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Widening Women's Work in Information and Communication Technology

Professional trajectories and biographies

WWW-ICT
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Introduction

This is a summary analysis of the biographical interviews conducted with 107 women and 33 men working in the ICT sector in seven European countries – Austria, Belgium, France, Ireland, Italy, Portugal, and the UK. Our analysis combined two strategies – to on the one hand preserve the biographical aspect of informants' narratives and to on the other hand look at more general patterns across individual biographies. Accordingly, the report is organized in five sections:

- We first present the major findings of the biography part of the WWW-ICT project, based on the seven national reports on professional trajectories and biographies. We searched the life stories for experiences that cut across the 107 female biographies. They allow a more general view of women's situation in ICT, namely of the diversity of backgrounds and career paths, of jobs and working conditions in the field, and the role of gender.
- Follows a detailed description of our informants, their background and their work experiences, based on a set of key data as well as on the coded narrative interview material. We combined a descriptive analysis of these data with a cluster analysis revealing particular *career patterns*.
- The third section presents what we call *life story patterns*. We arrived at these patterns by working with the narrative material, analyzing the individual life stories, looking for 'life themes', turning points, and strategies.
- Men's biographies are analyzed separately. We tried to read them in comparison to those of the women, looking for similarities and differences. Given their small number (33), the possibilities for doing such a comparative analysis are limited.
- The tables as well as the seven national reports on professional trajectories and biographies are to be found in the Annex.

Method

The aim of a biographical interview is to develop an understanding of a person's biography or trajectory – her development as based on opportunities, choices, and individual coping strategies.

Crucial concepts are:

- *Developmental tasks* that pose themselves in particular phases of one's life and/or in particular professions/work organisations (e.g. juggling the demands of work and private life, planning a step in one's career)
- *Individual coping strategies* in relation to given structures – enabling factors and constraints
- *Detours and their implication* for the person's biography – paths in a career that a person takes in order to prevent exclusion, find new points of entry, avoid exposure to particular expectations, etc.

- *Transitions* – changes of field of work, occupation, life situation, etc. that allow a person to redirect her biography, define new challenges, find better opportunities, etc.
- *Life themes* (Thomae 1996) – topics that emerge in the women's own accounts as crucial for understanding their choices

The focus of our interviews was on the women's work biographies, with an understanding that these are inseparable from their identity and concept of a good life. Silvia Gherardi's narratives of "women travellers in a male world" come closest to this notion of biographical interviews, the concepts that shaped her reading of the women's narratives being "the presence of a common plot, the outsider, the journey, the unexpected encounter with the different" (Gherardi 1996, p. 190).

The most common method for unravelling biographical information is the narrative interview. Although parts of the interview may be pre-structured, in particular those that concern information about the cornerstones of a person's biography, most of the interview is conducted in an open way. They are what Flick 1995 calls episodic interviews with a strong narrative character. The main idea is to stimulate a person to tell "stories" – significant episodes in her life that illustrate the whys and hows of important events in her biography and the role of relevant others in these events. Normally the interviewee covers several topics in her narration in her own sequence.

A good narrative interview also allows for a certain amount of reflection, supporting a person to remember, to make connections, to evaluate, regret or rejoice. The role of the interviewer is to stimulate, listen, and eventually suggest additional topics that help cover all the relevant points in the interviewee's biography.

We agreed on a set of criteria for selecting interview partners:

- Covering all ages, not only young workers
- Covering all levels of qualifications, not only highly qualified workers and a variety of job profiles
- Considering a diversity of firms (small as well as large companies)
- Covering a diversity of status (salaried, self-employed, full-time, part-time, etc.)
- Covering city and countryside as well as different regions (in the Italian case, both the North and the South; in the French case Ile de France, Picardie and Limousin).

The idea behind conducting interviews with a small number of men (five in each country) was to pair at least some of the profiles (as defined by age, qualifications, job category, employment status), looking for similarities and differences.

Conclusions from the biographical interviews

This chapter presents the major findings from the seven national reports on biographical interviews, discussing them in the light of previous research described in D1 'Conceptual framework and state of the art'. The joint set of conclusions takes account of the great diversity of biographies and their (national, cultural) context but also looks at common patterns. We focused on female informants only, also included is a description of tasks and skill profiles, based on the biographical material.

Background and the influence of the family

- The assumption that attachment to computers begins at an early age does not apply to our sample of women. There are several stories of informants having liked tinkering, using tools, and preferring technical toys as young girls. Especially among Italian informants there are several who mention early interest in computers and parents offering them a computer as a present. But the majority of informants did not get in touch with computers at an early age.
- Some women received special encouragement from their parents to go into the sciences and technology. Often it was the father's scientific or technical background or interest, who strengthened informants' affinity to technical things. In these cases the father (in some also an older brother) was a an important role model. Some fathers had attractive jobs, such as architect or industrial designer.
- There are numerous cases of women (especially in Austria and in the South of Italy) whose mother had a strong influence on the daughter's personal development and career choice. These mothers are described as role models – strong, admirable, and supporting, expecting their daughter to be strong and independent. These mothers' backgrounds differ – some are teachers, others homemakers, and only a few work in the area of math/science, 'naturalizing' mathematical and/or technical skills. There are several cases of mothers who run their own business, representing a strong incentive for their daughters to get independent. This resonates with research stressing the importance of the mother as a role model and source of encouragement for girls (e.g. Huang et al. 1999, Hapnes/Rasmussen 2000).
- There are also family circumstances that do not remotely signal a career in ICT. In many cases the fact that parents encouraged their daughter to make their own decision, respected their choice and trusted in it was mentioned as the most important support. Families often passed on to their children the importance of getting a good education and to be able to maintain themselves. In a few cases (in Belgium) informants had to fight against the expectations of their family to enter a more traditional career.
- Some informants come from backgrounds with limited educational ambitions and opportunities (rural, ethnic). They enter ICT through indirect routes, work in related areas or auxiliary professions, and use ICT to break out from a narrow path.

The influence of the school

- Some, but not all, of our informants excelled in math and/or the sciences. In the UK, a considerable part of women with careers in ICT comes from all female secondary schools.

In countries such as France school grades are important in regulating access to a career in science/technology.

- Teachers were influential only in a few cases. Then it was the math teacher who opened informants' eyes to computing as a career option.
- Some of our older informants went to school at a time when no computers were available, and in many cases first contact with ICT was at university level. Some of the younger women had computers at home, provided by the father, an older brother, in a few cases the mother, or they bought one from their pocket money.
- There are very few stories of negative experiences in school, of being confronted with gendered attitudes. Though, some of those informants who went to a technical secondary school, mention the strange experience of being one of a few girls.

Personal attributes – relationship to ICT

- Many of our informants report to have been determined to overcome difficulties from an early age on and they like to solve problems. Some describe themselves as fighters against difficult odds. Some of the highly successful women characterize themselves as shaping their own environment. They are ambitious but also engaged, critical, and self-conscious, defining themselves through what they accomplish in their work. They like ICT, often the purely technical side of it, because it requires problem solving and giving shape to a solution. Another part of the successful women embarked on a straight career in ICT and strive to the top, accepting the tough conditions – hierarchical structures, stress, competitiveness, sometimes even fighting.
- Technology, in particular ICT, is attractive to a large part of our informants, for several reasons:
    - It 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 web site – this may even include a care-taking aspect.
    - It is an open world, with a wide horizon.
    - It offers jobs in a respectable area and status.
- Even those women, who have left the ICT sector maintain this positive relationship to ICT, either teaching ICT skills or creating their own web site.
- "Assimilation of informatics with technology, mathematics and physics" (D1, p. 56) is not a disadvantage. For many of our informants ICT is attractive precisely because it requires analytical and problem solving skills and they experience this as a source of creativity. There seem to be two major entry routes in ICT for women, either through mathematics and the sciences, or through an application area. Different types of girls benefit from different approaches to teaching ICT skills – a more mathematical one or one based on software packages (D1, p. 78f.).

- We did not find evidence of women contextualizing their interest in computers in other areas such as medicine (Margolis et al. 2000) or of appreciating computers via the contributions to society they make (D1, p. 71 and 99). However, a few informants distanced themselves from the love stories some of their male colleagues have with computers.

Entry routes into computing

- Entry routes into computing are diverse and, as mentioned already, early contact with computers is not a determinant in choosing ICT as a career. Many informants learned to use a computer rather late and most of them used a variety of resources to acquire the necessary skills – from formal school-based training to learning on the job and complementary special training courses. The great diversity of entry routes into computing confirms the need for innovative cross-disciplinary curricula (Cedefop, 2001).
- Most of our informants had their first job in the ICT sector. 20 (of 107) women studied informatics at the college or university level (computer science, information sciences, software engineering, information systems), some in combination with management, and some have degrees that include some informatics (e.g. cryptography). Another frequent route into computing is (technical) mathematics. To those who love math and analytical thinking a job in computing offers something applied and practical. A series of informants chose subjects that would lead obviously into computing and ICT work, such as physics. A strong interest in electrical engineering, as in the example of a woman fascinated by robotics, is rare.
- Other informants have degrees in other subjects, such as economics, journalism, marketing, chemical engineering or biology, and environmental studies. Some of our informants have a background in art, graphic design or journalism which they later combine with ICT into successful careers as illustrators, digital graphic designers and web designers.
- There are several cases of women working in tourism, regional planning or graphic design, who discovered the Internet and web design. These women developed their skills either by self-learning or by attending a training programme. There are a few cases (in France) of informants for whom Internet and web design skills offered the opportunity to invent their own area of expertise and job in their work organization.
- Another part of the women followed a work-based route into ICT, from secretarial or clerical work, tourism, librarianship or accounting. Several women started out as teachers of math, history, accounting or adult teaching. A common career step is to move from more technical work, including project management, into marketing and customer-relationships.
- There are also some examples of women who drifted into computing by chance, having eliminated other choices and learning about ICT in one or another way. In some cases it was an internship or temporary employment that brought them into contact with ICT.
- For some women computer science is a "ticket to economic opportunity". This holds true in particular for women living in economically deprived regions and women with an ethnic background and has been described by Margolis et al. 2000 (D1, p. 76). Some of the informants from Italy, for example, motivate their choice of ICT with the job opportunities in the field. Getting an education in engineering and ICT is seen as the most

reasonable way to optimize their chances on the labour market. Job security is a strong consideration especially for women from the South.

Job histories/trajectories

- As the women entered ICT through a wide variety of routes and occupy a diversity of jobs, there are no clear-cut trajectories.
- The majority of informants have technical careers, starting, for example, in software development and processing to the position of team leader or entering management. Others work in operating or support functions. There are also several careers in management and marketing, starting from assistant positions with managerial tasks. Some women entered a university career or work in research institutions.
- Careers in web design and Internet journalism (14 of 107 informants, two of them team leaders and one web design manager) differ from those in software development. They are easier to enter, because they are less technical, with skills in areas such as journalism or graphic design serving as entry points. They are much more restricted as regards skill development and career options.
- A number of women have what we call 're-orientation careers'. They typically felt that their present work did not offer enough challenges and opportunities for learning and, while e.g. looking for additional training, discovered ICT. A large proportion of those who entered ICT from other professions or fields of work had several jobs before.
- In some countries (notably Portugal and France), women's job histories are not a result of a conscious career choice but of following the opportunities that present themselves. The women engage in an extended period of search, moving through several small jobs, before they start constructing a career.
- Careers in large organizations – 51 of 107 informants work in organizations with more than 100 employees – differ markedly from those in small or middle-sized ones. Large organizations have a strongly-developed internal labour market. Openly advertised job opportunities and a wide pool of jobs to apply for have been a key to the development of women who work in such organizations. What keeps women in these organizations is the opportunity to always do new things in different fields and with different people.
- Smaller companies – 31 of 107 informants work in organizations with less than 100 employees, some of them very small companies – offer the possibility to acquire a broad range of skills through learning on-the-job. Hierarchies in these companies are rather flat and there is a limited range of jobs and areas of expertise available. A career here means to move on to other companies and types of work.
- Within the software industry, inter-company mobility is seen primarily as a way of acquiring new knowledge, of increasing one's experience and grow in one's profession. When we look at women's careers within the ICT sector, 45 have their career within one company (some of our informants are too young to have had the opportunity to move on), 24 have changed company within the sector once, and 38 several times. Although "nomadic careers" (D1, p. 59) are not the norm in ICT today, there is some evidence of successful women in the field changing company, also several times, in order to broaden their opportunities. Living in a metropolitan area with a large and diverse labour market (such as e.g. in Milano, London or Dublin) facilitates inter-company mobility.

- We also have some examples of broken careers, with women suffering from the fact that they have not finished their degree or of few and limited job openings in the region or they find out that ICT is not the field they want to stay in. This experience is sometimes coupled with the feeling of failure and lack of courage.
- Especially among the younger of our informants, careers are still open. They had a good start in working life, love their job, and are hard-working. But they are considering other attractive options such as continuing their formal education, going into marketing or training or even more remote alternatives (e.g. artistic ones).
- Although the women in leading positions in general like their work, are ambitious and see themselves as successful, there are a few cases, four of them from the UK, in which several negative characteristics coincide. One woman, of Asian origin, works as a director of information and technology services in an international catering association. She has enormous difficulties in organizing child care and gives a rather negative evaluation of her work situation – low pay, lack of support, high levels of stress, high work loads as well as the lack of career possibilities. She does not feel too comfortable with ICT and would like to change employer/job. Another UK informant, whom we described as 'struggling', embarked on an impressive research career after an extremely difficult start in life, but is very unhappy with her situation at university, feeling mobbed. A third one, general manager in a software company, left her career as a history teacher, which she still sees as her 'real' career, out of the need to earn money. A Portuguese woman with a good career in a large international computer company, feels in the right field but complains about high levels of stress, high work loads, role overload, and having to be totally available. One of the Irish informants is a successful manager but expresses that the (right) choice of a family has somehow compromised her career. She also complains about the lack of support, a high level of stress, and the lack of career possibilities.

Self-employment as a strategy

- Several of our informants are or have been self-employed, building their own software house, web agency or training academy (and some consider this as an option). The main motivation of these women is to shape their own work environment and to be their own boss.
- There are two Austrian cases of 'university spin-offs' where the women (in one case together with a male colleague) took a particular software product as the basis for founding a company, the main idea being to further develop and sell the product and to carry out projects in cooperation with industry. In both cases special loans and counselling were available. One of the women acts as director of finances and software development while her associate is responsible for project acquisition. The other woman kept her university employment. She describes herself as the 'technical mastermind' of the company which is managed by her brother. Both women have a strong computer science background.
- There are several cases of women who have founded a web agency together with their husband or father. Their roles vary. A French woman with a background in law and experiences in a series of jobs in the political administration bought a web agency together with her husband. Each of them has their own clients and is responsible for project acquisition and management. In the case of a woman with a background as laboratory technician and some ICT skills, it is the husband who directs the group which their small

web agency joined and who is responsible for project acquisition and programming, while she took over the administrative tasks including the web. In another case it is the father who helped his daughter set up a web agency together with an associate partner who is responsible for the technology while she takes care of the rest, including HR. The young woman has some management skills but no degree.

- Another structure is that of a company within a company, such as in the case of a Belgian woman with a strong background in computing, who first went freelance in order to be able to spend more time with her children and now owns and manages an independent development team of 12 (male) employees within a company "as a good mother".
- Several of our informants work as freelancers, for a variety of reasons. For those with a background in art, journalism or graphic design it is almost a 'natural' solution. They have built good relationships within the designer community and can make a living. In other cases going freelance offered the opportunity to have more flexibility and time for children and family. We did not find evidence of "blurring boundaries" between employees and independent employment though (D1, p. 59).

Tasks and skills

Our findings largely confirm the job profiles defined by *Career Space*. The more detailed job descriptions that we extracted from the biographical material emphasize the importance of solid technical skills for good jobs in the ICT industry, including project management (D1, p. 110). They also describe the relevance of non-technical skills. None of our informants works as a system architect or chief developer.

- *Network administration*: This is a low level job in the ICT sector, requiring occupational training but not necessarily a degree. Network administrators have to know how to set up, configure, and maintain a network (on a Linux or Windows basis), install software on computers, define and handle policy issues, make back-ups (or even provide a solution for back-ups), and handle break-downs.
- *Development*: Developers do the programming of software, on different levels of technical complexity. For this they need to know several programming languages, be able to learn new ones quickly, be able to work on different platforms, and use a wide range of development tools. Even when working on a well-defined and limited task, programming is not completely routine and often requires finding a solution to a specific problem. Programming tasks may range from databases, to user interface design, to business processes. The work of developers may include writing up a specification, finding a solution to a specific request from a client, searching for errors and handling them, software maintenance and trouble-shooting. Developing may require working in the client company.
- *Project management*: There are several levels of responsibility within project management.
    - At a lower level managing means being the leader of a small team in charge of a specific set of tasks. The team leader communicates with the overall project manager, articulates open questions and problems, explains and distributes tasks, and helps team members to find a solution. Team leaders may have to define milestones and detailed specifications, review and integrate the technical

documentation, and implement configuration and change management procedures. They may be in contact with the client organization.

  - At a higher level project management includes project acquisition – to negotiate and specify requirements with the client organisation, carry out a feasibility study, make a cost estimate, and write up a project offer. A project manager cooperates with technical specialists in the team or a technical leader in defining work packages, tasks, and dependencies. S/he has to draft a detailed work plan, distribute tasks, define milestones, schedule and re-schedule tasks, and assess project progress. Project managers typically act as boundary spanners between team and client, organizing presentation meetings with clients, negotiating requirement changes and communicating them to the team. They are responsible for their project budget, the quality of the product, timely delivery, and project documentation.

- *Project communicator*: The project communicator acts as a boundary spanner or mediator between a) people in a development team (e.g. graphic designers and programmers), b) developer and client organization (e.g. talking to clients about needs, products, and solutions), and c) project partners (in the case of cooperation projects involving several networked companies). The role of communicator may include designing marketing strategies, participation in project/client acquisition, (participation in) proposal and report writing, project presentations (e.g. describing the product for users), and research (looking for new or similar products, development tools, etc. in the Internet). This role can be performed on varying levels of competence and responsibility. For example in large companies it includes management responsibilities.
- *IT management*: IT managers typically are leaders of a department. They are responsible for the organization of work within the department, sometimes including human resource management, for planning, budgeting, and implementing projects, and for reporting to top management. Within IT managing a department may require to build up competencies and teams in new application areas (e.g. Enterprise Resource Planning, e-commerce, e-learning, Manufacturing Execution Systems) and/or to organize the transition to a new technical regime (e.g. from single applications to integrated systems, from host to client-server solutions). In some cases they are in charge of maintaining client relationships.
- *Sales and marketing*: Those computer specialists who are in charge of customer relationships with business accounts (big enterprises/organisations or SMEs). They are responsible for negotiating the design process of hardware and software solutions to be developed by their company for their business clients, to follow the process of design and implementation as commercial supervisors, and to manage the practical aspects of the contracts between providers and clients. Practically, these occupations do not include sales persons in the computer shops. But, to some extent, they may include commercial agents of hardware manufacturers.
- *Customizing*: Those occupations concerned with adaptation and customisation of software packages according to the specific features of the enterprise or organisation where the package has to be implemented. This kind of job is most frequently related to software packages such as ERP (SAP and others), CRM packages, platforms of e-commerce, etc. It also exists for "sectoral" software packages, such as banking software, travel agency software, etc. The job includes a mix of programming tasks (more exactly

parameterisation of existing programmes), definition of functional specifications, relationships with the users for translation of organisational needs into parameters.

- *Multimedia production*
  Depending on the size of the company, there is an overlap of roles and tasks, with the resulting hybrid job profiles. Moreover, small companies tend to outsource the more technical tasks, concerning e.g. system architecture, hardware configuration, and database connections, to external partners.

    - *Web graphic designer*: These are people responsible for the media-specific design of a web site. They need to combine skills in graphic design (this may include an artistic aspect) with knowledge of the rules of web design, including its technical implementation. Web design requires negotiating the design with web developers/programmers and being able to define technical details of the implementation. Web design includes some (HTML, flash script, etc.) programming.
    - *Web production manager*: Web production managers combine classical management skills with special knowledge of multimedia production. They are responsible for marketing, project acquisition, project planning, budgeting, quality control, and timely delivery. In small companies they may have to be competent web graphic designers being able to define a design concept and review designs.
    - *Web publisher/content strategist/information specialist*: These are people responsible for concept design (this includes content and navigation). They create scenarios and define the content of a web site. This requires journalistic skills and experiences.
    - *Internet journalist*: The basis of the work of Internet journalists are journalistic skills, mainly interviewing, research, and story writing. The work of editing information in the Internet is often supported by special authoring software, including Photoshop. It consists of editing text and images and making links to other web sites.

Organization of work

- Work in ICT is organized in the form of projects. There are few examples of solitary work, as most work in software development and web design is team-based. Whereas in web design this reflects the need for a variety of skills – graphic design, programming, content production, video and sound, etc., work in software development is based on a well defined division of labour. Depending on the system's architecture, different sets of functionalities are distributed to different modules, with defined interfaces, and different teams being responsible for the development of those modules. In large projects, tasks such as testing and system integration (re-composition) are carried out by specialists. Despite of this division of labour, developers need awareness of the overall project design and arch of work to be able to do their work.
- Being part of a software development team requires to cooperate and align the work with others, distributing tasks, discussing coding practices, producing and controlling bug reports, change requests and design changes, and creating and managing different versions of a system. This also implies helping each other when it comes to special problems

requiring a particular skill. Teamwork is a genuine practice in software development and not just, as argued by the FLEXCOT project "a rhetorical and motivational tool" superimposed on a reality of "very narrow, repetitive series of tasks" (D1, p. 51). We did not find evidence of a tailorized work organization in our informants accounts of their work.

- There are two types of teams to be found in ICT work: (i) teams in which members have complementary skills and collaboratively work on a common task; (ii) teams where people work independently but have to align their work with the work of others.
- Being a member of a good team is an important experience and also value for our informants. They not only enjoy the personal side of working with friendly and supporting colleagues but also appreciate the support they get in a good team for creating a high quality product and for developing their own skills. This resonates with the findings of Von Hellens et al. (2000 and 2001) that women ICT professionals see the mix of technical, human and organisational skills as the most positive aspect of computing (D1, p. 86f.).
- In particular in the smaller companies, there is a limited internal hierarchy. Companies emphasize the need for self-management and responsibility. In the foreground are the quality of the product and the meeting of deadlines. Most of our informants appreciate the space that this gives them in how they and their team organize their work. Managers are visible and close. As a few cases show, a negative personal relationship can lead to the decision to leave a job.
- Our findings do not allow to distinguish between large and small organisations as offering more or less opportunities for women, as suggested by previous research (D1, p. 61 and p. 87).
- There are several examples of company take-overs, outsourcing, and organizational restructuring. Some of the informants who have experienced this have found their age to be a major factor in their vulnerability to redundancy (notably in the UK). In general, the de-localisation of work "from 'core' organisational premises to back offices, call centres, offshore facilities and remote subcontractors" is not as widespread as suggested by recent European socio-economic research, nor is teleworking (D1, p. 51).

Working conditions

- People working in ICT have to cope with high workloads. In Belgium and the UK a large part of the informants finds long working hours a definite draw-back of jobs in ICT. In the other countries few informants complain about long working hours and stressful working conditions. This may be to do with the fact that many of our informants (34) are young and have no children. Only in some cases informants work long hours (50-60 hours) regularly. Overtime is in general not paid in the ICT sector.
- As found in several European research projects (D1, p. 44), working time arrangements are in many cases rather flexible (52 of 107 informants), hence individualized, and there is a tacit, unspoken agreement to balance long hours versus the flexibility to arrange them.
- Our findings do not confirm in general that "intensive rhythms of work, the overloaded schedules and frequent overlaps between professional life and private life, which often characterise the working conditions of ICT professionals, are very little attractive for

women" (D1, p. 59). To the majority of our informants applies what Gerwitz and Lindsey (2000) formulated: "They are willing to spend more time working if they can have flexible hours or work at home and have their success tied to performance rather than face time in the office" (D1, p. 129).

- However, long hours, including availability during evenings and weekends, are a problem for working mothers (in particular for those without a supporting partner) and few companies and/or colleagues generously adapt to the need to reduce or regularize working hours when children are young.
- Moreover, in the ICT sector it is difficult to get part-time work accepted. For the women who negotiated a part-time arrangement, this often does not have an effect on their overall workload but negative consequences for their salary and their career.
- The pattern and rhythm of work is dictated by project deadlines (sometimes aggressive ones) and emphasis is on completion of work (rather than on hours). Also working directly with a client creates special commitments and the need to be available. This applies in particular to support work. ICT work is often unpredictable, due to the fac t that requirement have not been well defined and/or are changing and evolving over the course of a project. Additional pressure is created by the fact that
- There is a difference between the older, more stable companies and start-ups as regards working hours, with the latter strongly relying on the willingness of people to cope with excessive demands. Women working in very small companies and as freelancers describe "working like mad" as the normal and (in general) accepted situation.
- For our informants it is not uncommon to work at home during evenings or weekends, e.g. when the children are in bed, either reading e-mails and continuing an unfinished job or working on a training programme.
- In particular in the area of web design and project management there are cases of women reporting not being paid adequately in relation to their competences, responsibilities, and workloads. Complaints about inadequate salaries are particularly frequent in Italy (6 cases).

Private situation

- 79 of our female informants live in a partnership and only 43 have children. Of the 38 informants who are young (up to 30) 34 have no children. There are examples of women (e.g. in Belgium) who are divorced and with several children. For them managing timetables is extremely difficult. One woman consultant who needs to travel a lot abroad, is without children.
- In some countries (notably Portugal and France), the women are mainly (and sometimes exclusively) responsible for the family and in these cases private life and obligations shape and limit their career paths. In France several informants followed their husbands, trying to find work in a field where they would not be an obstacle to his career.
- Informants from Italy with small children often have a good support network. Women who had the experience of maternity leave did not find it difficult to get integrated when returning to work. For some, instead of representing an obstacle, maternity leave was a positive occasion for starting something new.

- Some of the successful women (notably in Austria and in Italy) have supporting partners who take over a major part of childcare and household responsibilities. There are a few examples of a partner encouraging the career of the wife in ICT.

Work culture

- Our findings do not support the view that women generally find hostile work environments in engineering firms (D1, p. 84). There are cases of supportive work cultures as well as those of exclusionary and unsupportive ones. No clear pattern emerges, with work cultures being organization-specific, location-specific, and even team-specific.
- As regards the unsupportive work cultures, there are some cases of women with children for whom the culture of the workplace (managers, male and female colleagues) makes their personal situation very difficult. Other negative experiences are related to company strategies, such as restructuring and outsourcing.
- 30 of our informants mention a mentor – a person whose influence and support has had a positive influence on their career. Female and male managers/bosses, professors, fathers, and older brothers acted as mentors. Their main role was to support the woman's career development, opening doors, suggesting career moves, and being supportive. There are several cases of women who were asked to follow their boss into a new project, a new area of work or new company (e.g. ITF14, ITF19, ITF20). AF13's mentor invited her to apply for a job in his company and helped her to negotiate a good salary and the job she wanted. In the case of IREF03 the manager of an IT department advised her to start an evening course and get a diploma and then offered her the opportunity to start work in the department before she had finished her degree. ITF14 first worked part time in her father's graphic art studio and, when joining a publishing company, met a famous art director "who was like a second father", acting as a mentor and teacher. FF03L is still in contact with professors at her university and in this way learned about a new educational programme in web design which radically improved her career. AF11 has a boss who encourages her and gives her the freedom to explore new areas of work. There are two examples of even more significant support. ITF09, who is still very young and open, has an older brother who offered her to join his business activities teaching her the skills she needed to be a competent customer support person. FF05L is very close to her father, who influenced her career choices, opened doors to employment, and helped her set up her own web agency. They are currently planning a joint venture.

Gender issues

- Women tend to deny discriminations and difficulties unless they become evident. However, 30 women report feeling disadvantaged and 28 talk about being faced with prejudices, to 18 out of these women both applies. There are cases of 'sexist and racist humour' to which our informants react in different ways, sometimes also addressing them openly.
- In some companies there is a gendered division of labour, in particular in the lower hierarchy jobs. There are gendered lines between development and network-related tasks, most pronouncedly in the telecommunications industry, which has its roots in electronic engineering. These lines also seem to be more pronounced in web agencies and in multimedia companies, where the more technical jobs (programming) are almost exclusively done by men. In software development there are some cases of women who

are not included in project acquisition activities, e.g. in cooperation projects with industry, assuming customer prejudices against women. This is a clear disadvantage for them. Although balances between technical and non-technical tasks may be gendered, the gendering of work in the ICT sector is not as marked as suggested by previous research (D1, p. 84f.).

- Among some of the Austrian women in particular there is a high awareness of gender issues and these women engage in activities supporting women in the field, for example training courses.
- There are women who enjoy working in (almost) male environments and who feel that they even benefit from their visibility. There is another group who feels uncomfortable in (almost) male environments. Furthermore, there is a difference between older women, who experienced a lot of hostility (when their numbers were increasing) at a time, when diversity was not contemplated, and younger ones whose technical background and competence and familiarity with male environments help them adapt and be accepted.

Training and learning, development and progression

- Learning is an integral part of working in software development and web design. The possibilities for training depend on the size of the organisation. Whereas big software companies, including banks, offer formal training programmes, small work organisations rely on self learning and peer group support. However, as a result of the crisis in the ICT sector, also the large companies reduced their budget for training.
- In small companies, the team and/or informal network of colleagues becomes the training ground, with people benefiting from informal coaching, from talks by team members, and from the many specialized web sites in their field. These kinds of learning are an integral part of the work and highly appreciated characteristic of a supportive work culture.
- Training is a scarce resource on the lower levels of the job hierarchy, more so than in the more qualified areas of work. The lack of training opportunities has in some cases become a critical issue for women who interrupted their career.
- Except in some of the very large companies, career advancements are based on individual performance and are individually negotiated. 20 women mention the lack of career possibilities in their company. These are women who work in web design, project management but also some women in leading positions. 20 informants do not feel sufficiently supported in their work.
- There are some cases of discriminatory development and progression practices (notably in the UK and Ireland).
- Women report on mixed experiences with e-learning, some are rather critical (Belgium), others positive (France).
- Providing training courses in ICT (for women) is an attractive career perspective for some of our informants.

A looking glass on women's biographies

This section presents findings which are based on a set of key data asked for in each interview on the one hand, the coding of the narrative interview material on the other hand (see Annex 2A for the key data sheet and Annex 2B for the coding scheme).
The coding scheme was derived from a first analysis of the interviews when we looked for patterns, not only within but across cultures, capturing common features as well as diversity and contrast in the material. Members of the national teams filled in the coding scheme for each informant. The scheme was organized in several broad categories (derived from the explanatory model described in D3) and contained both, pre-defined categories as well as open descriptions:

- Background (home environment, significant others, career choice, critical life events, etc.)
- Work history (ruptures/breaks, promotion, steps ahead, constraints, etc.)
- Current work (tasks/skill profile, quality of working conditions, workspace, cooperation at work)
- Cultural factors (gender, relationship to technology, etc.)

SPSS for Windows (release 11.0.1) was used for evaluation of key data sheets and coding schemes. We conducted a descriptive analysis, highlighting correlations based on hypotheses, and a cluster analysis. Table 1 gives an overview of the interviewees per country.

		country							Total
		A	B	F	IRL	IT	P	UK	
sex	female	15	15	17	15	15	15	15	107
	male	5	5	4	5	5	4	5	33
Total		20	20	21	20	20	19	20	140

Table 1: Number of female and male informants in each country

We first describe the sample of women using the key data to then present an analysis of the coded material. The final part of this section describes the career patterns we identified with the help of the cluster analysis. (The detailed data on key charachteristics and the varied profiles are presented in Annex 2C and 2D. In Annex 2E the data for the cluster analysis are provided.)

Key characteristics

Age, partners and children

The majority of women we interviewed are between 31 and 40 years old (see Table 2), the youngest is 22 and the oldest 55.

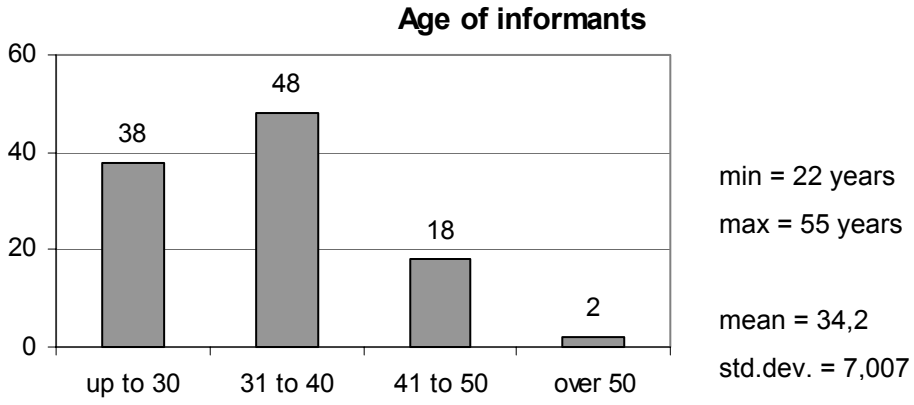
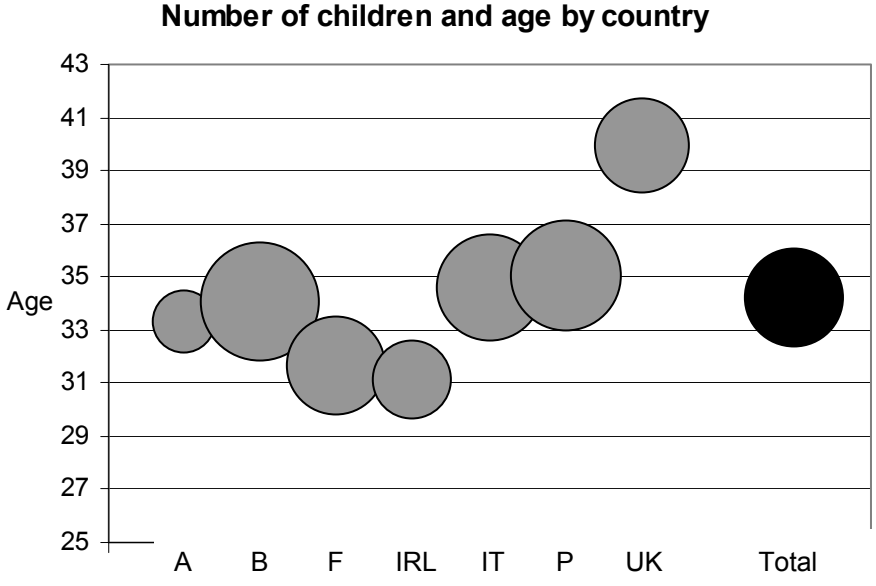


Table 2: Age of informants – frequencies, n = 106 women

79 (74%) of the 107 women live in a partnership. Only 43 (40%) of them have children. The overall average number of children is 0,69 but it differs notably from country to country. Differences between countries may have to do with the ways informants were selected. Table 3 shows the average age of the informants (height of the centre of the bubble) and the average number of children (size of the bubble) for each country. The age of informants is highest in the UK with 8 (of 15) women over 40, and two of them over 50. The number of children is lowest amongst the Austrian interviewees, with 11 of the 15 women having no children, and highest in Belgium and Portugal, with 8 women having children. Most women with children have one child (21 women) or two children (16 women). There are 6 women with three children – three of them live in Belgium, two in the UK and one in France.



	A	B	F	IRL	IT	P	UK	total
average age	33,27	34,07	31,59	31,07	34,60	35,00	39,93	34,20
average number of children (corresponding to the size of the bubble)	0,33	1,00	0,71	0,47	0,82	0,87	0,67	0,69

Table 3: Average age and average number of children in each country, n = 102 women

The low number of women with children could be explained by the low average age of informants. Most of the young women in our sample do not have children (see Table 4).

		3 categories of age			total
		up to 30	31 to 40	over 40	
number of children	0	34	18	8	60
	1	2	16	3	21
	2	1	6	8	15
	3		5	1	6
total		37	45	20	102

Table 4: Number of children by age, n = 102 women

Of the 43 women with children 32 have at least one child younger than 14. Numbers are highest in Portugal (7 women), Belgium and Italy (6 women each). Four of these women do not have a partner, 11 talk about sharing their responsibilities with their partners. In two Austrian cases the partner takes even more than 50% of the responsibility of looking after their child. In another seven cases partners help in the household but not with childcare. Finally, there are nine women who take full responsibility for children and household; five of them live in Italy. Apart from support from their partners, some of the women have nannies, occasional babysitters or domestic help, again mainly in the Italian cases. In five cases family members (mainly mothers and mothers-in-law) are mentioned as helping out with childcare.

Jobs, tasks and companies

Our informants work in many different jobs in ICT. They work in small as well as big companies on different levels of the hierarchy. Some are self-employed, some work in non IT companies but in IT jobs within an IT department of e.g. a bank or insurance company. To capture the diversity of jobs and tasks of our informants, the job titles they gave us together with a short description of the tasks (see key data sheet in Annex 2A) have been used to derive categories of jobs/tasks. These empirically grounded categories are by and large identical with those defined by *Career Space*. However, the narrative material allowed us to describe these job profiles in more detail (see section on conclusions).

We identified seven job profiles. Table 5 lists them in the order of frequencies:

Project management (26 informants): These women have a project management position or are head of a department, but do not have responsibility for personnel. Most of them (17 cases) work in large companies (companies with more than 100 employees); six of these women work in companies with less than 100 employees (small companies).

Developing (24 informants): Their work mainly consists of programming which sometimes also includes analysing and testing the software and/or quality assurance. One woman in this category works as a SAP consultant. Three women who do technical writing have also been included in this category. They write software documentations or educational content. Again most of the informants (14 women) work in large companies, five women work in small ones.

Leading position (19 cases): This category includes women in jobs with responsibility for personnel but also single-person companies. Typical jobs are director of information and technology services or general manager in a software company or technical sales leader. Six of the informants in this category hold a leading position in a large company, another four women have university careers (which was also categorised as a leading position in a large

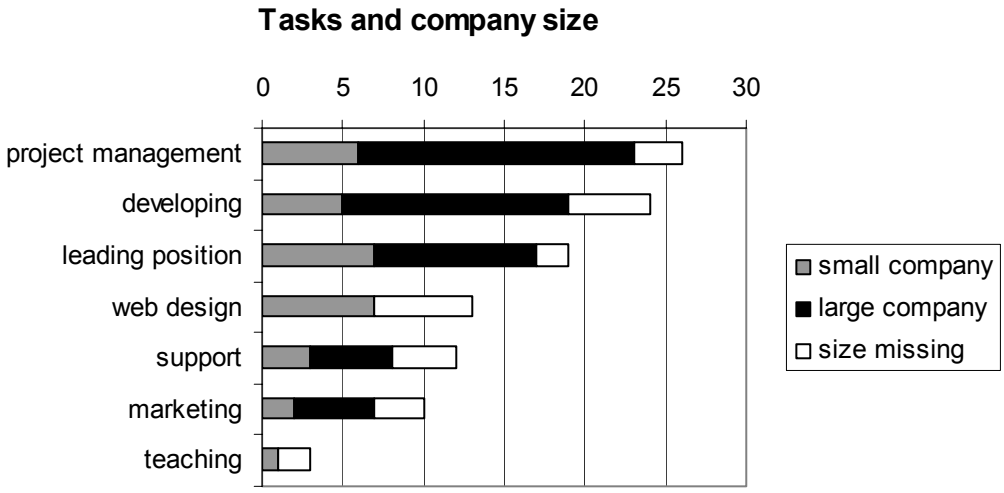
company). One of the women with a university position also has her own company. Seven of the women in leading positions work in small companies (with less than 100 employees). One of these women is self-employed as an independent IT consultant; four work in their own company, which they built and manage either alone or with an associate.

Web design (13 cases): They work as web designer (8 women) or as graphic designer (4 women) and Internet journalist (one woman), mostly in small companies (7 women).

Support (12 cases): These women do server/network administration or work as helpdesk operators. A common job title for these tasks is "IT specialist". Five of the women in this category work in large companies, three in small ones.

Marketing (10 cases): Marketing requires dealing with public and business relations, customer acquisition and sales. A common job title is "Product manager". Five of the women work in large companies, two in small ones.

Teaching (3 cases): Two of our female informants teach computer science (one in a private school, one in a secondary school, both in Italy). Another woman works as ICT trainer at a regional educational institute in France.



	small company	large company	size missing	total
project management + middle management	6	17	3	26
developing / programming	5	14	5	24
leading position / university + single-person company in IT	7	10	2	19
web design + graphic designer / Internet journalist	7		6	13
support / administration / helpdesk	3	5	4	12
marketing / public and business relations	2	5	3	10
teaching	1		2	3
total	31	51	25	107

Table 5: Tasks and company size (in the order of frequencies), n = 107 women

Eleven of our informants are *self-employed*; six of them have been categorized as having a leading position, one as project manager, and one as developer. The remaining three are in web design. Two of these eleven women work as independent IT consultants (one in the UK, one in Ireland who is currently unemployed). Four of the women work as freelancers, two of them in web design (they live in Portugal and Italy) and one is a digital visual and graphic

designer from Italy. One of the Austrian informants has organised IT training courses and seminars for women and is currently finishing her master thesis. Five women have founded their own company, either alone or with an associate, in two cases their husband. A Belgian woman set up a small development firm which has been taken over by another company. She acts as development team manager and has considerable autonomy in running her department. One of the Austrian informants runs a software company in addition to her university position and another one works as director of finances and software development in a company she co-founded with a male colleague. One French woman is head of her own company, another one co-manages an information and communication consultancy together with her husband who is in charge of technology and project acquisition.

Seven of our informants had left the ICT sector at the time of the interview[1]. One of the informants from the UK – she is 52 and took early retirement in 2001 – has worked as a systems batch analyst. Two women – one has worked as PC support in Belgium, another as an independent IT contractor in Ireland – are currently unemployed. Two of the Austrian informants are currently undergoing further education. One of them, who lost her job, follows a self-designed curriculum in "Intercultural IT management" with financial support from a foundation; the other one has gained a scholarship to finish her master thesis in journalism. Two of our informants have changed into a non ICT job. A former client/server development engineer now works as a primary school teacher in France; a former software developer from Ireland also moved into teaching. One of the informants from the UK works part-time as an "e-learning consultant" and part-time as economics professor in a superior school.

Not all the job categories are covered in each country. For example, the three women in teaching live in Italy in France. In all countries there are informants working in project management and in developing, except for the UK none of the informants work in developing and almost half of them in leading positions. Another five of the women in leading positions live in Austria. The women working in web design mainly come from France (5 cases) and Italy (4 cases). Support jobs are frequent among interviewees from Belgium (4 cases) and Austria (3 cases).

The majority of informants entered the ICT sector from the start. Of the 30 women who have worked in another area before moving into ICT, eight are French. A common pattern here was to first explore different (non ICT) jobs in the form of short internships. Interestingly, there are eight cases of women who first worked as teachers: one former maths teacher and one former history teacher in the UK; one Belgian woman who started out as an arts teacher in primary and secondary schools and one as a professor for accounting – she now works as an e-learning consultant in addition; and four of the Portuguese informants, among them a kindergarten teacher (in the US), a mathematics teacher, and an assistant professor of physics at a university.

Inter-company mobility within the ICT sector is rather low. 69 women changed their job/employer not more than once in their career – some of them are quite young. Altogether 38 women changed their job/employer twice or even more often during their career. Mobility is highest in Ireland and Italy, with 7 women in each of the these countries changing their job/employer twice or more often.

The companies in which the majority of our sample (41 cases) works are part of the ICT sector, in the areas such as software, consulting, system house or IT services. 15 women work

[1] The answers in the coding scheme apply to the last job in IT in these cases.

in web design companies, nine in companies with a focus on hardware, another nine in telecommunication companies or Internet providers. 13 women work at universities or in schools or other educational institutions. Finally, 18 women work in companies that are not part of the ICT sector and here in special ICT jobs or in ICT departments. This includes banks, insurance companies, political parties, trade associations, a broadcasting corporation, and a steel trace.

Working hours

Most of our informants work full time as measured by their actual working time; only eight women work less than 35 hours a week (see Table 6). 59 of our informants (55%) work between 35 and 45 hours a week; 75% of those in developing. Mainly women in leading positions work very long hours. Of the 25 women who work between 45 and 60 hours a week, seven are in leading positions and all four with regular working hours of 60 hours and more. There is no correlation between working hours and the type of company the women work in. Informants working in ICT companies as well as those in user companies (non ICT companies) show the same tendency towards long working hours.

	support	web design	developing	marketing	project management	leading position	teaching	total
	1	1		2	2	2		8
under 35	8%	8%		**20%**	8%	11%		7%
	8	7	18	5	17	2	2	59
35 to under 45	67%	54%	**75%**	50%	65%	11%	(67%)*	55%
	3	4	3	3	5	7		25
45 to under 60	25%	31%	13%	30%	19%	**37%**		23%
						4		4
60 and more						**21%**		4%
missing		1	3		2	4	1	11
total in task category (100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

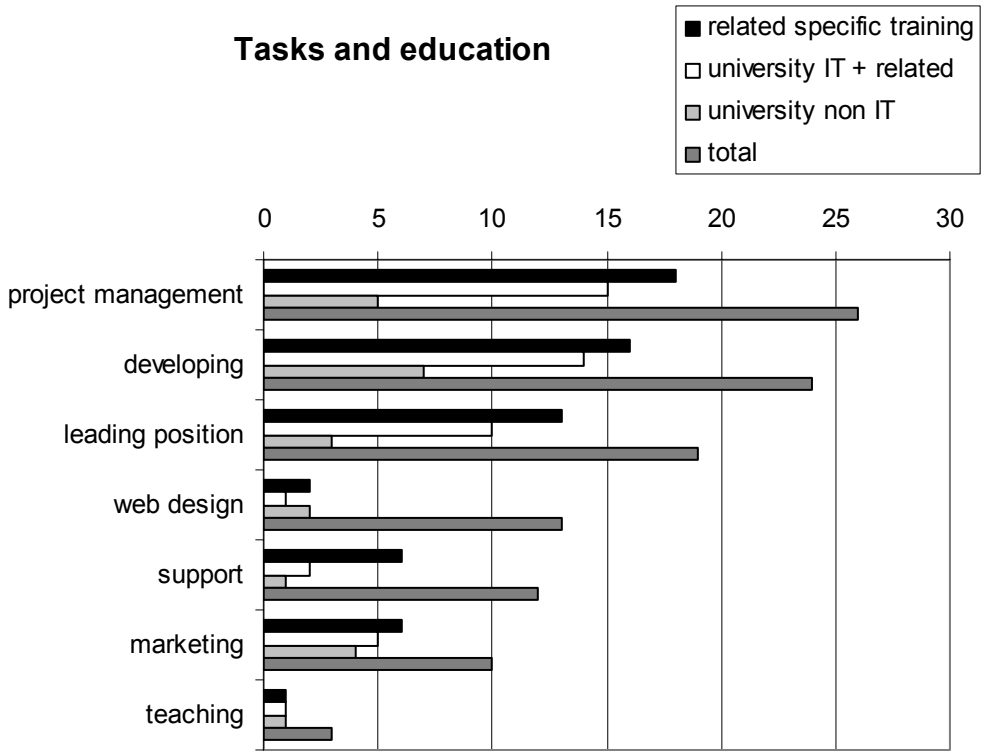
Table 6: Tasks and working hours – frequencies and percentages, n = 107 women

Education and qualification

Of 107 informants 62 have a formal initial education in an area related to ICT (see Table 7); 47 of them a university degree in ICT (and 20 of those have a degree in informatics) or in related subjects like physics or mathematics. Overall there are 48 women in our sample who have a university degree in ICT or related subjects. One of the Belgian informants did her initial training in chemistry where she got a degree and went to the US for her dissertation. Back in Belgium she did a complementary degree in computer science to work as a developer and later on another complementary degree in educational technology for adult education. 23 of our informants have university degrees in non ICT subjects, 9 of them are Irish.

Table 7 shows the relationship between education and job category. Percentages are given for the women in each task category to make them comparable, although absolute frequencies are quite low. Nevertheless we can see that especially informants working in project management

have related specific training (69% of the women in project management). Figures are also high for women in leading positions (68%) and in developing (67%). Women working in web design often do not have related training in ICT (only 15%). 58% of the women project managers and developers have a university degree in IT or a related subject. This also applies to 53% of the women in leading positions and for half of the women in marketing (5 cases). Another four of the women in marketing have university degrees in other subjects, but also seven of the women in developing hold non IT university degrees.



	related specific training	university IT + related	university non IT	total per task
	18	15	5	26
project management + head of internal department	**69%**	**58%**	19%	100%
	16	14	7	24
developing / programming	67%	**58%**	29%	100%
	13	10	3	19
leading position / university + single-person company in IT	68%	53%	16%	100%
	2	1	2	13
web design + graphic designer / Internet journalist	15%	8%	15%	100%
	6	2	1	12
support / administration / helpdesk	50%	17%	8%	100%
	6	5	4	10
marketing / public and business relations	60%	50%	**40%**	100%
	1	1	1	3
teaching	(33%)*	(33%)*	(33%)*	100%
total	62	48	23	107
total	58%	45%	21%	100%

* the percentages are not considered as the overall number of persons in teaching is too small

Table 7: Tasks and education – frequencies and percentages, n = 107 women

Varied profiles: a description

This section describes the data derived from the narrative interviews in more detail, following the structure given by the explanatory variable. Due to the fact that not all topics have been covered in each interview, there is a rather high number of missings [2].

Background

Our informants mainly come from the city (see Table 8): twelve (of 15) Italian informants, seven (of 8) Irish, and six (of 7) Portuguese. While 9 (of 12) UK informants come from small families, eight (of 12) Italian women grew up in a large family. While 40 (37%) women mention having grown up with boys – twelve of them from Italy, for 27 (25%) – most of them from Belgium, France and the UK (6 cases in each of these countries) – this was not the case.

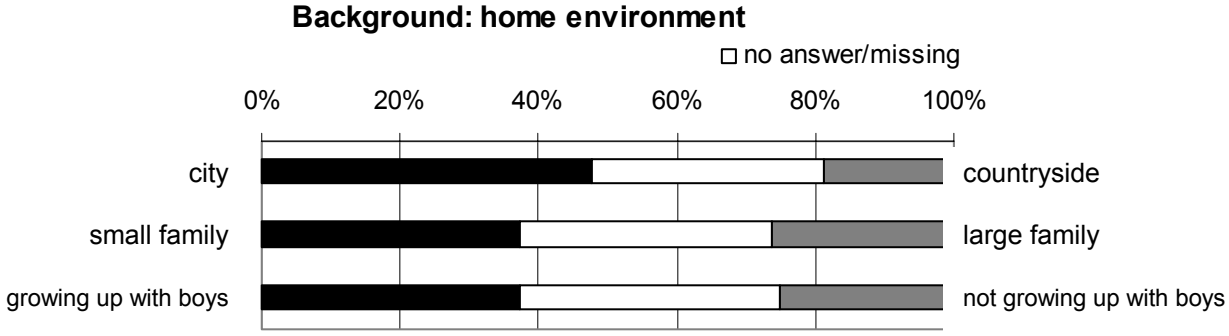


Table 8: Home environment – percentages, n = 107 women

An open question helped identify other relevant factors in the women's home environment. Five women stress the importance of playing with boys and playing computer games; three mention to have been in all girls schools. A few women have an ethnic background and/or come from another country, such as one of the Belgian informants who comes from Spain (via Luxembourg), a UK informant who was born in Sri Lanka, and an Italian woman who was born in Tripoli. She describes herself as coming from a cosmopolitan family. Women point to such varied experiences as "the big freedom" one enjoyed in her family, coming from a "very traditional Italian family where boys and girls are not raised with the same purpose" (one woman who lives in Belgium), or another one about her parents who gave such high value to work. Apart from the family atmosphere special constellations are mentioned as important: divorced parents (2 cases), being the only child (1 case), and having lived for a while with her grandmother after graduating in chemistry. In this case it was the grandmother who encouraged her to re-orient her career – "she saw an add about a post grad in computers and told her granddaughter that this could be a new world with fewer barriers".

Only 20 of our informants have a *technical family background* with their parents working in a technical profession. While in 14 cases it is the father who works in a technical profession (as an engineer, physicist or computer specialist), in three cases the mother has a related profession or education (one computer engineer, one agronomy engineer and one mother with

[2] The numbers of missings are therefore given for each variable. Tables with figures for all variables (frequencies and percentages) are provided in Annex 2D. The answers to open questions of the coding scheme are summarised in those cases where they seemed interesting. Differences between countries and categories of tasks are only mentioned when they are significant.

a degree in mathematics). In three cases both parents work in technical or scientific professions and one Italian woman has a very strong science background in her family, with her father in astrophysics, her mother in bio chemistry, and other close relatives in physics, geology, and chemistry.

There are quite a number of *significant others* who in one or another way influenced the women's career choice (in 81 cases). (Only 16 women do not mention any significant other person of influence). These significant others are family members (62 cases), teachers (15 cases), friends (9 cases), and colleagues (4 cases). Very few (9) of these women felt discouraged, such as the case of a woman whose adoption family did not believe in her, of a widowed mother living in the countryside who feared her young daughter would not succeed with a non-traditional career choice or a father who thought that there were no jobs in the ICT sector. Only two women talk about bad experiences in school – being discouraged from planning a career for herself (one case) or from taking honours mathematics at an all girls convent school.

Most of the experiences the women reflect upon are positive. Especially parents were important in encouraging and supporting their daughters. Eight of the women mention both parents as encouraging them to learn and study. In 18 cases the women stress the importance of the father. Fathers were experienced as role models (11 cases), as generally supportive (11 cases), and in only six cases they provided their daughter with computers/expertise. One of the fathers is described as explaining how things work, the daughter being a companion in all kinds of hands-on work and tinkering. One woman mentions that she like her father likes electronic engineering, "so this must be hereditary". In sum, fathers are the ones who explain to their daughters how computers work, they act as role models, and in some cases they gave advice in the search for a job. Often been given the freedom of choosing their own career is mentioned as decisive.

Mothers also play a major role in supporting their daughters (15 cases). Mothers are mainly mentioned as role models (8 cases) and as generally supportive and encouraging (8 cases). In three cases it was the mother who introduced the daughter to computers. One woman from Italy describes her mother as very dynamic and extroverted. Another Italian woman was influenced by the entrepreneurial attitude of her parents and especially by her mother's spirit of autonomy. Parents' support is mentioned in particular in the case of our Italian informants (13 cases).

Siblings were influential in the case of ten women (3 of them from Italy). In five cases it was the brother who provided computers/expertise. Both, brother and sister of an Austrian informant work in technical fields, but it was especially the older brother whom the young woman admired and who actively supported her. One Irish and one French woman talk about encouragement from their sister, while in two French cases the women did not follow their mother's and sister's role model, all of them teachers. In some cases (8) women got support from other family members, such as husbands (3 cases), grandmothers, the family-in-law and an aunt. Nine women mention friends as important. 14 women talk about their teachers as having been encouraging but in only five cases teachers were the ones who provided computers/expertise and in one case the mathematics teacher was experienced as role model. Four women mention support from their first employer, a mentor in the company or the manager of the company, and one woman got encouraged by a woman she worked with as librarian.

Many women had support from others, but most of our informants see their *career choice* as having been taken independently (85 cases, 79 %, see Table 9). In 19 cases (18%) women had

to assert themselves against contrary expectations. More than half of our informants (55 cases, 51%) look at their career in ICT as having grown out of opportunities – a career choice "by chance" in contrast to focused (which applies only to 21 cases).

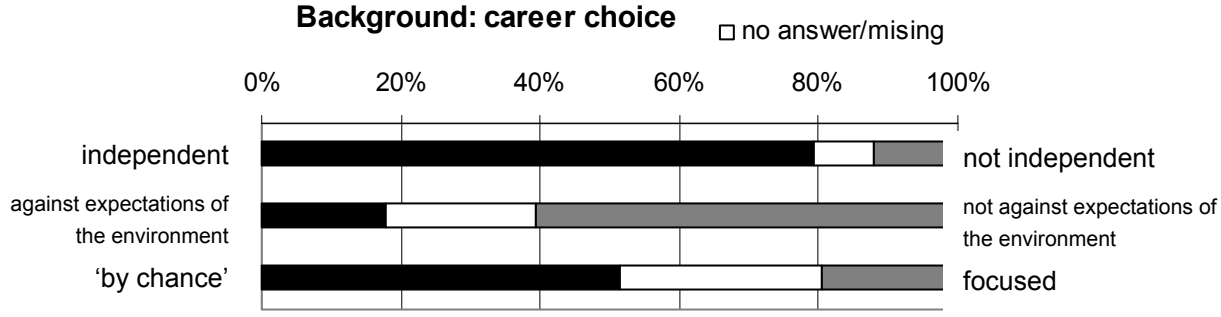


Table 9: Career choice – percentages, n = 107 women

By far the most dominant *motivation* for the women to move into ICT is their interest in the field (62 cases). But it is not always clear if this was the original motivation for their career choice. It rather seems that for some women the interest in the field emerged after they had started to work in ICT. For only nine women (3 of them Irish) the salary was the decisive factor. 25 of the women looked at a job in ICT as offering opportunities in one or the other way, mostly to find a (good) job. For some informants moving into ICT offered the chance to find a new (more interesting) job, to move away from their region of origin or to return to the labour market after having children. Some women chose ICT by elimination, such as those two women who did not want to follow the role model of an older sister or the case of a woman who was interested in mathematics, had a limited choice at university, and wanted to "do something different from what women normally do".

Factors shaping the women's careers

In this section we describe the diversity of women's career paths. We identify ruptures and breaks, look at support at work and promotion, at perceived constraints, and at the women's plans for their (professional) future.

Ruptures or breaks in their career have been experienced by 30 of our informants. In 19 cases the fact of taking maternal leave caused a career break. This is less frequent than may be expected – one (of 8) cases in Portugal, two (of 8) cases in Belgium, five (of 7) cases in France. Among those who did experience maternal leave as a career break, eight work in leading positions and four in project management.

Twelve of our informants – four of them in project management, three in a leading position – think that they made a wrong career move at some point. One got the wrong education and entered the ICT sector without a degree; another one with an MA in physics decided to abandon a career in academia and started to work as analyst programmer. While these are examples of women who moved into ICT from another profession and/or education, there are also examples of having taken a wrong career step, such as an Austrian woman who worked as a high-level project manager in a steel company and applied for the position as head of sales in a subsidiary. Economic difficulties of this firm forced her to go back to her old position and from there into the internal training department.

As regards *renouncements and regrets* (open question in the coding scheme) mainly bad decisions in education, such as not getting a degree or not going to university, are mentioned (6 cases). In five cases the women feel they are in the wrong job or followed a wrong educational path and one woman regrets that she did not go abroad during her studies because of her boyfriend. Among the things these women would have preferred are working as an architect (2 cases), doing something more artistic and creative, being an actress, and working in a web profession. Three women missed out important professional opportunities, such as not having moved to Rome to an interesting position because of her family, or having left their job in a good company (one Italian and one Irish case). Two women regret not having enough time for their children. In two cases women had many different jobs or a succession of short contracts. One of these women finally ended up in a company where it was possible to work part-time.

As regards *promotion and support at work*, women's experiences are not so good. 17 women (16%) express that they are in a dead end position. One of these women has taken early retirement, another one works as a teacher now. Seven of the women in a dead end position work in project management. One woman working in developing has no possibility to get a part-time job. There are three cases of women working in small companies or small departments who do not see the opportunity for a career move. While 30 women (28%), eight of them now in leading positions, mention having (had) support from a mentor, 38 women (36%) had "to do everything themselves".

Asked for their *plans for the future,* 36 women (34%) would like to move into project coordination; another 34 (32%) want to have more to do with clients, 27 women (25 %) want to do more conceptual work, 17 women (16%) more design activities, and 11 women (10%) want to move into project acquisition. Career plans are not evenly distributed over job categories. (see Table 10 – the highlighted figures are the highest percentages for each future plan). Women in project management are the most explicit concerning future career steps with half of them planning to move into project coordination, another half (46%) wanting to have more to do with clients, about a third to do more conceptual work, and 19% to move into project acquisition. 38% of women in web design want to do more conceptual work, and 31% more design activities.

We also looked for career steps the women envision. Only 36 women (34%) want to gain a leading position, while for 49 women (46%) this is not their career goal. 29 women (27%) – 11 in project management, 6 in developing – plan to change employer/company. Numbers are especially high in Belgium (11 women). Finally there are 8 women (7%) who would like to go abroad.

	support	web design	developing	marketing	project management	leading position	teaching	total
in terms of work								
	1	2	10	2	13	8		36
move into project coordination	8%	15%	42%	20%	**50%**	42%		34%
	1	3	6	4	12	7	1	34
have more to do with clients	8%	23%	25%	40%	**46%**	37%	(33%)*	32%
	1	5	5	1	9	4	2	27
more conceptual work	8%	**38%**	21%	10%	35%	21%	(67%)*	25%
		4	4	2	4	2	1	17
more design activities		**31%**	17%	20%	15%	11%	(33%)*	16%
		2	2	1	5	1		11
move into project acquisition		15%	8%	10%	**19%**	5%		10%
in terms of career steps								
		5	7	3	13	8		36
gain a leading position		38%	29%	30%	**50%**	42%		34%
	3	3	6	2	11	3	1	29
change employer/company	25%	23%	25%	20%	**42%**	16%	(33%)*	27%
		1	3	1	3	2	2	12
get self-employed		8%	13%	10%	12%	11%	(67%)*	11%
	1		2		3	2		8
go abroad	8%		8%		12%	11%		7%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 10: Steps ahead / plans for the future by task category – frequencies and percentages, n = 107 women (variables in the order of frequencies)

Other plans for the future are: to get a permanent position, to always do and learn something new, to find a part time job, to work fewer hours, and to work from home.

Looking at the *requirements* for advancing in their field, 39% of our informants (42 cases) say that they would need additional training, while for 42% (45 women) this does not seem to apply (see Table 11). Especially informants in Portugal (12 cases) and France (11 cases) mention the need for additional training. As regards job category, it is mainly women in project management who mention additional training (14 cases) but not those in developing (with 13 women not mentioning the need for more skills and training). 30 women (28%) – 12 of them Portuguese and, again, many (10) from project management – think that a career in their field would require working longer hours.

	support	web design	developing	marketing	project management	leading position	teaching	total
requirements								
	2	5	9	4	14	6	2	42
additional training	17%	38%	38%	40%	**54%**	32%	(67%)*	39%
	2	4	7	3	10	4		30
longer hours of work	17%	31%	29%	30%	38%	21%		28%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 11: Requirements by task category – frequencies and percentages, n = 107 women (variables in the order of frequencies)

26 of our informants, many of them (11) in project management, do not see higher positions as attractive (see Table 12). Arguments are that a manager does not have any private life or that a higher position means too much pressure and involves dealing with political matters – aspects that are seen negatively by some.

	support	web design	developing	marketing	project management	leading position	teaching	total
constraints								
	2	1	5	2	11	4	1	26
higher positions not seen as attractive	17%	8%	21%	20%	**42%**	21%	(33%)*	24%
	2	4	1		6	5	2	20
lack of career possibilities	17%	**31%**	4%		23%	26%	(67%)*	19%
		2	4	2	7	5		20
lack of support		15%	17%	20%	**27%**	26%		19%
		1	1		1	2		5
age		8%	4%		4%	11%		5%
	2		2					4
lack of degree	17%		8%					4%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 12: Constraints by task category – frequencies and percentages, n = 107 women (variables in the order of frequencies)

A major *constraint* is the lack of career possibilities (20 cases). This observation applies especially to those working in web design and in project management, but also to some women in leading positions. Another 20 informants do not feel sufficiently supported in their work. Five women, two of them in leading positions, experience their age as a constraint. One is a 55 years old independent IT consultant, the other one, aged 47, general manager in a software company, both from the UK. Furthermore, a programmer working in the IT department of a bank in Austria (age 45), an ICT project manager in Portugal (age 38), and a

webmaster in France (age 37 years). Only four women, three of them in the Austrian sample, mention not having a degree as a major career obstacle. Two of them work in support, and two in developing. There are two cases of women who do not feel sufficiently qualified. One had difficulties with computing from the beginning of her professional life; another one, although quite successful in her job, feels insecure in her position as a project manager due to her lack of in-depth technical knowledge. Two Portuguese women mention the crisis of the national economy. Three women point to the structure of their company with few levels of hierarchy as constraints.

Support from partners

79 (74%) of the 107 women interviewed have a partner. 38 of these partners (in 9 Irish and 7 Portuguese cases) have a profession close to their field of work (see Table 13). While most partners (56 men) seem to be supportive of the women's careers, in five cases (2 in Portugal, 2 in Italy) the male partner is critical of the woman's professional commitment. Of these five four work in the same field as their spouse – the situation of both partners working in ICT jobs can be quite stressful. One of the women remarks that her partner would prefer her to have a more "quiet" job; another one says that their both working in the ICT area makes organizing childcare rather complicated. However, the majority of men who work in the same profession are supportive of their partners' careers (in 31 of 38 cases).

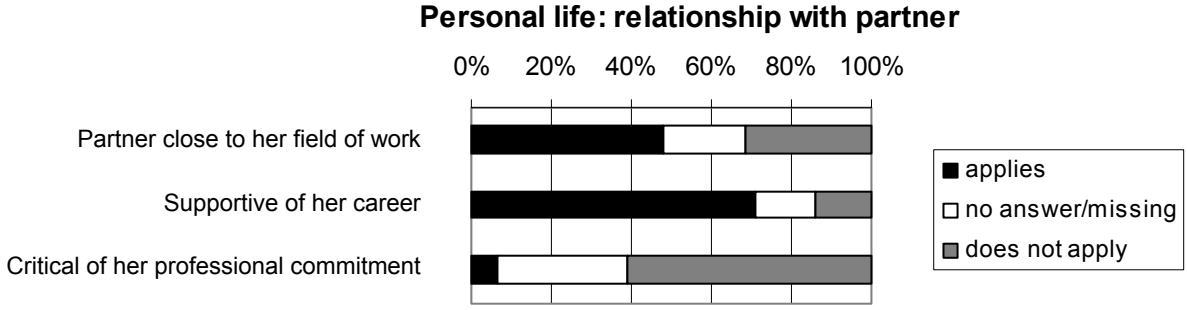


Table 13: Relationship with partner – percentages, n = 79 women

Working conditions

We asked for *salaries and work contracts* (see Table 14). Most women (83 cases) are content with their contract conditions and the majority (68 cases) think that their salary is adequate. However there are 20 women who do not think so, ten women explicitly mention unfavourable contract conditions, five of these are dissatisfied with both. The cases of inadequate salaries come from Italy (6 cases), the UK (4 cases), and Belgium (4 cases). Five of the women with bad salaries work in support jobs, but there are also cases in project management (5) and in web design (4). Three out of the ten women with unfavourable contract conditions are French.

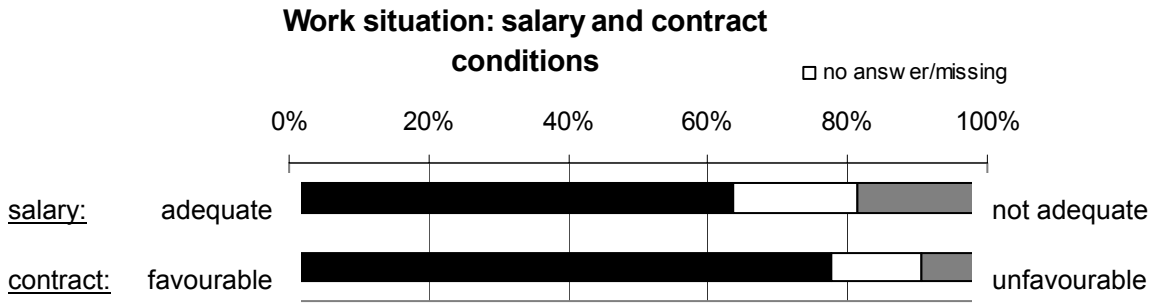


Table 14: Salary and contract conditions – percentages, n = 107 women

As concerns the *quality of working conditions*, 68 of the women (64%, see Table 15), most of them in leading positions and in project management, describe themselves as enjoying a high level of discretion/freedom in their work. Work in support jobs and in developing seems to be more pre-defined and constraining. 57 women (53%) face high work loads, fewer (38 cases, about half of them in leading positions and project management) report on high levels of stress.

Mothers of young children (up to 14 years) more often complain about high levels of stress – 15 (56%) of 27 women as compared to 23 (37%) of 63 women without caring responsibilities. Even more of them mention high work loads – 22 (79%) of 28 women with young children as compared to 35 (56%) of 63 women without young children.

Half of our informants (49%) have flexible working time, for 35% this does not apply. There are variations across job categories, with more flexibility in leading position (63%) and in web design (62%), considerably less in support jobs. We saw a variety of arrangements for flexible working time: Some women (11 cases) are entirely free in organising their working time, be it that they are their own bosses or that nobody controls them. Others have a flexible daytime, giving them discretion over arrival and leaving times (8 cases). Another possibility is to take hours off to compensate for overtime (5 cases) or to be allowed to work from home, which sometimes is reduced to checking e-mails in the evening or to take work home for the weekend (5 cases). Four of our informants mention that flexible schedules are dictated by their employer or that their timetable is controlled by clients' needs. In 33 cases "total availability" seems to be required. This applies mainly to those working in project management (11 women) and developing (10 women).

	support	web design	developing	marketing	project management	leading position	teaching	total
high level of discretion/freedom	6	10	9	4	21	16	2	68
	50%	77%	38%	40%	81%	**84%**	(67%)*	64%
no high level of discretion/freedom	6	2	11	2	3	2	1	27
	50%	15%	46%	20%	12%	11%	(33%)*	25%
high work loads	7	7	10	5	16	11	1	57
	58%	54%	42%	50%	**62%**	58%	(33%)*	53%
flexible working time	4	8	11	5	11	12	1	52
	33%	62%	46%	50%	42%	**63%**	(33%)*	49%
no flexible working time	7	4	11	3	7	3	2	37
	58%	31%	46%	30%	27%	16%	(67%)*	35%
high levels of stress	2	4	7	5	10	10		38
	17%	31%	29%	50%	38%	**53%**		36%
total availability required	3	2	10	4	11	3		33
	25%	15%	**42%**	40%	**42%**	16%		31%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 15: Quality of working conditions by task category – frequencies and percentages, n = 107 women (variables in the order of frequencies in positive answers)

Women's accounts of their *tasks and responsibilities* suggest that for the majority (96 cases) their job offers the opportunity to deploy their skills/competencies (see Table 16). Only in eight cases this does not apply, suggesting that the women may feel underemployed or not sufficiently challenged in their current job. Three of them have leading positions – one a general manager of a software company (UK), one a senior lecturer for computer studies at a university (UK), one an integrated technology services director (Portugal). Among the other five there are a former systems batch analyst, who took early retirement (UK), as well as two developers – one from Italy and one from Ireland who now works as a teacher.

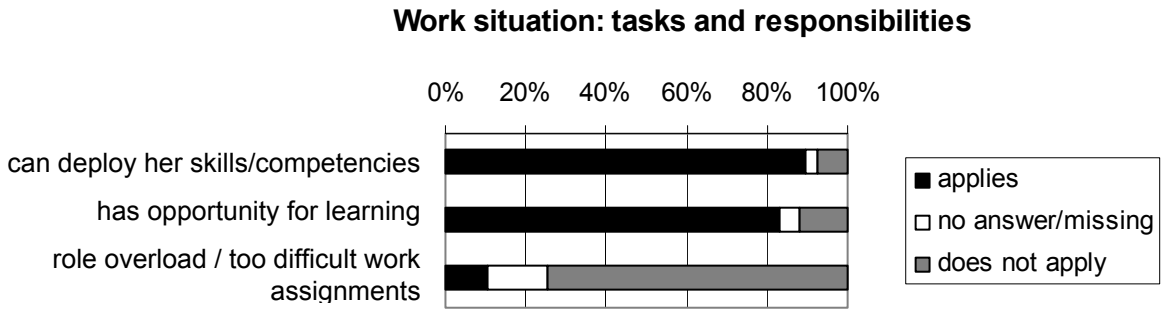


Table 16: Tasks and responsibilities – percentages, n = 107 women

While most our informants (89 cases) have the opportunity for learning in their jobs, 13 women (4 in project management, 3 in developing, 3 in a leading position, one in support, in web design and in teaching) say that this is not the case. Although in many cases women have the possibility to learn, they have to organise this for themselves. In two countries – Portugal and Belgium – economic difficulties are mentioned as reason for less training opportunities.

Role overload and too difficult work assignments are mentioned by eleven women, six of them Portuguese and five of these six in project management. An Irish woman who was promoted to a team manager position, but did not enjoy her managerial responsibilities remarked occasional role overload. Two of the women mentioning difficult work assignments are in leading positions, two in developing, one in web design, and one in support (in Belgium). She thinks that her boss sometimes sends her to too difficult missions in too technically sophisticated firms.

Team work is widespread in the ICT sector (see Table 17). While 64 of our informants work in environments where team work prevails, 26 women mainly work alone and ten engage in both forms of work. While in support jobs solitary work dominates, developing is in large parts team work.

	support	web design	developing	marketing	project management	leading position	teaching	total
	6	6	4	1	4	3	2	26
solitary work prevails	**50%**	46%	17%	10%	15%	16%	(67%)*	24%
	6	6	18	6	16	11	1	64
working in teams prevails	50%	46%	**75%**	60%	62%	58%	(33%)*	60%
		1	2	2	3	2		10
both		8%	8%	20%	12%	11%		9%
total in task categories(100%)	12	13	24	10	26	19	3	107

* the percentages are not considered as the overall number of persons in teaching is too small

Table 17: Solitary or team work prevailing by task category – frequencies and percentages, n = 107 women

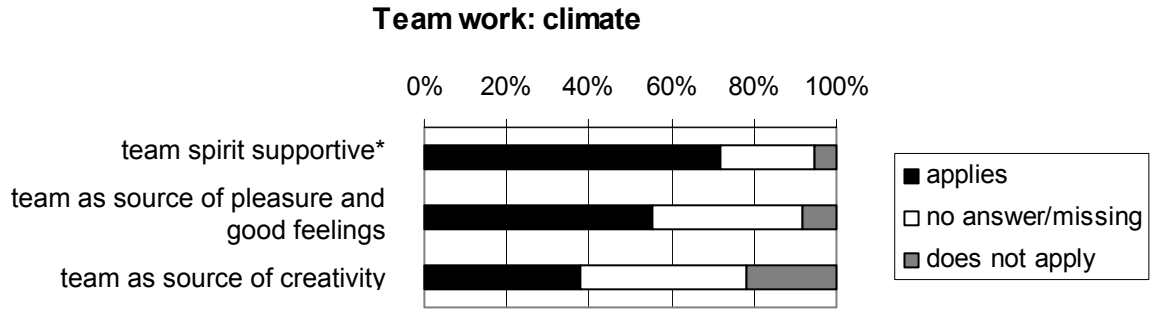
Of the 74 women who mainly work in teams, 35 work in open, project-dependent teams, 22 in stable teams, and in 11 cases both applies (see Table 18). While for women in marketing and in developing it is common to work in open teams, those in leading positions (and in support if they work in teams) tend to work in stable teams.

	support	web design	developing	marketing	project management	leading position	teaching	total
open, project-dependent	1	2	11	7	10	3	1	35
teams	17%	29%	55%	**88%**	53%	23%	(100%)*	47%
	5	2	6		3	6		22
stable teams	**83%**	29%	30%		16%	46%		30%
		1	3		5	2		11
both		14%	15%		26%	15%		15%
total in task categories(100%)	6	7	20	8	19	13	1	74

* the percentages are not considered as the overall number of persons in teaching is too small

Table 18: Open, project-dependent or stable teams – frequencies and percentages, n = 74 women

Teams are mainly experienced as supportive (53 of 74 cases) and only in a few cases (4) as competitive. Some women (5) experience teams as a mixture of both (see Table 19). For about half of the women (41 of 74 cases) the team is a source of pleasure and good feelings and for another 28 women a source of creativity.



* "missing/no answer" values include those 5 cases where the team spirit was indicated as both: supportive and competitive

Table 19: Team spirit – percentages, n = 74 women

Cultural factors

The coding scheme provides data concerning two cultural factors – aspects of gender and women's relationship to technology. Tables 20 and 21 list the corresponding variables in the order of frequencies of positive answers.

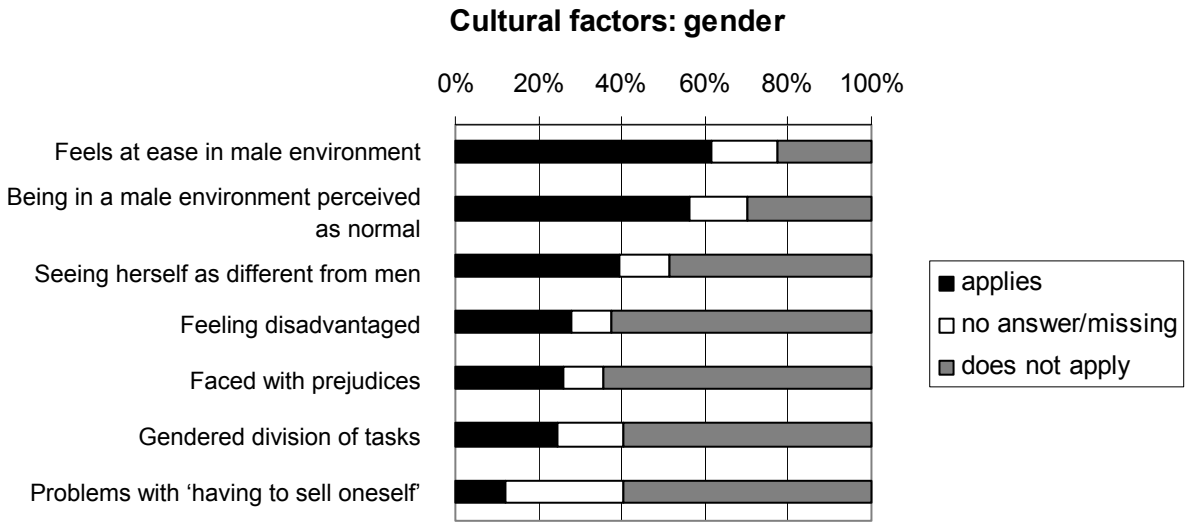


Table 20: Gender – percentages, n = 107 women

Concerning *gender* aspects we see that the majority of the women feels at ease in a male environment (66 cases, 62%, see Table 20). Moreover most of them perceive being in a male environment as normal (60 cases, 56%). Only one woman perceives a male environment as normal but does not feel at ease in it. In particular women in developing (18 cases) and in project management (15 cases) feel at ease in a male environment. Having grown up with boys does not seem to make a difference in this respect. Positive perceptions are most frequent in Belgium (13 cases), Ireland (11 cases), and France (10 cases). Of the 24 women

(22%) who do not feel at ease in the male environment, the majority comes from Austria (6 cases), the UK (6 cases), and Portugal (6 cases).

While 42 of our informants (39%) perceive themselves as being different from men, to 52 women (49%) this does not apply – among them more often young women. Interestingly, women in leading positions, more often than those in other jobs, see themselves as different from men (13 cases). About the same number of women feels either disadvantaged (30 cases) or faced with prejudices (28 cases). The two variables are highly correlated: In 18 cases women feel disadvantaged as well as confronted with prejudices. Being exposed to prejudices is weakly correlated with a gendered division of tasks in the company, which applies in 29 cases. 13 of our informants (12%), seven of them in project management, mention problems with "having to sell themselves".

The women's *relationship to technology* is overwhelmingly positive. The majority of our informants experience technology as source of competence and high achievement (73 cases, 68%, see Table 21). For 59 women (55%) technology is a 'natural' element of everyday life. This applies in particular to informants in Portugal (13 cases), Belgium (11 cases), and Italy (10 cases). 53 women (50%), many of the Portuguese (12) and French (10) cases, experience technology as a source of creativity. These positive connotations are comparably frequent in web design and in marketing (69 and 60% compared to an average of 50%).

In a few (8) cases technology is a source of anxiety and feeling of incompetence (see Table 21). These women work in different jobs on different levels of hierarchy. Three of the project managers (2 Portuguese, one Belgian) and a visual graphics designer from Portugal mention feelings of anxiety and incompetence towards technology. Interestingly, this also applies to two women in leading positions: one, a Portuguese informant, works for a computer service provider that is operating worldwide, and a woman from the UK is director of information and technology services in a trade association. While the Portuguese woman characterises technology as "a source of stress and invasion", a Belgian project manager dislikes technology and is satisfied as long as she manages "to type her text in Word". Two of the Irish developers refer to the high level of technical competence required in their job as creating anxiety. This, however, seems to diminish with experience.

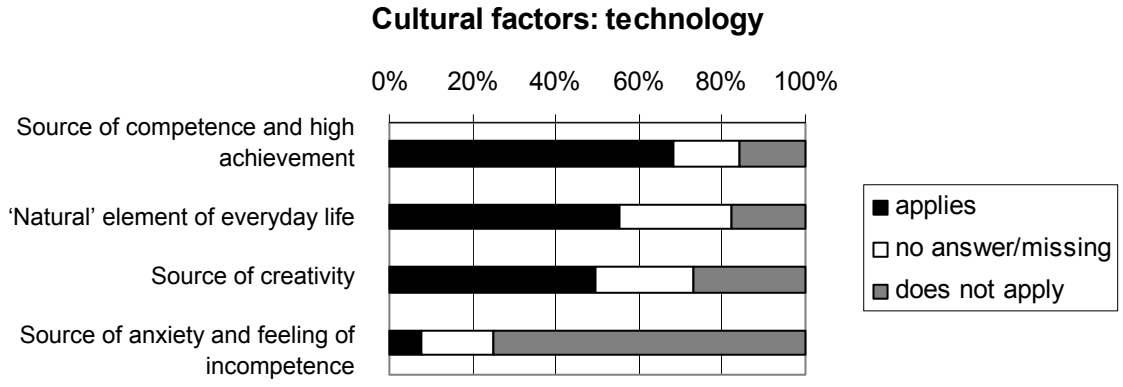


Table 21: Relationship to technology – percentages, n = 107 women

Career patterns – the result of a cluster analysis

This section describes our sample of 107 women not only in terms of single variables but identifies groups of informants that have some characteristics of educational background, job, and work experience in common. A cluster analysis was used to help identify these different career patterns.

In a first step variables were selected for the cluster analysis[3]. Age and tasks were considered. They were re-coded into binary variables with three categories of age (under 30, 31 to 40 and 41 and older) and seven job categories (as described above). Attributes of women's personal life were considered, such as living in a partnership, having caring responsibilities for children, and having a partner who is close to her field of work or supportive of the woman's career. Informants' background was included, taking into account if they have grown up with boys, if they had parents with a technical professional background or encouraging mothers, fathers or teachers. Furthermore their education, characteristics of their career path and their work situation as well as gender aspects and their relationship to technology were considered.

In a first explorative round of cluster analysis the Ward linkage method was used as suggested by Backhaus et al. (2003) with the binary squared Euclidean distance measure to get a good first impression of possible clusters. After this first round a number of eight clusters seemed reasonable. For the second round variables that did not contribute to the clustering were excluded[4]. Others were transformed or replaced[5]. University degrees (in IT and related subjects as well as other university degrees) were included in the analysis, so that in the end 28 variables were considered (see Table 1 in Annex 2E).

In a next step the Jaccard distance measure was used as suggested by Moosbrugger and Frank (1992). It is more appropriate for binary variables, especially for asymmetric ones as used in our case. As the results with this method were not really conclusive we finally ended up using the Rogers and Tanimoto distance measure (described in Kaufman and Rousseeuw 1990). It has the effect that the tasks and age categories get more weight in the analysis. This turned out to be an advantage. Using the Complete Linkage algorithm distinct and conclusive clusters emerged (for detailed data on the clusters see Table 2 in Annex 2E). Again a number of eight clusters was most appropriate. While some of these patterns are close to the life story patterns described below, some highlight other aspects of the women's careers.

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3 All variables used in the cluster analyses were re-coded into binary variables with the value 1 representing the presence of the characteristic and 0 representing absence. Missing values were re-coded as 0. Variables with many 0 values were not considered as they would not contribute to the forming of clusters and could lead to the distortion of the result. For highly correlated variables (e.g. the variables concerning gender) those were chosen that were most expressive.

4 Excluded variables are: "living in a partnership", "technical background of the parents", "encouraging mothers", "supporting fathers", "encouraging teachers", "independent career choice", "maternal leave as career break", "has to do everything herself", "high level of discretion/freedom", "gendered division of tasks"

5 The variable "no flexible working time" was used instead of "flexible working time" and "no adequate salary" instead of "salary adequate". The variable "high work loads" was replaced by "high levels of stress". The task categories were recoded.

Cluster 1 Chance careers

Chance careers (20 women)

- Age: under 30 (13)
- Tasks: web design (6), developing (5)
- technology as source of competence and high achievement (16)
- growing up with boys (11)
- career choice ‚by chance' (11)
- large company (8)
- team as source of pleasure (8)
- no flexible working time (7)
- salary not adequate (5)

Many women in Cluster 1 are quite young (under 30). They come from a diversity of educational backgrounds, mostly non-IT degrees. Many of them encountered ICT and job opportunities in the sector 'by chance'. Some of them, especially women from the UK, started to work in clerical jobs before moving into the ICT sector. While a few have jobs in multimedia and online-journalism, the majority works in web design and developing. The fact that jobs in web design tend to be low paid may be the reason, why some women in this cluster judge their salaries as not adequate.

About half of the women in Cluster 1 have grown up with boys, some of them come from the countryside, and many of them have been attracted into ICT by the opportunity for a job and for professional development.

Cluster 2 Open careers with strong IT background

Open careers with strong IT background (24 women)

- Age: under 30 (20)
- Tasks: developing (7), project management (5), support (4)
- related specific training (21), university degree in IT or related (15)
- technology as source of competence and high achievement (18)
- team as source of pleasure (16)
- career choice ‚by chance' (11)
- supportive partner (11)
- support from mentor (10)
- large company (10)
- no flexible working time (7)

The women in this cluster are also predominantly young and, in contrast to those in Cluster 1, most of them got their (initial) training in ICT. Almost two thirds of them even have a

university degree in IT or in a related subject. Most of them have positive job experiences and some already have quite successful careers. Nearly half of them mention a mentor, who helped them or still supports them. In this cluster we also find some of the young women we describe as 'open and not yet having arrived' in our life story patterns, especially the Austrian informants, but also women from Belgium and Italy.

Cluster 3 Consolidated careers

Consolidated careers (15 women)

- Age: 31 to 40 (14)
- Tasks: project management (9)
- related specific training (15), university degree in IT or related (13)
- technology as source of competence and high achievement (12)
- large company (11)
- growing up with boys (9)
- supportive partner (8)
- higher positions not seen as attractive (7)
- few: caring for children (5)

Women in this cluster have similarities with those in Cluster 2, but they are older (between 31 and 40) and already more advanced in their careers, with more professional experience. All of them have ICT related education and nearly all of them have a university degree. This is a group of highly qualified and successful women with what we call 'consolidated' careers. Nearly two thirds of them work in project management. These are mainly women in leading positions, some of them satisfied with their present position but some of them very ambitious. Only one third names caring responsibilities for young children. Some have very straight careers, e.g. university careers of Austrian women or other straight careers towards management positions of Belgian or British women.

Cluster 4 Women in leading positions

Women in leading positions (13 women)

- Age: 41 and older (10)
- Tasks: project management (5), leading position (6)
- supportive partner (12), partner close to her field of work (10)
- technology as source of competence and high achievement (10)
- large company (9)
- high levels of stress (9)
- related specific training (8), university degree in IT or related (8)
- career choice ‚by chance' (8)
- caring for children (8)
- support from mentor (6)

The women in Cluster 4 are on the average older than the women in the other groups (41 and older). They have reached leading positions, including higher level project management. Nearly all of them have straight careers with an IT background, many hold a university degree. What is remarkable is the high proportion of supporting partners the women refer to, many of them working in a field close to theirs. This evokes men who are understanding and helpful concerning their partner's work situation (and not necessarily share family responsibilities). Among the women in this cluster we also find a number of self employed women, some heading their own company (Austria), but also directors (France, Portugal) and heads of department.

Cluster 5 Reorientation careers

Reorientation careers (8 women)

- Age: 31 to 40 (7)
- Tasks: web design (3), marketing (2), project management (2)
- university degree in non IT subject (7)
- career choice ‚by chance' (6)
- caring for children (5)
- technology as source of competence and high achievement (5)
- no flexible working time (4)

In Cluster 5 we mainly find women who at some point re-oriented their career towards ICT, coming from a diversity of educational backgrounds. Many of them entered the ICT sector because an opportunity opened up. Nearly all of these women have university degrees in non-IT subjects, one worked as a kindergarten teacher before. The women in this cluster also have a great variety of jobs and skills. Some are working as web designers, some in marketing, and two in project management. Many women in this group have caring responsibilities for young children.

Cluster 6 Mobile careers

Mobile careers (12 women)

- Age: 31 to 40 (9)
- Tasks: web design (3), developing (3), project management (2), leading position (2)
- mobility in IT (11)
- supportive partner (11), partner close to her field of work (8)
- career choice ‚by chance' (9)
- gender: feeling disadvantaged (7)
- caring for children (6)
- salary not adequate (6)
- not: technology as source of competence and high achievement (1)

Most of the women in Cluster 6 can be described as mobile in the sense that they have had several jobs in the ICT sector. Especially some French women show a special kind of mobility – they follow their husbands and look for a new job in a new region. These women also mention the support of their partners, some of them especially the career support. Many of the informants in this cluster have an arts background. This led them into jobs in journalism (France), multimedia (France), and technical writing (Ireland). Quite a few of them mention being disadvantaged. In this cluster we find some of the women with 'broken or fragile careers'.

Cluster 7 Low hierarchy jobs

Low hierarchy jobs (5 women)

- Age: 31 to 40 (4)
- Tasks: support (3), developing (2)
- career choice ‚by chance' (5)
- no flexible working time (5)
- gender: feeling disadvantaged (5)
- related specific training (3)
- team as source of pleasure (3)
- not: technology as source of competence and high achievement (1)

In this small cluster we find women who express feeling disadvantaged. Some have low qualifications and all of them work in low hierarchy jobs in support and developing. They do not feel comfortable in their jobs, complain about low pay and they do not have flexible working time. They tend to feel insecure and entered the ICT sector 'by chance'.

Cluster 8 Good careers with some constraints

Good careers with some constraints (10 women)

- Age: 31 to 40 (8)
- Tasks: developing (4), support (2), leading position (2)
- technology as source of competence and high achievement (10)
- related specific training (9), university degree in IT or related (7)
- large company (7)
- no flexible working time (7)
- gender: feeling disadvantaged (5)

Most of the women belonging to Cluster 8 have an IT background (9 of 10), some of them also a university degree, and they are technology-oriented. Many of these women are 'struggling' against adverse conditions, such as lack of job opportunities in the field (Italy), low salaries (Italy), mobbing (UK). One of these women feels unhappy in her job and

therefore wants to leave it for having a family (Ireland). However, some of the women in this group have good jobs and good careers and most of them high IT related qualifications.

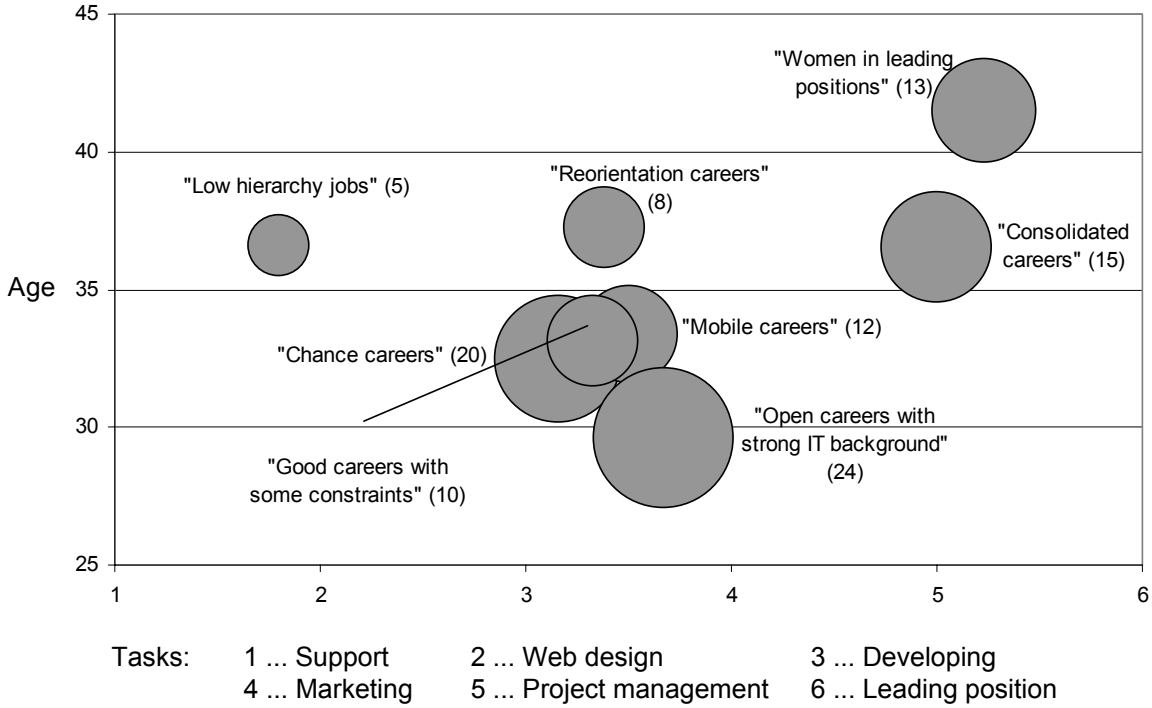


Table 22: Average age and "average" tasks in the clusters (the size of the bubble corresponds to the number of informants in the cluster), n = 107 women

Table 22 shows all the eight clusters, the distribution of frequencies based on the average age and tasks. The size of the bubbles corresponds to the number of persons included.

Most of our female informants were under 35 years old, a majority working in developing and marketing jobs. Many 'Low hierarchy jobs' can be found in web design, women working in this area are between 35 and 40 years old. Also about this age are women belonging to the cluster of the 'reorientation careers'. Women who have leading positions are about 40 years old on the average, some of them work as project managers, others in higher level leading positions. The second group of quite successful careers, the 'consolidated careers', are a little bit younger than those mentioned before and most of them can be found in project management.

As argued at the beginning of this chapter, the most appropriate method for asymmetric variables would have been the Jaccard distance measure. However, the results obtained with this measure were less conclusive than the ones obtained with the Rogers and Tanimoto distance measure. One reason may be that when using the Jaccard distance measure variables such as "large company", "related specific training", "university degree in IT", "university degree in non IT subject" and "supportive partner", "partner close to her work" get very high weight. As a consequence, the resulting clusters do not describe career patterns.

Nevertheless, we give a short description of five of the eight clusters obtained with the Jaccard distance measure (for more details see Table 3 in Annex 2E).

Cluster 1 (16 women) combines "chance careers" of women, most of them with a non IT background, with "re-orientation careers". The women in this cluster are of different age and have different jobs and tasks. Some of the cases we described as "open careers" can be found in this cluster.

Cluster 2 (29 women) integrates women from the "consolidated careers" (12 women), the "women in leading positions" (9 women) and the "good careers" (6 women) clusters. The majority of the women in this cluster can be described as successful in their jobs.

Cluster 3 (11 women) is mixed with no clear profile. Some of the women in this cluster have an art background and are mobile, many work in web design.

Cluster 4 (15 women) is the group of women who feels disadvantaged, many of them working in low hierarchy and low salary jobs, with low qualifications. We also find some "open careers" in this cluster as well as two women with "low ambitions".

Cluster 5 (16 women) contains a great number of young women, most of them with IT background, but also some having entered ICT by chance and without related specific training. In this group of mainly young women some cases of "open careers" can be found.

Life story patterns

The categories we use in our analysis of life story patterns are not theory-based but empirical, grounded in the material itself. They reflect some of the colour the women themselves gave to their narratives. One of the reasons to look for life story patterns is the diversity of our informants' professional trajectories. There are so many variations and the trajectories themselves are not 'telling' unless seen in the context of the women's life stories – opportunities, choices, life themes. One of the sources of this diversity is that our informants come from different cultures; another that each national team made their own choice, based on what they knew about typical and interesting careers of women in their countries. Although this is a disadvantage from a methodological point of view, this also is a source of richness.

The patterns we describe are based on a comparative analysis of all 107 female biographies, taking into account national/cultural differences. They offer a particular view onto the professional trajectories and biographies across these differences (which are described in detail in the national synthesis reports), trying to reach some common conclusions. They provide a specific reading of the very rich and varied material. The organizing principles behind the patterns differ:

- Two of the patterns – *Straight careers in ICT* and *Combining art with technology* – describe specific types of trajectory.
- The focus of the patterns *From the margins to a field of opportunities*, *Buildings one's own environment*, *Being open, having not yet arrived* and *Good work but limited ambitions* is on different strategies.
- Two patterns – *Struggling but not giving up* and *Fragile or broken careers* – reflect the experience of constraints and how the women respond to them.

<table>
<tr><th colspan="2">SPECIFIC TRAJECTORIES</th></tr>
<tr><td>Straight careers in ICT
Taking a passionate interest in science, math and/or technology
In some cases looking for a field with good job prospects
Following one of the pre-defined trajectories in ICT
Having a strong notion of excellence and in some cases also striving to the top
Accepting the conditions for success in ICT, including long hours, stressful working conditions, a competitive environment and (in some cases) hierarchical structures</td><td>Combining art with technology
Having a background in art, graphic design or journalism
Getting in touch with ICT and turning it into an integral part of their work
Developing a passion for both fields
With no boundaries between work, family and social life, and personal inclinations</td></tr>
</table>

<table>
<tr><td colspan="2">DIFFERENT STRATEGIES</td></tr>
<tr><td>From the margins to a field of opportunities
Having seized the chance to move out from their milieu – a rural background (Austria), an area with limited job opportunities (the South of Italy) or ethnic background (UK) – into jobs that offer good pay, a high level of job security, and the opportunity for learning
In some cases rebelling against their home environment but in most of the cases staying emotionally attached
With different entries into ICT – getting interested in IT at school, taking an engineering or computer science degree, or encountering IT in their first jobs
Being interested in working with technology but not passionate</td><td>Building one’s own environment
Being goal-oriented – the women set steps to realize their career goals and life themes
Actively creating the environment that corresponds to their ideas and attitudes
Defining themselves through the content of their work
Some of them coming from supportive families and having chosen supportive partners
Some of them having a strong engagement for women in ICT</td></tr>
<tr><td>Good work but limited ambitions
Having good qualifications and good work, feeling competent in their work
But other important life perspectives (having more time for their family, hobbies) and few professional ambitions</td><td>Being open, having not yet arrived
Having had a good start in working life, liking their job in ICT, and working hard
Taking up opportunities where they offer themselves, not always sure where to go
Or looking for alternatives, already concretizing them
In some cases too young to be able to know where to go in the future</td></tr>
<tr><td colspan="2">RESPONSES TO CONSTRAINTS</td></tr>
<tr><td>Struggling but not giving up
Having received a good education and often accumulated an interesting skill profile
Suffering from adverse working conditions, problems in managing work and family life or limited perspectives in their region
Looking for alternatives and starting a training programme in another area
Or after a bad start into working life having succeeded in overcoming obstacles such as lack of qualifications and/or a degree</td><td>Fragile or broken careers
Not having had a good start into working life due to lack of qualifications and/or degree, unsatisfactory working conditions, limited job possibilities, having made a wrong career step, not liking to work in ICT, etc.
Lacking motivating and realistic alternatives
In some cases feeling discouraged and having failed and/or with unfulfilled ambitions</td></tr>
</table>

We will describe these patterns using three to four exemplary biographies of informants from the seven countries.

Straight careers in ICT

Some of the careers are moved by strong interest in math and the sciences. They follow a clear career model and strive to the top. AF09, aged 35, for example stepped right into a typical academic career after finishing her studies. She grew up as an only child. Her mother had worked as a secretary but gave up her job when she was born. Her father worked in the planning of petrol stations. Her parents always were very supportive and she still has a very good relationship with them – "they always had the right degree of leaving freedom but giving support". She preferred boys' games like Lego and playing football. When she was playing with her Barbie doll, she constructed things for her using the Lego blocks. She remembers how proud her family was when she received good grades, what she always did. Her ambition is unbroken – "I am still very ambitious. Only to be average is not enough for me."

Already in her master thesis AF09 found her main research topic – performance analysis of parallel and distributed systems – which she pursued in her dissertation, and later for her postdoctoral degree. After a short interlude as a professor in the Netherlands she got an offer for a full professorship at an Austrian university. So what she likes about her work is "solving riddles and generally the curiosity to get to the bottom of things". For AF09 work is almost like a drug and even things like arranging for a visit to the theatre are difficult to fit into her day. She has a broad field of interests, having learned to play the guitar and to do massages. In her spare time she used to knit. Now she only manages to do little socks for babies when one of her friends has a new child. She manages the web site for a sporting community.

One of AF09's life themes is 'standing out'. It becomes visible in how she describes herself as a remarkably tall child or an excellent student. Standing out is also what she does in the scientific community. She never felt out of place but being a woman contributes to this experience of standing out. It amuses her to see the reactions of surprise when male colleagues that haven't met her before realize that she is a woman and moreover a young woman. One of her fantasies when attending an academic ceremony was: "They all strode in, in their fur coats, and this was such a male clan, and as the only woman the vice rector for personnel, and that's when I thought, to be on top there, this could be a goal".

Women like AF09 are extremely hard working. They are single-minded, taking extreme pleasure in mastering the intellectual challenges of their discipline. The conditions for being successful – a hierarchical structure, a competitive environment and long working hours – are accepted. Being a woman is not a topic in these women's biography, moving in a male world and being successful in it is taken almost for granted.

While AF09 exemplifies a highly successful woman in academia, IREF02 made a remarkable career in the Irish software industry, where she works as a programme manager in a medium sized company. She worked as an engineer first and then as a project leader, leading at one time up to 40 people. On the verge of 40, IREF02 has achieved one of the highest managerial levels in her company. Her story is the story of a woman with a strong technical background who entered the Irish software industry before the booming time of the mid-1990s, and therefore when women's presence in the sector was unusual. The narrative of her work story –

from a company to another, from a job position to another – betrays rather conscious personal preferences and choices that activated different resources and strategies.

After her first job, IREF02 moved to a company that marked her consequent career steps. In a dynamic and technically advanced environment, IREF02 discovered her passion for work in ICT. The company was the first one in Ireland to develop C++ and she was one of the developers. The company also shipped another product with an innovative edge. Despite the disorganisation, IREF02 found that life in the company was extremely fascinating. The company was eventually taken over but IREF02 was not worried. She learned to assume men's behaviour and this affected also the way in which her choices were made. In her next job she missed the competitive atmosphere that she got to love. This is why she quit and found work where again she had to gain the respect of her male colleagues. IREF02 left also this company for no other reason than the fact that a cycle of research and application was concluded. In her words, work had become very much a life style. The definition of her identity included late working hours and socialisation over a drink. Then, now in a managerial position, she got pregnant and had to leave at a time in which the new product on which her team had worked was in its final steps. She arranged everything so that she could return to her job after maternity leave and at the same time focused on the birth of her child.

Straight careers in ICT can be found in all the different national cultures that are included in our study. UKF10, for example, went to excellent universities and has degrees in Electronic Engineering and Information Sciences and in Computation. In her first job, she found herself "thrown in at the deep end", which was fun and required a lot of hand-holding, she remembers. For ten years she moved from project to project in the company and then changed to a mobile telephony service provider as a contractor, working on a three-to-three months basis. In the end she was hired as a technical designer which is about designing new services, researching technologies and products, developing realistic cost estimates and time scales. Forty years old, Milanese ITF16 is a very serious and determinate woman, who chose to become an engineer twenty years ago when there were still very few women. She comes from a traditional family, the father being an entrepreneur, the mother staying at home. She attended a scientific high school, as is the tradition in her family, following her older brother, and studied electronic engineering. What attracted her was the combination of science with a more practical orientation. She started her career in one of the biggest software companies in the world as a product manager. When she had her second child, she stayed at home for one year and when she came back, her boss and mentor not only arranged a part-time job for her but persuaded her to move into marketing. She is in a leading position now with interesting and challenging work and neither she nor her husband have "such a shocking working time". Like many of our Italian informants she has organized a well structured network of baby sitters and family helpers for her two children – her parents and parents in law living nearby.

Combining art with technology

In these careers, it is not technology that is in the foreground but a passion for art and/or journalism, with ICT entering later as an important tool and skill. Accidentally, all three women who combine art with technology come from Italy. ITF15 is 40, lives in Milan and works as illustrator. She has been a "wall writer" and now she is a free-lance web designer. She has a rather articulated background and uneven education path. A continuous coming and going between her science-oriented familiar cultural background and her personal inclination to arts characterises her trajectory. Both her parents are scientists and she grew up "eating bread and physics". Her father taught her to use a PC and do programming in Basic. Although

having attended a scientific high school and having started studying physics, she decided to break with the family tradition, attended a two-year course in graphic art and decided to work as an illustrator in a publishing company. In her work she met ICT and quickly taught herself designing covers for records on the PC. She sees this move as a kind of reconciliation with her family background, "closing the circle between art and science". One of her detours was founding a studio fabricating tapestry, mosaics, and windows, together with friends. They soon found out that they were not really entrepreneurial.

ITF15 works as a free-lancer now, doing all kinds of jobs in advertising and publishing. At the same time she teaches computer science at a 'social centre' (unpaid), where she meets a lot of interesting people. She has a child of nine years, is divorced from her husband, and lives with a new boy friend. Typically for these careers that are close to the arts is that there are no boundaries between professional work, social commitment and private life.

ITF10 lives in Catania. She also works as a free-lancer in digital visual communication and graphic design. She proudly talks about one of her recent, enormously successful products, for which she combined several media – material products (oranges) with painting and digital images. She describes her family as being open-minded, her father working for the Italian Telecommunications company and her mother at home. Even though she moved a lot, she is attached to her home region. Building up a professional network required to move to the North, where she met important designers and created her own company at a time, where ICT was still at its beginning in communication and advertisement. Now she has many job offers but continues to work alone. She got married rather late and has a lot of free time in between periods of concentrated, hard work.

ITF14, aged 44, works as the responsible editorial graphic designer in an important magazine addressing women. She reached this successful position due to her deep passion in both, graphic art and computers. Her father is a graphic designer with his own studio and she partly worked with him, partly as a journalist. She found a mentor and teacher in a famous art director at one of the major Italian publishing houses. She had twelve years of interesting work with lots of travels. When she returned from maternal leave, she felt fed up with the work and thinking of ways to escape she found ICT. She very quickly became proficient at the computer. Her mentor wanted her to follow him to Rome which was a rather attractive offer. But this she could not do because of family reasons. ITF14 has organized a network of baby sitters for her children and is currently deeply involved in a new graphic project for a magazine.

Typical of all three careers is the ease with which the women integrated ICT into their work, developing a passion for both fields, but with their artistic interests and ambitions staying in the foreground. Regarding their life style and way of working they are more artists than computer professionals.

From the margins to a field of opportunities

There are life stories in which ICT is strongly connected with moving out from one's milieu and/or region into promising and relatively secure jobs. While in several cases informants come from marginal regions – the countryside in case of Austria, the South (Sicily) in the case of Italy – in a few other cases its is ethnicity which creates a potentially marginal position from which the women escape. For example, UKF14 is of Indian ethnic origin and, as it was expected that she would simply marry and have children, her education was not considered important. However, this gave her a strong motivation to pursue her education

despite her parents. Her teachers in late secondary education were central to helping her break out of the narrow path which was set for her in Indian culture.

AF04 comes from a farming family with six children. After secondary school she went to a two-year agricultural school, and having finished her apprenticeship she worked on her parents' farm until she was 20. This didn't interest her. Very early she knew that she wanted to move to the city and found herself a job in a small trading and production company where she stayed for seven years. Although she had no background in ICT, she managed the transition from manual to ICT supported work in the office. She talks about the ways office work was organized 20 years ago in such a company. It included everything, from short-hand to typing, accounting, and skilled clerical work. Wanting to develop herself, to learn something new, "become more professional", she found her present job as a developer in the IT department of a bank. This is a respectable and stable environment that offers a variety of fringe benefits for its employees – they reach from six weeks of paid vacation and daily lunch in the cafeteria to a place in a nearby kindergarten and a parking lot. The fact of working in the city centre adds to the attractiveness of her present work. AF04 has achieved what was possible for a woman from the countryside with no high school diploma. Currently, the bank makes the transition from host technologies to a server-client technology. This creates a problem for AF04, since she belongs to the 'old group' who was responsible for the host-based system. AF04 is still very attached to her family. She is always there to help – to pay regular visits, to support decision making in the family. Frequently her brothers' children stay in her apartment when they come to Vienna.

ITF20 comes from a family of landowners in Sicily. Her parents always regretted not having a good culture and education, so they encouraged all of their children to study. She had a deep interest in math and computer science. After graduating as a mathematician she started work as a programmer then analyst in the branch of a company specialized in financial software. After maternity leave her new boss, a woman, offered her to join a new project team on electronic payment. This was very interesting work from a technical point of view. After the birth of her second child, she found it difficult to cope with the changes that implied working as a project manager in another division of the company. There was a period of tough competition, constant arguments and much stress after which she decided to start a new professional life as a teacher of computer science at a technical institute. She does not regret her choice. She says she wants a quiet life with her family but, in fact, she let herself being involved in many new projects and in extra school work and she seems enthusiastic about it.

BEF13, aged 33, works as an information administration consultant for a large solution and service provider. She grew up in Spain with three sisters and one brother, the father a teacher, the mother at home. All four sisters have a university degree. She had a child when she was 16 and with the help of her parents she managed to finish school. This was tough, being at school and returning home to care for her baby son. She went first to Luxembourg and later to Belgium for her studies. Although she never had touched a computer, she decided to study informatics because of the job prospects. She soon discovered that she didn't like programming and switched to library administration and for her third degree information administration. Recently she moved to a part time position in order to find time for her passion, fashion design. This allowed her to reduce her working time from ten hours a day and weekends to a little less, even though tight project deadlines make it difficult at times to keep working hours low. BEF13 likes her work but she does not have any career or mobility project. She has given priority to other things in her life, such as a fashion design course.

These women are interested in working with technology but not passionate. ICT opens a field of opportunities to these women. Entries into ICT vary. While some of the women studied informatics or something related, others encountered ICT in their first (clerical) jobs, seizing the opportunity to qualify themselves, either through learning by doing (the older ones) or through additional training. One of the prime movers of these careers is the chance to get a well paying job offering security, possibly in a large company. In some of the Italian examples the women's choice of ICT is clearly opportunistic in the sense of optimizing the opportunities to get a job independent of their personal orientations and interests. In some cases these expectations are disappointed, such as in the case of ITF03, a young engineer from a small town near Catania. She describes herself as taking after her mother – "dynamic, open, interested in a lot of things" – and quite fond of technical work. Her bad experiences with a low paying job in a large mobile phone company with a 'macho' environment made her lose her interest in having a career.

Building one's own environment

Some informants' stories show a strong will and skill to shape their own environment so that it fits their idea of good work and a good life. This is a theme in their accounts which they address explicitly as 'building'. AF07 is one of the few self-employed women in our sample. Everything in her biography points into this direction. She talks about having had a happy childhood with caring parents with whom she still has a very positive relationship. The central person in her life has been her mother who is at home. She describes her mother as a generous and caring person, who protected her whenever she was in trouble, for example at school – "she was the protecting wall". When at the age of 15 AF07 started thinking about moving away and being on her own, her mother always let her know that this was right, saying: "Go your own way, do what you want, get yourself a job". AF07 (age 37) entered informatics somewhat accidentally. Her ambition was to work on a master thesis with a practical outcome – a product. It happened that one of her acquaintance's offered her a job as a part-time project assistant at a university, where she had to develop special software. She put a lot of energy into this project which was part of her supervisor's long term research programme. After more than two years of intense cooperation both decided to set up their own software company together. Having been an excellent student from her early school days on, liking math, and adoring the work of developing software have shaped AF07's relationship to technology. Her competence is solving problems – to structure a problem, find a solution, and organize its implementation: "This is what I love, I need the hurdles, I always needed them, I need challenges and I need the next mountain to climb up", she says. This is reflected in the software the company produces which supports the solution of highly complex problems.

Being in charge of her own life is AF07's main life theme. She remembers that this was already so when she was a young child. She perceives herself as having created the environment for herself, in which she feels comfortable. When AF07 had her child, her partner, a former social worker who recently retrained and now works as an internal SAP consultant for the city council, switched to working a lot at home. She became engaged in the peace movement and the women's movement as a student – "a conscious woman". There she always met other women, somewhat older than her, who gave her support, encouraging her to go her own way. This made her gain her self-confidence which she tried to transfer to other, younger women and girls, mainly as part of her work in a youth centre.

FF03L, age 39, works as a Web Manager in a Regional Department. This is the story of a woman who found ICT rather late, made an enormous effort to acquire skills in web design

and management, and now builds her career. She did not have such a good start into working life. She comes from a family with a dominant father and an older sister that was presented to her as a role model. She went her own way, thinking herself more enterprising and adaptable than the rest of the family. At university she discovered her interest in geography and after graduating she had several small jobs in the South of France connected to tourism. She also worked as a cartographer at her university but found it boring. She got married and followed her husband. After a short maternal leave after the birth of twins (she has three children), she convinced the director of the regional department to nominate her 'Chargée de Mission de Tourisme'. All the time she was looking for more challenges and being still in touch with professors at her university she learned about a new educational programme in 'sciences et techniques chef de projet' to which she subscribed without telling her employer. This was her first encounter with ICT and the first year was extremely difficult. Students in this distance learning programme gave each other support and encouragement. After having passed successfully her first year she convinced her employer to financially support her further training and in the end he created the position of 'Chargée de Mission TIC' for her. FF03L has started an additional training programme at her university – a DESS 'intelligence collective et management des connaissances via les communités virtuelles'. Her project is to one day open her own company. Describing her professional and private life she uses the metaphor of "adding stone upon stone to a building". ICT for her offers "l'horizon libre, non bouché'. At herself she looks as a free electron, who roams the desert all by herself, convincing others. Her husband, an engineer, works long hours. He accepts her professional ambitions but she gets no support for him in managing the family (but from her mother-in-law, a retired teacher). She often works long hours during the night when the children are asleep.

These women have clear goals and set the steps to achieve their ideas and ambitions. This may also include broader interests, such as political commitments (AF07) or artistic interests. ITF19, aged 40, works as product manager in an IT company specialised in software for health care. She is a brilliant and self-determining woman, with a marked learning orientation in her working life, always attracted by new things. Both her parents are self-employed. Her mother still manages her small business herself at the age of 71 and her strong message for her children was to be independent. After having graduated in computer science, ITF19 started working in a small company doing programming and development. When the company closed, two of the partners took the software product with them and asked her to join in, which she did. This was the start of a highly mobile but still focused career path, with seven job moves within 15 years. She recently shifted to a part-time job since she now needs the time to develop her hobby – designing jewellery from material collected on her travels around her world (stones, wood, iron) – into a real business. Images of some of her designs have already been published in a newspaper and she has contacted a shop which will sell them. At the same time she keeps a good managerial role and a good salary in the IT company and she thinks she loves too much this job to leave it. In future, she could work as free-lance consultant.

BEF07, age 38, works as a training manager for a middle-sized company that sells hardware and computer services. She chose scientific studies, at secondary and superior level, made a chemistry degree and finished her dissertation in the US. She had planned to work in the nuclear field but found this milieu closed to women. Her studies oriented her towards genetic research, but once again, young women were not admitted into the laboratories because of pregnancy risks and she was given uninteresting jobs. So she came to computers, because her grandmother, with whom she lived, had seen an advertisement about computer studies.

Although she did not feel attracted by computers and only knew rudiments, she had no difficulty in getting a degree in informatics. She first worked in an adult education project at a university and when, by chance, she contacted her present employer who was in the process of setting up an information department, she created her own job according to her ideas. She is director of the training department that counts around 10 salaried and 5 freelancers. BEF07 is divorced. She left her husband because he was present "without being there", always in front of his computer, only stopping to have meals. She has three children (7 to 11 years old) and a new boyfriend. She works around 50 hours a week but had to take part time because she needed her Wednesdays afternoons off to take care of one of her children who suffered from health problems. She was forced to agree to a cut of her wage, despite her timetable – management would not give her the flexibility she needed without going part time.

The strong will of these women to shape their own environment takes them into different directions. It includes going abroad as a single woman to be exposed to other cultures, being in charge of their own life from a quite young age on, founding their own company, carving out their own field of expertise, building things on their own, fighting for a good position. Some but not all of them come from supporting families and chose supporting partners.

Good work but limited ambitions

Several biographies exhibit rather 'normal', unexciting patterns. UKF19, aged 41, left school with poor qualifications, having moved a lot as a child. She took a one-year printing diploma course and then acquired her skills on the floor, where she learned everything, from design to the completed product. She "was the assistant who did most of the editing on-screen, in the early days of desk top publishing. She then worked as a system technician and is currently IT support specialist in a printing company. She has a strong sense of responsibility of the work, the organisation and her colleagues. It is quite gratifying for her that people respect her knowledge. She talks about not being a very ambitious person. She does not care about not being 'in the loop' when she does not participate in parts of the office culture, such as the football culture.

UKF08, 52, started as an operator, punching policy details onto metal plates, at a time when there were no computers in offices. She moved from clerical work to data entry, then to help desk support, then to payroll systems support. One thing she regrets looking back is that she didn't push herself enough to become a team leader sooner than she did. When her firm with a very friendly office culture was outsourced to one with a very serious work-oriented office culture, it took her quite a while to recreate a 'family' feeling in the office. She is happy being the team leader of a small group of three, since she does not want the extra work of continual meeting, weekend working, and constantly having to make proposals for improving the company.

These women have good qualifications and are satisfied with their work. But there are other important perspectives in life, such as having more time for their family or for hobbies. They have jobs at the lower end of the hierarchy of ICT jobs but feel competent and respected. This is also the case for FF04L, aged 40, who, together with her husband, has created their own small multimedia company. She comes from a farming family. FF04L took a one-year diploma course as a laboratory technician in physics/chemistry which included IT. She followed her husband who, more ambitious than she, wanted to get an engineering degree. She had a series of small jobs where she benefited from her ICT skills. When they created their own company, she took over the more administrative tasks, including the web, while her husband is responsible for project acquisition and programming. Meanwhile they joined a

group of companies with her husband having the position of director. For herself she has no professional ambitions. She talks about herself as 'le suiveur', the one who follows her husband. She is happy in this situation where she can support her husband and meet interesting people. She is proud of her daughter for whom she has sole responsibility. Just one regret – not knowing other countries, never having worked abroad.

Being open, having not yet arrived

These are examples of women who had a good start into working life but it is still open where they will go in the future. Most of these women are still quite young. BEF02 is 26 and married to an industrial designer. She works as a customer support engineer in a big international computer firm. She has a university degree in engineering. She has always felt interested in math and sciences and in do-it-yourself things, like her father – building models, radio controlled cars, etc. Her father works as a translator and her mother is in marketing. Her brother also chose computer studies. She early benefited from having a computer at home, while she was in primary school, thanks to her mother's job. She spent a lot of time in front of the computer as a teenager. The average age in BEF02's company is 26/27 years. Her team is nicknamed "baby team", the one where the youngest begin. The way she describes her work looks as if she continued childhood. Colleagues "baby-sit" your project when you are away; resource colleagues are named "God"; they draw lots for week-end duties; stock options dramatic loss of value was subject to laughing; changing job towards more development means wanting to "play" with devices; colleagues are mates and so are managers, except in the relationship with clients; a professional mistake is qualified as "bullshit"; work distance control is named "spying". Play activities seem to have an important role in the work atmosphere. Workers relax by playing with darts guns and last extra-professional activities were going to a circus, to a leisure park or ice-skating. BEF02 has a strong relationship with computers. Working for "a big monster that she holds in her hand", with contracts with the US government gives her a feeling of power. She does not control her working hours; it is as if "a little voice whispered to stay after 5 pm". She does not have any particular professional project, she just feels good in her job.

Some of these women are looking for alternatives without necessarily disliking ICT work, such as FF02L, whose specialty is cryptography. Her life story is full of hesitations and insecurity and time and again the idea to move into ergo-theraphy comes up. Although enthusiastic of her job and the company she works for, AF11 does not yet know where she wants to be. One of her life themes is "to be late in realising what I really want". When she is telling stories of her life, she very often ends up with "…and this came to my mind rather late" or "…as I said before, all the things I realised later". AF11 always had an interest in natural sciences, in particular biology and genetics, but she also liked languages. She finally decided to study technical mathematics. In her second job she worked as a research assistant in a project developing a virtual character that talks in gestures. The challenge was to support different views so as to be able to "look over the shoulders" of the creature. This was an eye-opener for AF11. She loved the work which also gave her the opportunity to do presentations and to be in contact with the mass media. Her current job in a small multimedia company helps broaden her interests in multimedia production. She started getting involved in the company's PR activities and is changing her role in the direction of marketing and selling. AF11 describes herself as open minded and extroverted. She loves getting in contact with people and appreciates the possibility to talk to politicians and bosses of big companies.

ITF09 works as technical assistant in a computer shop. She is very young and sensitive. Her mother has a small job, her father is retired. They give her a lot of freedom. She attended the public school of art, where she did graphic art for advertising and photography, which she enjoyed very much. She should have continued with computer-based graphic art, instruction at the school being rather old fashioned, but was too lazy. Her older brother offered her a job in his small hardware and software company, where she started answering the phone and soon learned from her brother how to assemble a PC and install software on it. Now she thinks that assembling a PC is an art, saying: "At the beginning I did not know what to do with all these cards, cables ... then when you start understanding what there is inside a computer, you start loving it and what at the beginning seems you a terrible mess you can do easily and it is very nice what you can find inside a PC". ITF09 describes herself as a lucky person because the work she does came to her, she adapted to it and found out that she actually liked it. She defines herself as a bit lazy and about her future she does not seem to have a precise idea of what she is going to do. Taking up opportunities where they offer themselves is also the dominant thread in ITF11's life story. This is a very young woman who works in the medical branch of a big electronics company where she deals with a special telemedicine project providing ICT-assisted home care to people suffering from chronic diseases. She has two young parents who trust in her, always helping her in difficult situations. She describes her meeting with ICT and with her job as a result of lucky coincidences, but in fact she is a determinate and self-reliant person. She says: "Again, fortune decided for me". Here she alludes to the fact that she happened to read about a company specialized in IT for health care offering a job related to new technologies. That got her interested. She is happy with her work but in the back of her head are other options such as her love of oriental languages and her passion for singing. She feels still open to changes, including doing something completely different.

Struggling but not giving up

In some of the life stories constraints and how women succeeded in overcoming them play a dominant role. These constraints vary – from lacking qualifications and/or a degree to suffering from adverse working conditions. FF06P, 31 years, is currently managing the multimedia service of a regional department. Her parents divorced early and she was moved from place to place. Her mother teaches French and her father is in marketing. She did her baccalaureate in biology, studied science with a specialization in environmental science. She worked in parallel in several places, including an architectural office were she prepared documents on a variety of environment-related issues. She then went to Mexico, with a self-defined project which was supported by the ministries of health, education, and the environment, conducting a campaign teaching children to be aware of water pollution. Upon her return to France she briefly taught sciences to then follow her husband to Amiens. There she started training in multimedia to give her husband the chance to find employment connected to environmental issues. She also participated in a concours (ingénieur subdivisionnaire territorial). What she finally found, with so many qualifications, was her current job as manager of a small multimedia department within the public administration. Her job involves management, administrative and also more technical function. She works with a multi-disciplinary team which she has not chosen herself and this is certainly not her dream job. She is overqualified for this type of work. She had some nasty experiences with not being accepted as a young woman and mother. It was particularly bad when she returned from maternity leave and her adjoint started mobbing her. This included not returning the dossiers on which she had worked before leaving. Her salary is not good and she often feels

very tired and worn out. To stand up for the errors of everybody is something she perceives as tough. At the same time she feels responsible and protects her team against the outside world. But she has not given up. She looks for an opportunity to change employer and she prepares for another concours (administrateur de la fonction publique). This would open the way to more interesting positions. "A mother has a tendency to neglect herself and her career", she says, and this is why she does not want to stop moving on.

FF06P is highly qualified and for family reasons she is trapped in a region with few opportunities. But she does not give in. BEF10's professional trajectory is quite chaotic. She started studying medicine but gave up soon, starting to work as a receptionist-telephonist, then as a security agent. At some point she decided to stay at home to take care of her three children. Looking for something to learn, she attended an information session about web design. Her husband first accepted her decision to start a training programme but when he realized that she got more and more independent, he could not tolerate it and hoped that, because she was pregnant, she would not be recruited at the end of her traineeship but she was. He denied her abilities and argued that she must have seduced her manager. Even her friends and family did not believe in her and could not realise that she would be hired for something else than serving coffee and answering the phone. She works as a web designer in a small web services company, the firm where she made her traineeship. The firm is very young and requires much involvement and polyvalence from its workers. She believes that in a small firm, people have to work twice more, but she likes it because she is still learning things. She does not care if the supplementary hours are not taken into account; she considers them as an opportunity to develop her competences. Her training is equivalent to three years of non-university school but is not accompanied by any diploma, which leads to certification problems on the labour market. She knows that she could earn more somewhere else (her wage is really low) but she likes her current job. BEF10 has a very positive outlook on life. She believes that things always finally end well. For example, at the beginning she did not get on well with one developer. He gave her the impression that she was not able to understand what he explained and it took some time to build trust in her competence. People believed in her competences at work, while her family doubted. At this stage, she feels happy in her job.

UKF14, aged 40, had a difficult childhood with a father who became violent to the children. She started to study for A levels while living at a friend's house where she had to pay rent so was working for money in the evenings after school, until 10pm, then doing housework at lodgings. She was unable to do homework at all. Ultimately she left school and went to work full time. UKF14 liked maths from a very young age on and she was always interested in computing, she just didn't get any chance to do anything about it. She had many small jobs to support herself, got married and was happy to stay at home for a while. Her life changed dramatically when she started a part-time return-to-study course and her husband reacted violently to this decision. She then enrolled on a 'polymath' course at a college. She remembers "walking into the room with all these people, who all looked like they were working, and I was a housewife. I thought 'Oh my god, I'll never be able to do this.' " But she could, started a degree programme in computing, later moved on to a PhD programme and started research on formal methods. At present she is senior lecturer in computing studies. She participates in a European project on software metrics and also runs a women's group. Life is not easy with the university cutting expenditure and staff and she also experienced some hostility by colleagues. UKF14 has gone a long way, surmounting not only obstacles such as lack of education, but also struggling with difficult personal relationships and in the end raising three children, financing her own education and rising to a high academic position.

Fragile or broken careers

In some cases women do not succeed in coping with the constraints they encounter. We have several cases of women who did not have a good start into working life, due to lack of qualifications and/or degree, unsatisfactory working conditions, limited job possibilities, having made a wrong career step or simply not liking to work in ICT. But they lack motivating and realistic alternatives, in some cases feeling discouraged and having failed and/or with unfulfilled ambitions.

AF05 comes from a family with no money. Her father, a construction engineer, is currently unemployed. He has worked as a project manager in different countries, in particular in Asia, and tried in-between to use his contacts for building up a trading firm (fruits, rice, etc.) but things went bad very soon. Now, at the age of 62, he can no longer find a job and is waiting for retirement. Her mother worked as a lector for a publishing house – "she was not really a lector, she would have needed an academic degree for that" – and when AF05 was born she stayed at home. After high school AF05 wanted to study architecture, but she was discouraged, having no connections to architectural practices and hearing about the long study time. Then she thought "what else"? Her father wanted her to become a pharmacist or a physician. This did not interest her and she remembered her school experience with informatics which she liked a lot. She started computer science at the University of Technology and never finished her degree. Her present and first full time job is with a service provider. Her job title is IT specialist. Her area is Internet applications, from database to passwords. When AF05 accepted her current job she made the mistake to agree with the position of 'document provider', fearing she would not find anything better. So the first step to take is to redefine her position and, as a consequence, get a salary increase. AF05 apparently was not a successful student. She, for example, never did the basic but quite difficult exams in math and electrical engineering. When she decided not to finish her degree, she felt very bad about it. All her computer skills AF05 acquired on the job but what scares her is to have nothing in her hands, should she lose her job. Although AF05 loves her work and in particular the wonderful team spirit she encountered, she describes herself as "maid for all things, because this includes everything, from watering flowers to taking care of clients". AF05 seems resigned and sad about her limited prospects in life. There is, however, a positive aspect in AF05's self image. She thinks of herself as being creative. AF05 would like to be a florist or a gardener. With some money she would build up a florist's shop, sell flowers, make arrangements. Obviously this is not an appropriate job for the daughter of a (failed) construction engineer. She can also think of studies she would like to go into, such as art history or Arabic culture – all things that she cannot afford now.

IREF03 entered the ICT sector nearly 10 years ago. Hers is a story of a woman who did not choose to enter the industry. Her educational background and personal attitudes were ones that would be incompatible with the ICT sector. By a series of accidental events, she got her first job in the industry and then moved twice. In each company, IREF03 consciously realised the cost of being in an environment she was not attracted by and, ultimately, she disliked. IREF03 has recently decided to leave the sector. She has a degree in English and history. As she recalls, she participated in computer classes that she never liked. At home, herbrother's passion for computer was balanced by her interest in books and music. After college, she did a computer course for a year but her math was not good enough. At that time her brother worked for a small company that had a contract with an Irish bank and offered her to join the company. IREF03's first encounter with the ICT sector was accidental. The content of the job was not technical; the project she worked on consisted of replacing old back-office hardware

with new computers; her brother and another guy were in charge of fixing and testing the system. Also the second project she carried out for the company had no technical content. IREF03 became project administrator but her work consisted of dealing with clients. With no future prospects and without codified technical knowledge, IREF03 accepted a friend's suggestion to apply to another company as a technical writer. In that period, the industry was booming and the company was expanding. As she recalls, the company was "hiring people continuously, they had 3 or 4 new people starting every week for the first three months". This circumstance favoured IREF03 who got the job in the company as a technical writer but "not the other job [more managerial and administrative] because I didn't know anything about computers at all when I left college, no experience at all". She describes how when people asked her to do something she had to pretend to be able to even though she had no clue about what they were talking about. In the end she was not able to cope with the technical demands of her job.

FF03P is 37. She comes from a family with artistic inclinations. As a child she moved a lot having to change school several times. She did a baccalaureate in the area of styliste/modeliste. After that she studied PR and graphic arts for four years. She started working in several small publishing houses and in parallel in her own studio. Then she got married, had two children and moved with her husband to the countryside with a farming project that involved restoring an old farm house. After the birth of her second child she had severe health problems and she is partly disabled now. She decided to reorient her career in order to make it easier for her husband to find a job (they have the same background). This is why she started a series of short internships where she received training in web design. She now works as a web mistress responsible for three web sites. She is not happy about her work since it does not offer any challenges and her salary is about a third of what it would be in PR. This is a job in which she cannot unfold her potential. She would like to do more programming, something that in her company is the domain of men. But her job situation allows her to take care of her two children while her husband works on the farm. "Chez nous l'inactivité tue", she says.

Male biographies

This chapter describes the profiles of our 33 male informants based on the key data covering age, family status, job/tasks, and education. Because of the small number of interviewees, information obtained from the coding scheme has not been included in the analysis. For more detailed information see tables in Annex 2F. The emerging profiles together with an analysis of the narrative interview material allow a cautious summary evaluation of male biographies.

Age, partners and children

The men interviewed are on average 38 years old. Most of them (21 men) are between 31 and 40 (see Table 23).

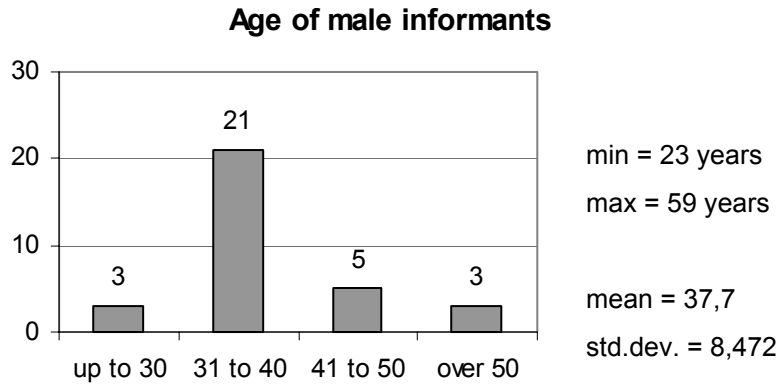
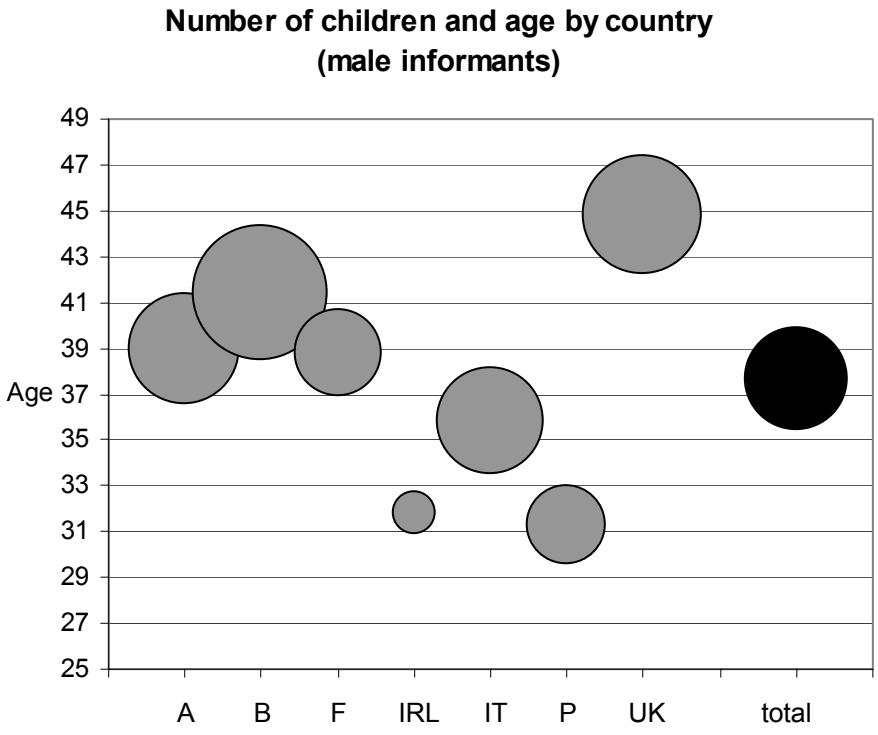


Table 23: Age of male informants – frequencies, n = 32 men

27 of male informants (82%) have a partner and eleven have no children. Table 24 gives an overview of the number of children and age of male informants for each country. In the UK the average age of male informants is highest, whereas many of the younger men come from Portugal. The male informants have on average 1,1 children, 1,8 in Belgium. Three of the Belgian men have two children, one has three children. In Ireland only one of the male informants has one child. Most of the men with children have at least one child who is still under 14. Only two of the interviewees in Belgium and two in the UK have grown up children.



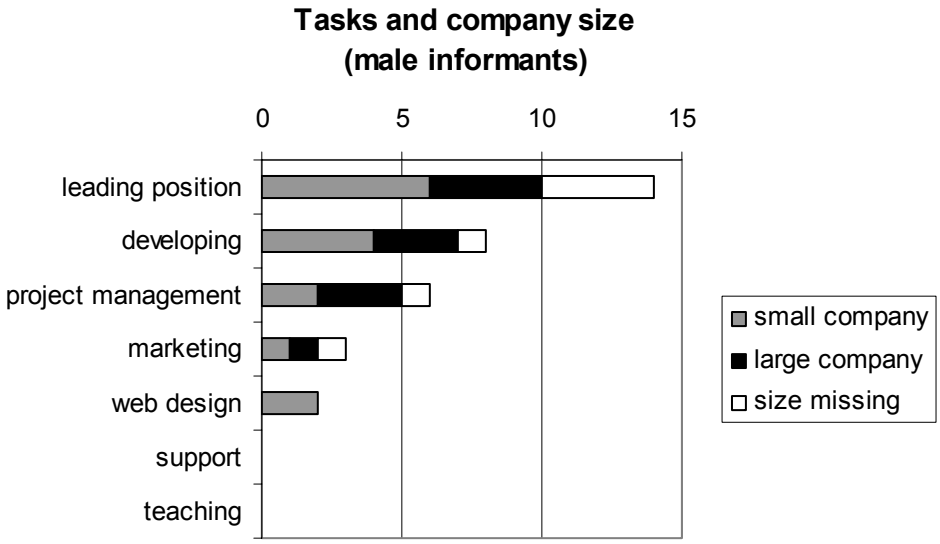
	A	B	F	IRL	IT	P	UK	total
average age	39,0	41,4	38,8	31,8	35,8	31,3	44,8	37,7
average number of children (corresponding to the size of the bubble)	1,3	1,8	0,8	0,2	1,2	0,7	1,4	1,1

Table 24: Average age and average number of children for male informants in each country, n = 31 men

Jobs, tasks and companies

14 of our male informants are in *leading positions*, seven of them self-employed or company owners (see Table 25). Three of the self-employed men have founded their own company, either alone or with a partner/associate. This includes one case of a CEO of an Italian company which was built up together with friends, one CEO of a small multimedia company in Austria, and one man from Portugal who provides technical assistance in IT customer support with his own firm. Four of the cases (2 in Austria, one in the UK, one in Belgium) are single-person start-up companies.

Two informants from the UK are in a leading position, a director for external relations in an e-Centre, and the business development director of an electronic commerce trade association. One of the French informants works as researcher at a university where he is also in charge of the organisation of e-learning courses for a psychology department. One Belgian informant works as general manager in a small desk furniture and computer supplies company of 60 employees. The remaining three informants in leading positions work in big companies: the manager of software engineering teams (supervising nine people) in Ireland, the leader of a team of 20 people in the IT department of an Austrian broadcasting corporation, and the technical director of a big software company in Portugal.



	small company	large company	size missing	total
leading position / university + single-person company in IT	6	4	4	14
developing / programming	4	3	1	8
project management + head of internal department	2	3	1	6
marketing / public and business relations	1	1	1	3
web design + graphic designer / Internet journalist	2			2
support / administration / helpdesk				0
teaching				0
total	15	11	7	33

Table 25: Tasks and company size for male informants (in the order of frequencies), n = 33 men

Eight of our male informants work in *developing*, four of them in small companies. One of them is a self-employed IT contractor in the UK and currently works for a US bank. Three of the male developers work for large companies in Ireland (two of them in a telecommunication company, one in a steel trace).

Six men have *project management positions*. One of them is telecommunications manager in a call centre in France, one in a European software company with around 70 workers, one in a software house in Italy. Furthermore two informants are managing projects in small firms and three others in large companies. One of them works as a legacy order manager in the UK for a big computer service provider, one does the radio frequency planning for an electronic company in Italy, one works at a broadcasting corporation in Austria and is responsible for the development of databases.

Three men work in *marketing*. Of those one is marketing manager for Europe based in a big software company in Ireland, one is sales director for a small computer service provider in France, and the third one is responsible for the acquisition of new clients for a communication agency in France.

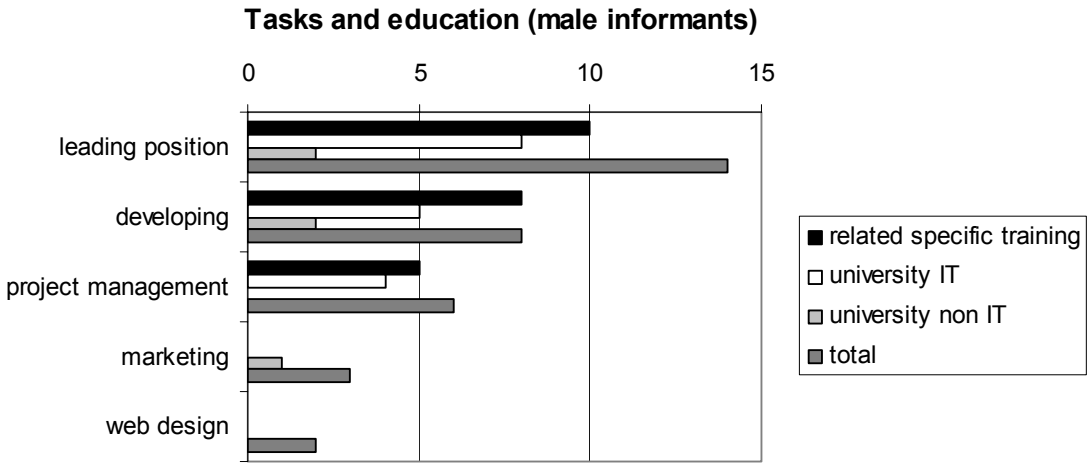
Two of our male informants work in *web design*. They are both in small companies, one in Belgium in a software company that also sells hardware, one in Italy who works in his own company with some of his friends as freelance collaborators. None of our male informants work in support or teaching.

Overall there are nine men who are *self-employed*. The seven, who have leading positions, have been described above. Of the remaining two one develops IT security systems as IT contractor and currently works as Chief Security Architect for a US bank in the UK and the other one built his own web design company in Italy.

The majority of the men's companies (15 cases) are in the ICT sector, in the area of software, consulting, system house and IT services. Three of the men work in hardware companies, five for telecommunication companies and Internet providers, and one at a university. One man in Italy works as web master, web designer and "digital animator" together with some friends in his own company. Six of our male informants work in non IT companies: two Austrians work for a broadcasting corporation, one of the Irish informants in a steel trace, an Italian informant in a bio energy society, and in the UK one in a US bank and two in trade associations.

24 of our male informants have been working in ICT from the start. Nine had other jobs. While in 18 cases the men still work with their first employer, 15 changed job/employer more than once.

Education and qualification



	related specific training	university IT + related	university non IT	total per task
leading position / university + single-person company in IT	10	8	2	14
developing / programming	8	5	2	8
project management + head of internal department	5	4		6
marketing / public and business relations			1	3
web design + graphic designer / journalist				2
total	23	17	5	33

Table 26: Tasks and education (male informants) - frequencies, n = 33 men

23 of the men have related specific initial training in ICT (see Table 26), 17 of them a university degree in IT or related subjects. There are five men who have a university degree in a non IT subject: one has a degree in geology, one is working in marketing and has a degree in law. The other non IT university degrees are held by men who nevertheless also have training in IT. One has a science degree, one has a university degree as an expert surveyor. One male informant holds a university degree in IT and an MA from the US in "charging and billing".

Male biographies – are they different?

- Male and female biographies in computing and ICT do not differ radically. However, the men seem more mobile and at the same time less passionate and ambitious than our female informants. The women we interviewed have more articulate lives and other important interests beyond computing.
- Men's entry routes into computing are often through science subjects but there are also several re-orientation careers, with the men coming from economics, business, ethnology, law, and even clothing design.
- Building one's own work environment is a particularly strong motive amongst men (6 out of 33). In most cases this resonates with being on their own and primarily accomplishing themselves. Among them are:
    - The director of a small multimedia company with a strong academic background (A) – he sees himself as taking care (of his family, his staff) and wants to lead a whole life, combining the world of academia, business, and family life.
    - The owner of a small product company (UK) – a man with a chemical engineering background, used to building his knowledge (of ICT, of an application area) on the job, who developed and now sells his own product, working at the same time as a management consultant.
    - An IT analyst (BE) – a former expert surveyor, who always wanted to have his own business, found programming boring and now manages a company of 60 employees.
    - An ethnologist and IT specialist (F) – with a background in AI/linguistic IT, who combines the jobs of researcher, teacher, and network administrator at a university institute with work for a small, independent service company within the university which he has co-founded with several others.
- Being independent is a motive that we did not find in this form in women's biographies:
    - A freelance developer with a background in engineering and psychology who currently manages a huge project (A) – his choices are highly motivated by his need of freedom. He would not accept any job that implies time restrictions or control mechanisms, even if he could earn much money. This is reflected in his personal life where he also tries to live with a minimum of commitments.
    - Project manager in a large TV company (A) – his authoritarian father wanted him to become a lawyer, he never took a degree, sees himself as a specialist and a generalist at the same time, plays music in a band, and has an almost hedonistic attitude towards life.
- For some of the men working in ICT is an extension of their hobby. These men have a bricolage approach to technology (tinkering instead of analyzing) and (in one case) to developing their own company:
    - The owner of a very small provider company with a background in IT (A) – who is not an entrepreneur nor a technical innovator but just managed to turn

his passion into something profitable. He does not have a vision for his small company and he leads it in a rather hands-on way.

  - The head of an IT department (A) – whose passion for computers was always there but who took a detour via advertising and marketing, creating his own firm around a collection of wedding dresses.
  - A freelance analyst/developer (BE) – who came to computers on the job, always having tinkered around, the fact that he does not have a degree does not bother him today.
  - An analyst/developer (BE) – whose only hobby is computing and who dislikes the people he is working with.

- Inter-company mobility seems to be more taken for granted by men and several of our informants held a number of highly qualified and interesting jobs, such as:
  - The owner of a small product company (UK) – who held several engineering jobs, always learning a lot on the job and leaving when there were no more challenges.
  - An electronic engineer who works for a telecommunications company (F) – he comes from a working class family, has always been tinkering around, after graduation worked in several small engineering projects and is changing jobs to have the opportunity for learning and foster his professional recognition amongst his co-workers.
- The family and in particular fathers play a different role in the men's biographies than in those of the women. Fathers (or grandfathers) appear in these stories as much admired 'images' – the mechanical engineer, the entrepreneur, the lawyer, the garage mechanic, the father who installed the first computer in his firm – rather than parents who encouraged or gave support.
- While a number of women mentions that they stand back so that their partner can have a career, the men (with a few exceptions) typically refer to their partners as being available in the background, taking care of the children and/or also giving professional advice. As is the case, for example, with
  - The owner of a small provider company, who is married to a computer scientist who no longer wants to neither program nor have much to do with technical stuff. He finds a lot of support in his wife, who not only does the bookkeeping, but is a partner for discussions, helping him to take decisions. He always hears her opinion.
  - The ethnologist and ICT specialist (F) – who talks about himself as "on fait partie de la belle catégorie des irresponsables", with his partner having adapted her ambitions and working hours so that she can take care of their small son, since "si elle devait avoir le meme rythme, ce ne serait pas possible".
- As a consequence, while for the women work-life balance is a topic (whether they have children or not), this is not the case for male informants.

References

Backhaus, Klaus; Erichson, Bernd; Plinke, Wulff and Weiber, Rolf (2003). *Multivariate Analysemethoden – Eine anwendungsorientierte Einführung*. Zehnte, neu bearbeitete und erweiterte Auflage, Springer Berlin Heidelberg.

Cedefop (2001). Curriculum Development Guidelines, *New ICT curricula for the 21st century: designing tomorrow's education*, Luxembourg: Office for Official Publications of the European Communities.

Flick, U. (1995). *Qualitative Forschung: Theorie, Methoden, Anwendung in Psychologie und Sozialwissenschaften*. Reinbek bei Hamburg, Rowohlt.

FLEXCOT – *Flexible Work Practices and Communication Technology*, DG-Science, Research and Development, TSER project 1998-2000.

Gewirtz, M. and Lindsey, A. (2000). *Women in the New Economy: Insights and Realities*, GLS Consulting.

Gherardi, S. (1996). *Gendered Organizational Cultures: Narratives of Women Travellers in a Male World*. Gender, Work and Organization 3(4): 187-201.

Hapnes, Tove and Rasmussen, Bente (2000): *New Technology Increasing Old Inequality?* In: Women, Work and Computerization: Charting a Course to the Future. IFIP TC9 WG9.1 Seventh International Conference, June 8-11, 2000, Vancouver, British Columbia, Canada, pp. 241-249.

Huang, A. Ring, A.; Toich, S. and Torres, T. (1999). *Girls' School To Encourage Achievement in Science, Math, and Computers*.
see http://www-cse.stanford.edu/classes/cs201/Projects/gender-gap-in-education/page12.htm (accessed January 9, 2004)

Kaufman, Leonard and Rousseeuw, Peter J. (1990). *Finding Groups in Data – An Introduction to Cluster Analysis*, A Wiley-Intersience Publication, John Wiley & Sons, New York Chichester Brisbane Toronto Singapore.

Margolis, Jane; Fisher, Allan and Miller, Faye (2000). *The Anatomy of Interest: Women in Undergraduate Computer Science*. In: Women's Studies Quarterly, 28(1/2), Spring/Summer 2000.

Moosbrugger, Helfried and Frank, Dirk (1992). *Clusteranalytische Methoden in der Persönlichkeitsforschung – Eine anwendungsorientierte Einführung in taxometrische Klassifikationsverfahren*, Verlag Hans Huber Bern Göttingen Toronto Seattle.

Thomae, Hans (1996). *Das Individuum und seine Welt. Eine Persönlichkeitstheorie*. Third extended and improved edition, Hogrefe: Göttingen, Bern, Toronto, Seattle.

Von Hellens, L. A.; Pringle, R.; Nielsen, S. H. and Greenhill, A. (2000). *People, Business and IT Skills: The Perspective of Women in the IT Industry*. Proceedings of the 2000 ACM SIGCPR Conference. New York: ACM, 2000, pp. 152-157.

Von Hellens, Liisa A.; Nielsen, Sue H. and Trauth, Eileen M. (2001). *Breaking and Entering the Male Domain*: Women In the IT Industry. In: Proceedings of the 2001 ACM SIGCPR conference on Computer personnel research, April 2001, pp. 116-120.