe that ICT careers are incompatible with family-time.

¹⁶ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 17).

¹⁷ Valenduc (2009) p. 493.

3. EDUCATION: ENCOURAGING GIRLS TO CHOOSE THE ICT SECTOR

On this backdrop, education has been put forward as the most effective tool to topple the obstacles faced by women when entering the ICT sector. The traditional pedagogical approaches are often considered biased towards boys, in the sense that they value certain roles, experiences and skills closely related to the male gender¹⁸. These pedagogical approaches thus become unhelpful in motivating girls to pursue computer sciences and other ICT-related courses, being partly responsible for the shortage of women in these courses and on the ICT sector in general.

Accordingly, this chapter will explore possible strategies answering the first of the two main questions of this briefing paper:

How to encourage young girls to pursue academic and technological courses related to the ICT sector?

In the literature, the barriers that need to be torn down in order for girls to be more attracted to engineering, computing and technical studies have been analysed. Policy recommendations based on concrete examples of projects that have been implemented and which address these obstacles will be presented. A more detailed example of a successful project sponsored by an ICT company will be described in the final part of this section.

Bearing in mind the studies¹⁹ asserting that boys and girls show the same aptitude for maths and sciences and that the number of qualified candidates is not keeping up with expansion and demand of the ICT sector, it can be easily concluded that women are generally seen as the great source of untapped potential to fill ICT-sector jobs. However, as was previously mentioned, the percentage of women among students enrolled in ICT-related courses in the EU (40.2%) is smaller than the overall percentage of women in higher education (55.2%).

According to literature, education is the most effective way of countering prejudices and dispelling myths, particularly the perception of ICT careers as being inherently male and the widespread prejudice of girls having untechnical minds and thus being unsuitable for ICT jobs. This idea implicitly, and often explicitly, creates an environment that discourages young women from pursuing maths, science or engineering studies. To counteract this issue, encouraging surroundings have to be created to convince girls that these subjects lead to viable career paths.

Another type of issue which concerns men and women in principle in the same way can be addressed through education: As mentioned above, girls argue to be often deterred from considering a career in ICT due to the standard working conditions of the sector being especially hard. The combination of long and unsocial working hours and often the unpredictability of a working pattern much based on ad hoc projects creates an the image that a career in ICT and parenthood are incompatible. While ICT enterprises increasingly adapt better to the needs of their employees²⁰, there is also room for actions in education.

¹⁸ Women in IT - The European situation and the role of public and private partnerships in promoting greater participation of young women in technology (p. 10) ; ECWT Position Paper on Gender and Technologies: Lining up for a gender action-plan for the digital agenda (p. 3).

¹⁹ ECWT Position Paper on Gender and Technologies: Lining Up for a Gender Action-Plan for the Digital Agenda (p. 3).

²⁰ See below.

For women, the presentation of women successfully reconciling work in this sector with family life, as well as setting up female mentoring programmes, are of extreme importance to encourage women to take up a career in ICT.

It is worth noting that there are two main educational periods that should be approached differently: primary/secondary school and higher education. In the first phase it is crucial to act in order to demystify myths and counter girls' general perception of ICT careers as a male field. This is the period when choices of studies are being made that will shape the future choice of career. Thus, the following concrete policy measures can be taken, both by schools and ICT companies in the EU member states²¹:

- a) sponsoring of school projects, technical summer camps, awards and other competitions aimed at breaking stereotypes and spurring interest in this sector;
- b) organisation of events that portray successful women working in ICT, so that the "geek" stereotype often attached to these careers can be broken;
- c) organisation of information sessions at secondary schools for teachers and parents alike to inform them on possible careers in the ICT sector and on technology in general, with the aim to promote a conducive environment at both home and school to this type of careers.

In higher education, the second educational period, when it is often stated that it is already too late to break stereotypes and persuade young women to pursue ICT-related courses, the primary aim is to target female students in science, maths and engineering courses and encourage them to finish their courses and eventually pursue a career in the ICT sector. This can be achieved through:

- d) organisation of meetings and school visits to companies for female students who choose the ICT sector as a potential career, in order for them to establish contacts and start mentoring processes with older employees in this sector;
- e) organising career days specially targeted to female students in their final year of studies, to encourage them to pursue a career in the ICT sector, including research work.
- f) financing programmes to encourage women to pursue a PhD in the ICT field, as there is a shortage of females in senior posts in research and academia in sciences;
- g) setting up mentoring programmes with older women working in the ICT sector to allow young women to build extensive networks to increase their chances of succeeding in a career in this field.

²¹ Code of Best Practices for Women and ICT (p. 7).

3.1. Motorola Poland - Best Practice in Education

According to the Commission, one example of a successful programme sponsored by an ICT company aiming to spur interest for this sector among high school students, particularly girls, can be found in Motorola Poland.

Their general goal in terms of education is to support the "creation of interest in ICT areas in secondary schools"²². The most successful product of this strategy is the **Diversity Project**, a competition aimed at increasing girls' interest and their visibility in ICT projects. Concretely, the Diversity Project was first run in 2000 and initially it had a limited scope, designed only for four high schools. 120 students participated in this first edition. Six years later, it had extended to the whole of Poland, with over 2000 pupils competing in the programme²³. High school students wishing to enter had to be aged between 12-16 years old and to form teams of 4-6 members. Each team would then submit a proposal for an original website, which would later be assessed on the basis of approach to the subject, artwork, user-friendliness, and technological level.

The most crucial condition for the project to achieve its main goal of promoting girls' interest in ICT was the 50% rule. At least half of the teams' members had to be female students. This rule has positively shifted the participants' characteristics overtime: in 2001 only 34.6% of participants were girls, whereas in 2006 they had become the majority at 56%.²⁴

Another important change made to the programme over the years was the launching of the project online. Besides the broader dissemination of the project and the greater convenience, as the competition is fully developed over the Internet, the launch online was crucial to improve girls' participation in the Diversity Project.

Initially, the project encountered some obstacles concerning mostly myths and stereotypes over girls' inability to engage in ICT-related competitions. Teachers rejected the project due to its specifically stipulating the participation of girls, seen as a nonsensical rule. There was a lack of effort to motivate female students to participate in the project. When the competition was launched online in 2003, the percentage of girls participating increased by 10 percentage points (43.4% in 2002 to 55.3% in 2003).²⁵

The outcome of the Diversity Project has been very positive. Its goal of attracting women into ICT-related studies has worked in two ways: it has shown female students that computer technology is what someone makes of it and it can actually be appealing to girls; and by promoting girls' participation in the programme, the Diversity Project has helped to dispel myths and stereotypes on girls' abilities to work with computers and helped to shape a motivating environment for young women to pursue computer science studies. A tangible result has been the increase of women studying computer science in Polish universities: in Krakow, in 2001, 2% of female students were enrolled in computer science in its

²² Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 106).

²³ Motorola Gender Diversity Management (Motorola Software Group) in http://www.berlin-divercity.de/diwiki/images/c/cc/Poland-Diversity-panel_disc-presentation.pdf.

²⁴ Motorola Gender Diversity Management (Motorola Software Group) in http://www.berlin-divercity.de/diwiki/images/c/cc/Poland-Diversity-panel_disc-presentation.pdf (p. 10).

²⁵ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 83).

universities, whereas in 2006 there were 8.6% of female students enrolled in the same course.²⁶

Three main characteristics of this project have been found to be the core of its success²⁷:

- **the age of the participants:** targeted to pupils between the ages of 12 and 16 years old, the programme acts exactly in the moment when students are deciding their future;
- **technical knowledge not required:** students do not have to have computer knowledge a priori, they are free to use their creativity. This shows to girls that technology does not have to be male-natured but it can be whatever you make of it; and
- **larger impact:** the benefits of the programme are not just attracting girl students to computer science degrees; even students who do not choose to pursue a career in ICT are nonetheless enriched with computer skills.

To sum up, the Diversity Project implemented and sponsored by Motorola in Poland has been identified by the Commission as a clear and successful example of a best practice in increasing female students' interest in ICT-related projects and courses. It relates specifically to the above-mentioned policy recommendation of:

c) sponsoring of school projects, technical summer camps, awards and other competitions aimed at breaking stereotypes and spurring interest in this sector.

4. EMPLOYMENT ISSUES: SOME BEST PRACTICES

Besides the low percentage of women working in the ICT sector there is a phenomenon broadly entitled the "leaky pipeline". This phenomenon consists in female mid-level workers abandoning their careers in ICT. From this it can be concluded that to overcome the problem of a low share of female workers in the ICT sector the emphasis needs to be put not only on how to attract women into an ICT career but also on how to help them to strive, in order for women not to quit their ambitions in this sector.

Three main areas can thus be identified in which to concentrate efforts and different types of good practices which could be put in place:

- **Recruitment:** in this phase attention should be devoted to ensure qualified female candidates feel confident enough to apply. Positive discrimination techniques could also be employed to try to narrow the gap between the discrepant shares of men and women in the ICT sector.
- **Career Development:** in order to counterbalance the male-dominated networks and environment which implicitly or explicitly exclude women and add an extra obstacle to women's ability to progress in their careers, programmes specifically targeted to female employees can be designed to assess and develop leadership and management skills. Female mentoring programmes are also useful for networking.

²⁶ Motorola Gender Diversity Management (Motorola Software Group) in http://www.berlin-divercity.de/diwiki/images/c/cc/Poland-Diversity-panel_disc-presentation.pdf (p. 6).

²⁷ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 85).

- **Work-life balance:** measures to allow female workers to better reconcile their working hours with family care responsibilities are of particular importance, since a poor work-life balance, translated into long and unpredictable working hours, is one of the strongest reasons leading to the "leaky pipeline".

4.1. RTÉ - Best Practice in Recruitment

In order to ensure a more balanced share of men and women in the ICT sector, there needs to be good recruitment practices in place. Special care should be given in encouraging women to apply to have a higher turn-out of female qualified candidates. Attention should be paid to the design of the advertisement and the channels through which to disseminate it, the phase of the selection of the candidates and positive discrimination might be used in divisions where there are low numbers of female employees.

RTÉ, Radio Telefis Éireann, is an example of a company with a heavy component of information and communication technologies which, according to the Commission, represents a best practice in recruitment.

RTÉ is the *Irish National Public Service Broadcaster*. Its workers are employed directly by the state and they have very favourable working conditions. As a way of setting the example, the public broadcaster offers very modern and attractive workplaces, and has set as its priority corporate social responsibility. This includes strong attention paid to gender anti-discriminative policies.

RTÉ has a very balanced share of employees from both genders (46% are women)²⁸. A third of people working in managerial positions are female (31%)²⁹ and there are women present at a very high level; the person in the highest position in RTÉ (chairman of authority) is a woman, and the high authority board has 5 female members out of 9. There are differences in the share of men and women in different departments and divisions; for instance, women are much more present in the human resources department than in specific technical sectors such as sound-specialists in Radio.

In 2005, over half of the overall applications for RTÉ (51%) were from women and 41% out of these were for management positions³⁰. These figures show that women are strongly motivated and encouraged to apply for positions with RTÉ. The public company's recruitment policy helps to account for the high turn-out of female candidates.

RTÉ frequently monitors its workforce and applies targeted measures to ensure a more balanced workforce. Difficulties were found in traditional male areas of work, such as engineering and technical areas. But special recruitment measures coupled with technological improvement over the years have made ICT jobs more accessible to women, as for example the decreasing in size and weight of cameras, which have allowed the existence of camera-women. In terms of specific recruitment policy, RTÉ makes a successful effort to ensure that qualified women apply and are recruited to varied positions at the public broadcaster:

²⁸ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 62).

²⁹ Ibid.

³⁰ Ibid.

- Ads are published on several communication channels, i.e. on the internet website, on the radio, and sometimes also in Trade papers. They always specify the policy on equal opportunities so that women feel encouraged to apply;
- A questionnaire based on previously agreed selection criteria is filled out by all applicants. The purpose of this questionnaire is quite important to ensure that only fully-qualified applicants are considered. As several gender studies have shown that men apply for jobs to which they sometimes do not fulfil all criteria, whereas women only apply for jobs to which their skills fully match, questionnaires are particularly important to ensure gender balance and fairness in recruitment;
- 60 people are selected for interview, from which further 20 are selected. These 20 applicants go on to participate in a training course and if they are successful in the final exam, they enter a database of potential employees;
- Finally, positive discrimination (whereby in cases of equal qualifications, the female candidate is chosen) is a resource RTÉ uses in areas and divisions with a very low number of women.³¹

RTÉ's recruitment best practice can thus be summarised in three points:

1. Equal-treatment policy specified in job advertising;
2. Questionnaires to ensure that only fully-qualified candidates are interviewed;
3. Positive discrimination in areas with low share of female workers.

Discouraging recruitment procedures and low-attractiveness of the sector to female candidates are not the only factors responsible for the low number of women in ICT jobs. Also career development and a proper work-life balance have to be taken into account.

4.2. Telia Sonera - Best Practice in Career Development

The phenomenon of the "leaky pipeline", i.e. mid-career female employees dropping out of their ICT-sector careers, is testimony of the de-motivation of women caused by little career progress, a male-dominated environment and the difficulty to reconcile a job in ICT with parenthood and other care responsibilities.

The GO-program for career development of **Telia Sonera**, a leading Finnish telecommunications company, is called a best practice by the European Commission. It is designed to improve the chances of female workers in particular to progress to managerial positions within the company. Telia Sonera has a history of public-sector ownership with a culture of strict rules in terms of gender equality, in itself a very extensive practice in Finland.

The GO-program stems from the company's explicit objective of providing equal career advancement opportunities for both women and men and thus having a balanced presence of both genders in all positions³². The specific goal of the GO-program is to guarantee that

³¹ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 63).

³² Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 41).

the best and most qualified employees have the access to managerial positions. Women are encouraged to apply, as purposeful attention is given to equal participation. The results have been very positive as the company has seen a rise in the number of female managers, both in technical as well as service-oriented departments³³.

The programme consists of three different phases:

- the **Kick-off phase**: where individuals are required to assess themselves (e.g. how do they see themselves, what are their strengths and weaknesses, their reactions towards new work, their way of developing projects);
- the **Professional-growth phase**: employees are assessed by external psychologists, in order to be given objective advice and for the candidate to be able to plan their future career;
- the **Leadership assessment centre**: in this last phase, candidates work in teams. They are given individual tasks and are afterwards assessed by their peers based on their behaviour and work.

At the end, employees receive a career development plan based on the results of the different phases of the programme. A follow-up on each candidate is conducted in order to monitor the changes that occurred after the participation in the programme and thus to assess how effective it is.

The increase in the number of women in managerial positions in Telia Sonera since the start of the programme in 2003 has been related to the positive effects of the GO-programme. Explanations for the effectiveness of the GO-program can be summed up as follows³⁴:

- it boosts women's self-confidence;
- it gives female employees a clearer view of their abilities and their expectations;
- through different assessment channels, the Human Resources department is given an objective report on an employee's motivations, abilities and whether that person is working in a position in line with their potential. It is shown that this creates new opportunities for women to accede higher posts.

4.3. Fraunhofer Gesellschaft - Best Practice in Work-life balance

The other issue to be tackled in order to address the "leaky pipeline" is the reconciliation of work and family life in the ICT sector. According to research, promoting a balance between family responsibilities and working hours is of crucial importance to attract and maintain highly qualified women in this sector. Due to stereotypes women feel much more than men that, seen the long and often unpredictable working patterns in ICT, they have to choose between career and parenthood³⁵.

³³ Ibid. p. 63.

³⁴ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 44).

³⁵ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 17.)

Fraunhofer Gesellschaft is an example of a research company who has devoted special attention to the reconciliation of work in ICT and family life and provided women and men with opportunities to combine the two.

Fraunhofer Gesellschaft is one of the largest technology research companies in Germany, with 57 institutes at 40 different locations. It is partially funded by the German federal state and by the Länder. The research company follows many gender equality policies adopted by federal and Länder institutions, as is the case of having a gender equality commissioner, a common entity in German universities.

One of the main objectives of Fraunhofer Gesellschaft is to bring more women into applied research and increase the proportion of female researchers in areas where they are underrepresented³⁶. For this purpose, one of the instruments used is the flexible arrangements provided for its employees to reconcile working hours and family responsibilities. Two types of arrangements are offered:

- **Flexible working patterns:** Fraunhofer Gesellschaft lets employees organise their working hours as flexibly as possible. The company offers part-time and teleworking arrangements, as well as sabbaticals³⁷. In terms of leave, in Germany parental leaves are generally from one to three years³⁸ and in Fraunhofer Gesellschaft they may be taken up to five years. Fathers are also encouraged to take paternity leave and have more flexible working arrangements in order to take care of the family³⁹.
- **Childcare facilities:** the Stuttgart institute was the first to create a full-day childcare service in 1999. The childcare arrangements are provided in a nearby building for children from 6 months to 6 years. It provides a summer camp in August for children up to 12 years, as well as daytime after-school activities for school children. Many other institutes of Fraunhofer Gesellschaft have followed the initiative to have childcare services close to the workplace⁴⁰.

Regarding the extension of the legal parental leave period, however, not all scholars agree that a parental leave of several years can be qualified as a good practice for the reconciliation of work and family life. Some academics argue that it is not beneficial, career-wise, to stay out of the workplace for such extended periods of time as five years, neither for women nor for men.⁴¹

In sum, by allowing women and men to take flexible working arrangements and by taking an active part in childcare, Fraunhofer Gesellschaft has successfully attracted and maintained female researchers. Their success is attested by numbers: while in Germany the proportion of female researchers in the government sector in the field of engineering

³⁶ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 89).

³⁷ Ibid.

³⁸ In Germany by Federal law mothers are entitled to 14 weeks of fully-paid maternity leave (6 weeks before the birth date and 8 after). After these weeks and up until the first year, parental leave can be shared between the parents or taken up by only one, partially-paid. Up to the third year, mothers can choose to remain at home taking care of their child and are protected against dismissal. (Elterngeld und Elternzeit - Das Bundeselterngeld und Elternzeitgesetz [2012]).

³⁹ Ibid. p. 91.

⁴⁰ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 91).

⁴¹ See for example Román (2006).

and technology is 17%⁴², in Fraunhofer Gesellschaft the percentage of female employees is almost double at 30%⁴³.

⁴² She Figures 2006, Women and Science Statistics and Indicators, European Communities 2006.

⁴³ Best Practices for Even Gender Distribution in the 25 Member States in the Domain of Information Society (2006, p. 88).

5. CONCLUSION

Motorola Poland, RTÉ, Telia Sonera and Fraunhofer Gesellschaft are just four examples of best practices identified by the European Commission out of companies in the Member States which are making an effort to attract and maintain women in the ICT sector. It must be observed that many of the positive examples concern enterprises which are at least partially publicly financed.

These examples show furthermore that the gap between women and men making career in ICT has been identified and that solutions have been developed. However, the gap remains still quite pronounced. In order to reduce it in the medium-term, more concerted effort will be necessary. The two-pronged approach detailed in this paper is an example of such a concerted effort: putting an emphasis in education and attracting girls into technological courses to enlarge the pool of highly qualified candidates for the ICT sector; and addressing the "leaky pipeline" phenomenon by tearing down barriers preventing women from progressing in this sector and from reconciling their careers with parenthood and family responsibilities. The campaign recently launched by the European Commission "Science: it's a girl's thing!", can be regarded as an example of an educational approach in this respect⁴⁴.

What is more, the effects of the current financial crisis on future and ongoing gender-sensitive programmes in the field of information and communications technologies is yet to be fully comprehended.

⁴⁴ <http://science-girl-thing.eu/>, will be available in other languages as from September 2012.

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