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WWW-ICT
(http://www.ftu-namur.org/www-ict)

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Introduction

This report provides an analysis of the case studies of work organisation in the IT services and e-publishing sectors conducted in the seven European countries covered in the WWW-ICT project: Austria, Belgium, France, Ireland, Italy, Portugal and the UK. In each country, two case studies were conducted in each sector, making a total of 14 IT services case studies and 14 e-publishing case studies.

The report is presented as follows:

- The first two chapters of the report contain overviews of the IT services and e-publishing sectors respectively. These overviews synthesise data reported by the national project partners on the characteristics of these two sectors in their countries. The two sectoral overviews provide a background to our subject analysis of case study data.

- The following two chapters contain our cross-national analysis of the case study data in IT services and e-publishing respectively. In each case, we have focussed the analysis on two aspects of the case studies: the policies and practices of firms, and the work and experiences of employees. First, at firm level, we discuss the organisation of work and working time; recruitment, progression and employee development policies and practices; firms' skills requirements in hiring IT professionals; labour and employment relations; and firms' equal opportunities policies and practices. Second, at employee level, we analysis their work processes and skills, the training to which they have had access, and the individual learning which they have undertaken.

- The fifth chapter briefly considers the ways in which the case study findings are affected by the contexts, including country contexts, within which the organisations are situated. In particular, it examines the intersection between national and organisational contexts, and it seeks to advance our understanding of which factors take primacy in which circumstances. It focuses on three contextual issues: employment and industrial relations; training régimes; and equal opportunities régimes.

- The sixth chapter offers our conclusions from the case studies, set in the context of our original conceptual framework, and in the context of the findings from the biographical interviews.

- A summary of our case studies and informants is contained in the Annex.

1. The Computer Services Sector – an Overview

1.1 General characteristics of the sector

Computer services is a sub-category of the economic sector known as 'computing and related activities', which also covers hardware manufacturing, telecommunications and computer wholesale activities. In the European industrial classification system, computer services is represented by NACE code 72, representing the following activities:

- 72.10 IT system consultancy
- 72.20 programming and software consultancy
- 72.20 programming and software production
- 72.30 data processing
- 72.40 data banks
- 72.50 computer maintenance and repair
- 72.60 other IT activities (1).

Sales and employment in computer services far outweigh those in computer manufacturing, in all of the seven countries covered by this study. Computer services takes around two-third of the total computing market in these countries, accounting for between 66% and 70%. In other words, in computing as in the economy more broadly, services make up the vast majority of both activity and added value and have become far more significant than manufacturing.

Within the computer services (NACE 72) sector, the market is dominated by firms engaged in software consultancy and supply. This is true of all countries, though the degree of domination varies. In Italy, for example, software companies took fully 92% of the computer services market in 2000 (2). In Austria, they accounted for 60% of that market, in Belgium, 70%(3). The size and nature of these firms also varies. US multinationals (for example, IBM, HP, EDS) have either branches or subsidiaries in most European countries, but they have particularly strong presence in Ireland and the UK. In these countries, the sector is bifurcated and inward investment is a major driver of the sector and its local growth. The sector is consequently split between a small number of large multinationals on the one hand, and a large number of SMEs on the other hand. In all other countries, however, the sector is made up of small companies with less than ten employees. Some of these small firms tend to

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1 Although the NACE classification is commonly used throughout the EU, there are national systems often developed in order to provide improved European comparability, but with subtle differences. In Italy, for example, the Italian National Statistical Bureau (ISTAT) classification for IT software and services omits the category of computer maintenance and repair. In the UK, a similar classification system to the Italian system, the SIC-92 (Standard Industrial Classification), is in operation. Here, computer services is identified by code 72, with the following sub-sections and activities: 72.1 Hardware consultancy; 72.2 Software consultancy and supply; 72.3Data processing; 72.4 Data base activities 72.5 Maintenance and repair of office, accounting and computing machinery.

2 FTI (Forum per la tecnologia della informazione) (2002) *Verso la e-society, VIII Rapporto sulla Technologia dell 'Informazione e della Comunicazione in Italia*, Franco Angeli, Milano.

3 DAT (2001) (Datenverarbeitung and Datenbanken 2001) *Study of the characteristics of companies in the sector "computer and related activities",* Statistik Austria.
See http://www.statistik.at/unternehmen/datenbank_txt3.shtml. Agoria, Tic Flash 56 04/04/2002, EITO 2002.

specialise in niche products like development tools, applications software, network software, or sector-specific applications. They may compete with large software houses, spin-offs or former subsidiaries of large multinational hardware and software providers. Many have themselves been taken over by these large companies, and are no longer independent.

Furthermore, despite the ability of the information society to potentially create the 'death of distance', computer services turns out to be highly place-dependent. Activity is centralised in or around capital cities: in Austria, it is clustered around Vienna, in Ireland, around Dublin, in the UK, around London. Only in Italy does there appear to be more even geographical dispersion of computer services between the north and south of the country, and currently faster market growth in the South of the country (4).

1.2 Employment growth and contraction

Until two or three years ago, the story of the computer services sector in Europe was one of continuous and remarkable growth, in both market and employment terms. This was the pattern across Europe, but perhaps the most striking and illustrative example of growth in the sector is to be found in Ireland, where employment growth rates in the 1990s in software services and supply were consistently above 15%, and in some years were around 54%. Employment in this sector grew faster than in all other manufacturing sectors (5).

This dynamism can be attributed to a number of developments in European countries, including:

- A generalised shift away from manufacturing and towards services in European economies, increasing demand for both computer products and computer services.
- The rapid diffusion in ICTs underpinned, among other things, by national and European level policies for the development of the Information Society
- The move from hardware to software as the most important and also the most problematic element of IT systems, in both supply and demand terms (6)
- The entry of US multinationals as inward investors, bringing with them rapid economic and employment growth in regions such as Ireland.
- Economic development policies predicated upon the supply of a highly educated and IT skilled workforce. This has been a specific policy in Ireland which has shaped its approach to education and training for technological work.

Such was the rapidity of growth in the sector that it can be easy to overstate the importance of IT employment in national economies. Despite the high levels of revenues created by the computer services sector, it is worth noting that even at the height of the IT boom during the 1990s, it still only accounted for a small proportion of employment in many countries and did

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4 FTI (2002) already cited.

5 National Software Directorate (2000) *Survey of the Software Industry*, Dublin, National Software Directorate.

6 Friedman, A. with Cornford, D. (1989) *Computer Systems Development,* Chichester, John Wiley.

not constitute a major driver of job creation. For example, at the end of the 1990s, only 1% of the working population was employed in French computer services; in Ireland, employment in the sector did not exceed 2% at any time; in Italy, only 1.5% of the total national employment (7). This is in part a function of the fact that in all countries the computer services sector is very fragmented, consisting predominantly of a large number of small companies, or microbusinesses, employing very few employees and often utilising external professional consultants and quasi self-employed people.

Table 1.1: Employment change in computer services in the WWW-ICT countries, 1999-2001

	1999	**2000**	**2001**	**% change 1999-2001**
Austria	57,298	63,511	67,382	+17.6
Belgium	-	37,185	42,006	+12.9 (2000-2001)
France	-	-	278,000	
Ireland	27,600	30,000	-	+8.7 (1999-2000)
Italy	284,228	287,355	297,700	+4.5
Portugal	63,750			
UK		555,000	-	

Source: Sectoral Overviews of IT Services, WWW-ICT Research Team members, unpublished reports.

Table 1.1 gives an indication of the pace of employment growth in the computer services sector, and for Portugal and the UK, of the level of employment in computer services at fixed points. The workforce employed in ICT supply and services in the UK grew by 92% between 1997 and 2002.(8)

During the past two or three years, however, the computer services sector has undergone a dramatic downturn. Companies in the sector continued to assume a growth scenario and made major investments, even as the boom period was apparently ending. There has been a decrease in spending on IT by organisations, with the exception of the public sector. The dot.com crash took place, and this, coupled with a slump in general business confidence following September 11th 2001, has considerably slowed economic and employment growth in the sector. Companies have had to restructure, and some have closed down. Others have been merged or taken over. Paradoxically, large companies seem to have been particularly vulnerable to this process. Many companies are relocating or outsourcing their IT service functions to other parts of the world: the Indian sub-continent, China, south-east Asia and eastern Europe.

7 Ihle, J., P. Butler, et al. (2002). *ICT Cluster Study in the Dublin Metropolitan Area*, Dublin, Nexus Research; Anasin, Assinform, Federcomin, *Rapporto sull'occupazione e sulla formazione nel settore dell'Informatica e delle Telecomunicazioni in Italia,* 2002.

8 Peters, J., Lane, N., Rees, T. and Samuels, G. (2002) *Set Fair: A Report on Women in Science, Engineering and Technology,* London, Department of Trade and Industry.

The downturn is particularly noted in the Belgian and UK reports. In Belgium, the computer services market is completely flat, though employment figures are not yet current enough to show a decline. In the UK, employment dropped sharply at the beginning of 2002, and continued declining during that year. It only began to rise again slowly at the end of the year and during 2003, but remains at a lower level than two years ago before the recession took place. In software consultancy, for example, employment declined from a peak of 375,000 at the end of 2001 to 357,000 in the middle of 2003 (9). This does not take into account declining employment among self-employed IT contractors and consultants. Employment growth expectations for the near future are also poor, and as a consequence, a significant part of the skills shortage which traditionally affected the sector has evaporated.

1.3 Characteristics of the workforce

Gender and age dimensions

Across the participating countries, professional employment in computer services is dominated by young men. Women are a substantial minority in the sector, and of those employed in the sector, not all are professional workers. Many are administrative, support and other non-technical personnel. As Table 1.2 shows, between one-quarter and one-third of employees are female. Indeed, in many of the case studies which are analysed below, the majority of female employees in computer services companies are in administrative occupations.

Table 1.2: Proportion of employment taken by women in computer services in the WWW-ICT countries, 2001

	Percentage female, computer services workforce, 2001
Austria	30*
Belgium	26
France	28
Ireland	32
Italy	-
Portugal	39**
UK	26***

Source: Sectoral Overviews of IT Services, WWW-ICT Research Team members, unpublished reports.
* Figure is for 2002.
** Figure is for the ICT sector as a whole.
*** Figure is for 1999.

Looking at the case of Belgium, it is apparent that whilst there was job creation in the sector (up until early 2002), women benefited and consequently the absolute employment levels of women rose. However, in relative terms women's employment in the sector declined as a proportion of the total: women benefited from employment growth but men benefited to a

9 e-skills Bulletin, October 2003, London, e-skills UK.

greater extent. Throughout the participating countries, the computer services sector has if anything become more masculinised over time, and indeed the country reports which supply time series data show a steady decline in the proportion of female employment in the sector. Moreover, computer services employees are typically young men under the age of 35. Irish statistics also show that in that country, the majority (65%) are single, and this combination of workforce characteristics will undoubtedly influence the culture of the companies in which they are employed.

Education and Qualifications

The ICT workforce is also highly educated, highly qualified and highly skilled in comparison with its counterparts in the broader economy. For example, in most countries, the graduate population is between 10 and 15% of the workforce; in Austria, 36% of the computer services workforce has a degree, in France, 45% has one, and in Ireland, a full 69% are graduates (10).

Not all computer services professionals have degrees in computing or information technology subjects, however. Employers draw their workforces from all disciplines, mainly for their personal skills and aptitudes. Indeed, in a survey carried out in 2000, 70% of employers in the UK stated that they 'claimed computer science degrees do not provide the skills needed to succeed in the workplace' (11).

Until the beginning of the 2000s, there was a shortage of skilled IT labour in all countries. These labour shortages created rising pay levels and high levels of labour turnover. There is still strong demand for professional ICT skills, in fundamental operating systems, in programming languages and in Internet-related skills. In the last couple of years, however, the downtown in the global economy, the dot.com crashes and the contraction of the IT industry have led to large-scale redundancies among IT workers and contractors. The skill shortages of the 1990s appear to have passed as demand has slowed down and supply has caught up; and concern has now switched from shortages in the quantity of IT skills to the quality of skills supply. Increasingly, generic skills are sought, in teamworking, communications, problem solving and numeracy. A recent survey of IT managers conducted by the British Computer Society found that the most sought after skill is that of integrating business and IT strategy, which was ranked as more important than change leadership, people development, project and programme management (12).

Contracts and working hours

Employees in the computer services sector are among the most favoured in the labour market, in terms of wages and employment contracts. Wages are relatively high, and many IT workers are paid in a combination of cash and share options. Moreover, US-style individualised employment contracts are widely used, so that individually agreed pay, terms and conditions

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10 In this last instance, the figure may well reflect the deliberate strategy of the Irish government during the 1980s and 1990s to expand higher education and to create a highly qualified workforce for the growing technological industries.

11 Silicon.com (2000) *The silicon.com Skills Survey 2000,* Annual Skills Survey, www.silicon.com

12 British Computer Society (2003) *Business and IT Skills seen as Essential by IT Managers*, BCS e-Bulletin Archive Issue 45, April, www.bcs.org/ebulletin/030402/skills

replace the fixed pay grades traditionally found in other sectors. Performance-related pay or bonus schemes are common. Such arrangements have been relatively lucrative for employees until the recent recession in the sector and the decline in share prices. It has now become more apparent that IT employees' pay arrangements have drawbacks as well as advantages, and that their individualised pay arrangements make them peculiarly vulnerable to the vicissitudes of the stock market and labour market.

Despite this new vulnerability, IT employees remain core workers in the labour market. Employment is predominantly on full-time permanent contracts (for example, 88% of employees in Austria, 96% of employees in France). Part-time employment and flexible working arrangements are very much an exception in this sector, though they are more common among female employees.

Full-time working often means long working hours. Project work can be unpredictable, involving pressing deadlines, and evening and weekend working is not unusual. Working hours certainly often exceed those laid down in employment contracts, though overtime is rarely paid for. Indeed, as Mermet and Lehndorff (2001) have noted, long hours are often self-imposed by the employee (13). Consequently, in France, the implementation of the 35 hour working week has been very problematic in this sector, where even the imposition of the legal limit of 39 hours was fraught with difficulties. It is perhaps not surprising that, given these kinds of working patterns, the sector employs predominantly young men who seem able (and apparently willing) to provide the total availability needed by their employers.

This is the state of affairs for employees. However, conditions are less favourable for a 'buffer' of temporary and contract workers. There is a significant level of self-employment and contract employment in computer services, though we have not collected statistical data on this aspect of work in all countries. We do know that in Austria, 20% of people working in the sector are self-employed or working in a company owned by a family member. We also know that self-employed computing professionals are not as advantaged as their counterparts in the core IT workforce. Although their working time patterns seem to be similar to those of their permanently employed counterparts, they are more vulnerable to redundancy and have been hit hard by the recent downturn in the sector.

Employment Relations

In terms of employment and industrial relations, the computer services sector is a world away from traditional companies, in most of the countries studied at least. Even in countries with strong collective bargaining frameworks (for example, Belgium, France), employment relations in the sector are highly individualised. This has been described as a 'non-union human resource model' (14). At its centre is a lack of trade union membership and collective bargaining, underpinned by corporate antipathy or downright hostility to unions. This is especially so in the case of US multinationals which are present in every computer services market and particularly prominent in countries like Ireland and the UK. There are very low

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13 Mermet, E. and Lehndorff, S. (2001) *New Forms of Employment and Working Time in the Service Economy (NESY)*, Country Case Studies Conducted in Five Service Sectors, ETUI Report 69, Brussels, European Trade Union Institute.

14 Roche, W.K. and Gunnigle, P. (1995) 'Competition and the New Industrial Relations Agenda', in Leavy, B. and Walshe, J. S. (eds) *Strategy and General Management: an Irish Reader*, Dublin, Oaktree Press.

levels of unionisation on US-owned greenfield sites. Equally important is employee indifference to unions which are seen as irrelevant to their already relatively privileged circumstances. The fact that computer services employees are young, and highly skilled, and up to now operating in a tight labour market where unemployment and labour market disadvantage are unknown, militates against trade unionism. Even in countries where union membership is high, membership figures for the sector (which are difficult to obtain) seem to be comparatively low.

Collective employee relations are replaced in computer services by individualised employee relations, personnel management by human resource management. Pay and conditions are agreed bilaterally (and often kept confidential from other employees). Pay is based partly on performance assessed through individual appraisals carried out periodically by line managers. Training and development needs are usually assessed at the same time. Communication – not consultation - is carried out on a one-to-one basis between employers and employees.

One of the few examples of a collective agreement uncovered during this project concerned one signed between the French IT service companies association Syntec and the union of telephone and network operators, Unetel, in September 2002. This covered the sharing of activities and the definition of boundaries of activity.

For the future, the question is whether this model of employee relations will set the template for employee relations in other sectors. Already in Ireland and the UK, this ‘non-union human resource model’ operates well beyond the computer services sector and is increasingly typical of their generally weak collective bargaining frameworks. Is this likely to be the future of employee relations elsewhere in Europe? Alternatively, as the computer services sector begins to suffer some of the cyclical problems of reduced profitability, increased unemployment, and precarious conditions experienced in more traditional industries, will it begin to resemble them and move away from individualism and towards collectivism?

2. E-publishing – an Overview

2.1 General characteristics of the sector

Issues of definition

The precise definition of the 'e-publishing sector' is fraught with difficulty. This difficulty of definition arises from the problem of identifying exactly what e-publishing consists of, and which organisations are involved in it. At its most obvious, the term refers to the publication of material through electronic media, yet this very process involves activities which go beyond the province of conventional publishing. Moreover, e-publishing activities are carried out in such a wide range of organisations and indeed sectors that they cannot straightforwardly be mapped onto the mainstream publishing sector. The activities and processes connected to e-publishing are also constantly evolving as ICT infrastructures and media evolve. The complexity and fluidity of the sector besets any attempt to characterise, describe, and analyse with precision the activities conducted within it, or at least to be sure that the term 'e-publishing' has a commonly-understood meaning. One of our informants even suggested to us that 'the e-publishing sector does not exist' (15).

One of the central difficulties concerns the very identification of organisations and employees within the 'sector'. According to a draft report of the European Parliament, e-publishing covers internet bookshops, electronic books, print-on-demand and internet books, newspapers and scientific, medical and technical journals (16). In all the WWW-ICT countries, however, there is a lack of official statistics which distinguish this sector from publishing in general, or which isolate information on those working on publishing activities in organisations which are not defined as publishing. In general, the most widely-favoured approach to the analysis of e-publishing in the different countries participating in the project was to treat e-publishing primarily as a branch of the publishing sector, whilst recognising that some e-publishing activities and organisations fall outside of this main area of focus. This approach, however, is one that derives not from examination of uniform or internationally comparable official statistics, but rather is developed by the researchers largely on the basis of information provided by employing organisations and associations, trade unions, and education and training institutions.

Table 2.1 summarises the coverage of e-publishing in the different countries (as defined by the project partners on the basis of national exploratory research). It shows how e-publishing is differently constituted, and different activities carry different weight in the various countries.

15 D'Ouville, L. and Sage, R. (2003) *The e-publishing sector*, Sectoral Overview for France, unpublished WWW-ICT report.

16 European Parliament, Committee on culture, youth, education, the media and sport, *Draft report on new frontiers in book production: electronic publishing and printing on demand*, (2000/2037 (INI)), 10 October 2000.

Table 2.1: The origins and nature of e-publishing in the WWW-ICT countries

	Origin of e-publishing sector	**Nature of e-publishing actors and/or activities**
Austria	Development from traditional media to content industries	- Traditional media (e.g. newspapers) move into online journalism. - Specialist information providers (e.g. of business information) develop online distribution. - Public administrations provide public information via the internet. - Small multimedia studios emerge to provide dedicated internet content.
Belgium	Traditional publishing is affected by the diffusion of ICTs which develop e-publishing	- Book publishers - Newspaper publishers - Printing industry (NACE-Bel codes 22.22, 22.23, 22.24 and 22.25).
France	e-publishing develops out of conventional media and publishing sectors.	- Traditional publishing and media companies: books, newspapers, TV, radio, cinemas, theatres, museums. - Small start-ups: content providers, web agencies
Ireland	e-publishing develops as a sub-activity of traditional publishing and printing, which includes computer media reproduction	e-publishing is principally conducted within conventional publishing companies in NACE22 (Publishing, printing and reproduction of recorded media): - Publishing of books, newspapers, journals and periodicals, sound recordings (NACE 22.1) - Printing of newspapers and other printing (NACE 22.2) - Reproduction of recorded sound, video, and computer media (NACE 22.3)
Italy	e-publishing emerges from the innovative activities of traditional publishers, telecommunications companies and specialised 'Net Companies'. Convergence between companies takes place as they move into new territories. First phase of new media activities dominated by ICT firms; sector now dominated by publishers, and content and service providers.	- Book and newspaper publishers, radio and TV companies making material available online. - IT and telecommunications providers develop expertise in messaging and information provision. - 'Net Companies' are established to exploit opportunities provided by the internet and move into the provision of published material online.
Portugal	e-publishing is developed mainly by conventional newspaper and magazine publishers.	Newspaper and magazine publishers place some material on the internet. The also move into content and service provision.
UK	e-publishing has principally been developed by conventional newspaper and journal publishing companies, by broadcasters and by business and professional information providers.	- Book publishers - Journal publishers - Newspaper and magazine publishers - Business intelligence services - Television and radio broadcast media (e.g. BBC) - Database providers

Source: National overviews of e-publishing, unpublished WWW-ICT project reports.

Although the conventional publishing industry is one of the key drivers of e-publishing in most countries, there are national differences. In Austria, book publishers are insignificant players (largely because the Austrian market is dominated by German publishing houses),

whereas they are important players elsewhere. In most countries, however, it is the print media, particularly newspapers, which have been decisive in electronic publishing, placing online first small sections, then entire papers, and subsequently organising and presenting information in entirely new ways for online readers, including in specialised or personalised ways for niche markets.

Other organisations from outside the conventional printing and publishing sectors are also important for e-publishing. The public authorities in Austria have been instrumental in the development of e-publishing by placing information in the public interest online. In Austria, France and Italy, small internet start-up companies are particularly identified as key players in the development and distribution of content online, often moving into the terrain of larger publishing companies. In Ireland, computer media reproduction provides a major source of e-publishing employment. This is a function of the importance of IT manufacturing and services in Ireland, and of its status as a gateway to European markets for US multinationals in the IT sector. In the UK, the BBC has been one of the main drivers with its BBCi online information service. Indeed, there has been considerable convergence of activities between companies as they have moved into electronic publishing, such that it has become more difficult to talk of 'publishers' or 'media' organisations'. Increasingly, organisations from across conventional sectoral boundaries are involved in e-publishing and are moving into new markets in order to do so.

Economic characteristics of e-publishing

The discussion above underlines the diversity of the sector and illustrates the problems inherent in collecting statistical data on its constituents. Nevertheless, it is clear that in the WWW-ICT countries, e-publishing has its main origins in the publishing, printing, media and ICT sectors. The electronic dimension to e-publishing can be online (usually the internet), or off-line in the form of CD-ROMS and other electronic storage media. However, e-publishing is distinguishable not only because of the application of ICTs to conventionally presented information, although in many cases this was how e-publishing first emerged. More recently, however, it has come to require new ways of organising and presenting information, to give added value compared to printed or other conventionally produced products through interactivity and multimedia. Value is added through wider availability, greater interactivity, the inclusion of hypertext. The advantage of online newspapers, for example, is that information can continuously be changed, updated or modified; links can be created to other sites with further or more in-depth information; personalised subscription services can be offered to customers with particular news requirements.

E-published material (which is in fact mostly immaterial) is consequently considerably more flexible and manipulable than hard copy. It can be updated more rapidly and immediately and disseminated more widely at very low distribution cost. On this basis, we would expect e-publishing to threaten or displace its physical counterpart. Yet this has not happened everywhere. Although the printing industry is in decline in most countries in newspaper publishing, for example, proprietors report complementarities between physical and electronic editions, with online versions apparently attracting new readers to the paper editions of newspapers. As a result, newspaper publishers use the information content of their online versions to capture new markets and maintain the sales volumes of their paper products.

However, expectations of rapid growth in e-publishing activities and markets do not appear to have been fulfilled in the WWW-ICT countries. A report for the European Commission by Andersen Consulting published in 1997 assumed an increase in the e-publishing market in line with the diffusion of domestic multimedia, to between 5% and 20% of publishers' turnover in 2000 (17). Yet e-publishing has not so far expanded as fast as predicted, and in some countries it still remains peripheral to publishing more generally. One problem is that indigenous e-publishing companies have to date experienced a lack of demand for their products, which is attributed to several factors:

- Markets not yet ready for electronically published products. In both France and Belgium, it is argued that there is still too little cultural acceptance of material delivered on screen rather than hard copy, and/or a reluctance to pay for information delivered on the internet.

- Difficulties for non-English publishing companies of achieving large market share in a technological environment increasingly dominated by the English language. Austria, for example, finds that being a German-speaking country creates problems. It is not a technological leader in terms of internet development and its companies do not routinely produce material in the English language which would reach a wider international market. On the other hand, parts of its German language publishing sector (e.g. book publishing) are dominated by German enterprises, and Austrian participants in this part of the sector remain very small.

- The persistence of relatively low levels of internet access. In Portugal, for example, internet access remains quite low, and as a result hard copy media are still more widely read than online or electronic versions. However, the Austrian case suggests that internet access alone is not a sufficient condition for the take-off of e-publishing, since internet density in Austria is relatively high yet the development of e-publishing remains restricted by language limitations.

- The bursting of the dot.com bubble and its considerable effect on companies involved in e-commerce. The financial losses and closures among e-commerce companies over the past two years have removed a large segment of potential e-publishing activity from the market, and has forced many companies to redefine their business strategies. In Italy, it has meant that whilst the early phases of e-publishing activity were dominated by the ICT companies, they have now withdrawn, and it is publishing companies and content providers which are at the centre of the sector.

In all countries, the sector is bifurcated between large conglomerates and small independent e-publishers. This reflects the concentration of ownership of the precursors of electronic publishing: the conventional publishers, newspaper owners, print companies, ICT companies and media companies. The common scenario is one in which the market is dominated by a very small number of large firms, conglomerates and multinationals, many created through mergers and acquisitions. These firms also employ the majority of workers in the e-publishing sector. On the other hand, small companies, start-up enterprises and micro-businesses form

17 European Commission (1997) *Electronic publishing, développements stratégiques de l'édition européene à l'horizon de l'an 2000: le challenge multimedia de l'Europe,* Rapport principal, Commission européene, DGXIII/E, 1997.

the majority of total companies, are a vital part of the sector and in most countries, a major motive force in its development.

2.2 Employment and Work Organisation

The organisation of employment and work in e-publishing has been strongly shaped by the processes of restructuring and technological innovation which have taken place in publishing and printing over the past two decades. During the 1980s and 1990s, the progressive concentration of these industries, together with the introduction of computerised compositing, have fundamentally altered the labour market, skill levels and employment relations of the sector.

Most notably, the craft manual skills required for conventional hot metal-based printing have been superceded with the move to computerisation. This resulted in the progressive reduction and destruction of blue-collar jobs on the one hand, and in the creation of new jobs linked to the operation of information and communication technologies, on the other hand. Large-scale redundancies have taken place among craft workers, particularly in newspapers and the printing industry. Not only the craft skills but also the trade union relations attendant upon a strong blue-collar workforce have been decimated. What was once a highly unionised sector has become much less strongly organised, and in some instances, non-union. The era of the permanent employment contract has also been replaced; in most countries, freelancers are an important segment of the e-publishing workforce, particularly in journalism, but also in technical jobs such as web design and computer graphics.

As we have seen, e-publishers invariably work across markets rather than within market niches, producing a diversified range of information services where in the past they concentrated on a specialised area of publishing. So, for example, news media organisations also publish customised information, have developed online services, search engines, portals, e-commerce services, job services, thematic sites and thematic newsletters.

Professional profiles and skills

As a result of this combination of innovations both structural and technological, the professional profiles and the nature of skills used in the sector have also undergone considerable change. Even in classical publishing professions like journalism, there are notable new areas of knowledge and skill involved in the work of an electronic journalist. In early days of electronic journalism, particularly, a lot of technological know-how was required in addition to conventional journalistic skills, as online newspapers were often initiated by editors of existing newspapers. With the evolution of e-publishing, a division of labour has emerged in which technical, editing and design tasks are usually carried out by separate people.

Nevertheless, a survey of online journalists conducted in Austria in 2001 found that e-publishing involves a combination of conventional journalists' tasks (information gathering, writing, editing) with technical and design competencies (layout and processing of graphics

and pictures, using networks and databases) (18). It is generally found that online journalists need to have skills and knowledge in using ICTs for researching, processing and presenting information electronically, even if the technical aspects of e-publishing are increasingly handled by specialist technical staff. In situations where journalists do both writing and technical work (for example, in small organisations without extensive divisions of labour), they need to have competencies in searching for and selecting information from electronic as well as conventional sources. They need to be able to present information using diverse languages including HTML and WISIWIG software, and to be able to add illustrations, graphics, hypertext links. In this situation, it has been suggested that the job of e-journalist becomes more sedentary as s/he is increasingly tied to the operations of the computer, and that work may be intensified through the elimination of the natural breaks occurring when a worker moves around an office or from one task to another.

Beyond e-journalism, there are newly emerging professions in e-publishing, and the blurring of some professional boundaries. New and emerging professions linked to e-publishing include:

- Multimedia designer-copywriter: combines text, sound, images, etc. on one medium. Designs the diagrammatic representation of the product according to the requirements of the customer and anticipated users.

- Multimedia programmer-integrator: a computer scientist who uses computer programming languages to describe and design web pages, and assembles all the elements required.

- Computer graphic artist: a designer who creates graphics adapted to multimedia and to the interactivity required from the product. The computer graphic artist may also carry out pre-press functions in some firms.

- Webmaster: the website administrator, who co-ordinates, develops and supervises it. Conducts the technical operations, including the setting up and configuration, which allow maintenance of the site, and often provides the link, via an email address with the public.

- Project manager or project leader: manages the creative team and the programming work and ensures collaboration between the different professionals to produce the desired product within a time-scale and budget.

Qualifications and professional development in e-publishing

These newly emerging job profiles require a mix of technical and other specialist skills (such as design or journalism skills), and are all characterised by the need for flexibility, continual learning and training, and adaptability. As a consequence of the newness of electronic publishing and of the variety of newly-emerging skills involved in the work, there is, however, little formal accreditation of skills specific to this sector. On the development and programming side, skills are increasingly privately certificated by the large software providers, but this does not accurately reflect the skills and knowledge involved in exploring

18 Preundler, J., Schiefer, C., Tschütscher, D., and Weibold, T. (2001) *Berufsstruktur des Online-Journalismus – Allgemeine theoretische Ansätze und Praxissituation in österreichischen Online-Redaktionen*, seminar paper, January 2001, see http://www.onlinejournalismus.com

and developing new systems which are often at the cutting edge of software development, and creating highly bespoke products. On the content creation and design side of the work, again, there is private certification of, for example, web tool handling and web design skills, but the work often involves considerable experimentation, learning from colleagues, over the web and from magazines, and learning-by-doing which is not formally recognised and accredited. In effect, the skills required are flexible, broad skills with fluid titles, including design, operating systems and programming languages, server expertise, file manipulation, literacy, teamworking, project management and so on (19). Electronic publishing is a good example of an activity requiring 'reprogrammable labour' (20) which is constantly having to reinvent and upgrade its skills.

Yet, compared with emerging professions in the ICT sector, jobs in the e-publishing sector appear to require a lower level of technical skill. A study of the skills and qualifications of IT specialists in the Austrian 'IT-content and media' sector conducted in 2002 found that 80% of IT specialists possessed 'basic' IT qualifications and only 20% had high level IT qualifications, compared with 49% possessing basic qualifications in the IT software and services sector, and 51% with high level qualifications (21). Even in technical jobs, therefore, the technical content is relatively low compared with work in IT services. In e-journalism, the technical content is lower still, and specialist software often handles the design and technical tasks involved.

Professional development for e-publishing professionals is in its infancy. Many people working in the field have no vocational training, and are more likely to learn on-the-job. Training programmes specifically aimed at professionals in e-publishing are rare. In Austria, university and college courses exist, but they tend to focus on journalism generally, with modules or sections dealing with online journalism. Professional associations also run seminars and courses on online journalism. Very little training is done by employers. In Italy, postgraduate courses are offered by universities (for example, the Master in Editoria Cartacea e Multimediale at the Scuola superiore di Studi Umanistici di Bologna, and the postgraduate course in multimedia communication at the Politecnico di Milano). This seems to be the only country in which there is some collaboration between professional associations and trade unions to plan vocational training to better meet the needs of the newly-emerging professions. In the UK, too, the main type of formal training for e-publishing is done at postgraduate level in universities: degree courses for e-publishing have been established (for example, at Robert Gordon and Napier Universities in Scotland, and at City University in London), mostly at postgraduate level and mostly located in publishing and journalism departments. In addition, postgraduate courses in conventional publishing also now invariably include an element devoted to electronic media.

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19 Kotamraju, N. P. (2002) 'Keeping up: web design skill and the reinvented worker', *Information, Communication and Society*, 5, 1: 1-26.

20 Castells, M. (1996) *The Rise of the Network Society*, Oxford, Blackwell.

21 Kurt Schmid (2002), *IT-Fachkräfte im mittleren und intermediären Qualifikationssegment: Nachfrage und Einsatzgebiete – Explorative Befragung österreichischer Unternehmen*, in: Informatikausbildung auf Technikerebene – Internationaler Vergleich und Unternehmensbefragung, ibw-Schriftenreihe Nr. 121, 2002. The author defined "basic qualifications" as knowledge corresponding to the ECDL (European Computer Driving Licence), some knowledge of specific applications, plus higher problem-oriented knowledge and basic knowledge of network technology. "High level qualifications" involve detailed knowledge in specific areas of ICT or ICT developing capabilities and science-based ICT knowledge with research orientation.

2.3 Gender Issues

Gender divisions of labour

The difficulties inherent in quantifying the numbers of employees working in the e-publishing sector also apply to any attempt to estimate the gender breakdown between men and women. Because it is hard to distinguish e-publishing from conventional publishing in employment statistics, here we can only raise some issues based on what we know about the latter sector.

Unlike the ICT sector, women are not in a small minority in the publishing world. On the contrary, parts of publishing, such as journalism and editorial work, have long been an area in which women have been employed in numbers. In the WWW-ICT countries, there is some variation in the publishing sub-areas in which women are to be found. For example, in Austria, women are numerous in news journalism but absent from chief editorial positions. They are mainly employed in specialisms dealing with culture, lifestyle or health and wellbeing, less so in political journalism. In Ireland, by contrast, newspapers are strongly male-dominated, and women are only a majority of employees in book publishing. In France, female journalists are common, particularly where the publication is aimed at a wide public. In the UK, too, female journalists are numerous and several daily newspapers and online newspapers have female editors.

While women are therefore present in the sector in content-based jobs or editorial jobs, they are much less in evidence in technical jobs, for example, in professions related to development or programming or web management. This is where e-publishing seems to resemble the IT services sector. Previously existing research, together with case studies undertaken for this project, suggest that technical jobs in the e-publishing sector appear to be dominated by single, highly-educated, young men. This raises some important issues for the achievement of gender equality which go beyond the simple under-representation of women.

The equality dimensions of working conditions in e-publishing

Studies of work in new media such as e-publishing suggest that the working conditions in this sector appear to offer a number of features which are attractive to many workers, but which turn out on closer inspection to be problematic, particularly for gender equality (22). The informality, flexibility and autonomy which characterises new media work (and particularly project work done on a freelance basis) are aspects of the work which are both valued and at the same time connected to new forms of emerging gender inequality.

Instead of traditional entry routes into work, formal networks can be the key source of information about work and professionals often create their own work. In team-based projects without organisational hierarchies, roles are often fluid. This informality is both an attraction and a major problem, particularly for women. For example, it can be problematic in terms of: working with men in male-dominated teams, with sexist assumptions and laddish cultures

22 Gill, R. (2002) 'Cool, creative and egalitarian? Exploring gender in project-based new media work in Europe', *Information, Communication and Society*, 5, 1: 70-89; Perrons, D. (2003) 'The new economy and the work-life balance: Conceptual explorations and a case study of new media', *Gender, Work and Organization*, 10, 1: 65-93.

(23); the absence of clear criteria for evaluating work; and finding and securing new contracts.

Flexibility, too, can be double-edged, determined not so much by the needs of the worker but more by the needs of the project. Round-the-clock working has been noted frequently in relation to both IT work and new media work. This is of course a work pattern which in general women find harder to manage than men, and it is perhaps significant that the phrase 'midnight oil *guys*' has been coined to describe long hours working in the industry (24). New media project workers may also have bursts of intensive working for short periods followed by no work at all – a 'bulimic career' 25().

Perrons (2003) has similarly found that, among company owners, men are more likely to be managers of companies with standard working hours, while women are more likely to be sole traders or owners with varied working patterns, and so more vulnerable to the vicissitudes of market demand and to long or unpredictable working times (26). In addition, for freelancers who work from home, there are mixed experiences and tensions between home and work. This again is particularly problematic for women, for whom the home is a site of domestic labour too. Working from home may have negative effects on the work itself – social and work isolation, inability to benefit from the ideas and expertise of peers, competing demands of clients and family.

This, then, presents a broad picture of the e-publishing sector in the WWW-ICT countries, and highlights some of the issues which may affect the participation of women in technical occupations in the sector. The case studies conducted in IT services and e-publishing now allow us to investigate in more detail the work experiences of women in these two sectors, and to identify the factors which prevent them from participating and those which might help to promote their participation. In the next part of this report, we discuss the results of these case studies.

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23 Tierney, M. (1995) 'Negotiating a Software Career: Informal Work Practices and "The Lads' in a Software Installation' in Grint, K. and Gill, R. (eds) *The Gender-Technology Relation: Contemporary Theory and Research*, London, Taylor and Francis.

24 Marschall, D. (2002) 'Internet technologists as an occupational community: ethnographic evidence', *Information, Communication and Society*, 5, 1: 51-69.

25 Pratt, A. (2000) 'New media, the new economy and new spaces', *Geoforum,* 31:425-36.

26 Perrons, D. (2003) cited above.

3. Case Study Analysis – Computer Services

3.1 Introduction

In this section of the report, we describe and analyse the 14 cross-national case studies in the computing services sector. Here, we are seeking to draw out both comparative and contrasting features of these organisations, and to understand how their structures, policies, and practices can be understood in the context of their sectoral and national environments.

We are particularly interested in the organisation of work, skills and employee development in the case study organisations, and in the ways in which these features affect the place and prospects of women IT professionals. The following analysis is carried out at two levels, therefore. First, at organisational level, we discuss the characteristics and practices of the case study companies; second, at employee level, we consider the detailed work processes, training and development opportunities, and experiences of organisational life of our informants in IT professions.

The next part of this report analyses the organisation of work, the management of human resources, and the skills requirements of our computer services case studies.

There are several common characteristics across the case studies which are worth drawing out here:

- IT services professionals are young, typically in their mid twenties
- IT services professionals have mainly full-time contracts, but in fact work long hours
- Most IT services organisations are flat organisations with few hierarchical layers
- A culture of work which originates in the US is gaining ground in European IT services organisations. This principally involves long working hours, and new forms of HR management.
- Pay, conditions and employee relations in general are negotiated increasingly on a one-to-one basis between employees and their managers.
- Trade unions are at best weak and at worst non-existent in IT services, with little collective bargaining coverage.

3.2 The Firms - Work Organisation and Working Time

There is a common stereotype of organisations in the new economy which portrays them as flat, flexible, non-hierarchical structures, organised informally around teams of professionals carrying out discrete project-related tasks. In our case studies, the organisation of work is more diverse, and different systems find their origins in the long-running histories of these companies.

The Organisation of Work and Organisational Structures

In order to understand the organisation of work in computer services companies, we have to consider the business of these companies, their size and structure, and sometimes their cultural legacies. As in manufacturing, the organisation of work is strongly related to the nature of, and market for, the product. Just as in industrial work there is a vast difference between the mass-production of standard products, the organisation of production for making-to-order, and continuous process production, so in computer services we have to distinguish between the organisation of work for standard product offerings (such as software packages), and the production of bespoke products and made-to-order services and solutions. Computer services companies may also be engaged in the supply of solutions portfolios, in other words, in supplying complete packages of diverse items, some standard, some not, but configured or individually tailored to customer requirements.

Our case studies are involved in the production and supply of a wide range of computer services, aimed at diverse markets. For example, aiming at the standard package end of the market, UK2, the small British software house, writes and supplies standard e-business software but modifies it to the particular circumstances of client companies. Work is organised around a fixed timetable of progressive software releases, similar to a make-to-stock regime in manufacturing, and staff work to a steady pre-determined pace. F1, the small French website creation company creates websites which are individually tailored to customers' specifications, but also provides other more standard web services like site hosting. Work is organised by project and carried out by project teams. Projects are finite, but the company is handling 50-60 projects at any one time, in parallel with one another. B1, the large Belgian computer services firm, is in the solutions portfolio market. It provides portfolios of IT solutions to e- and m-business users, including strategic consulting, design, implementation and operation of systems. Again, this calls for work to be organised around client-based projects, and for the solutions to be custom-made and configured. This means that staff have to work according to the demands of the customer, particularly before a contract is secured. Consequently, work organisation is flexible and the company practices job rotation between individual employees where necessary. These three cases illustrate the potential diversity of forms of work organisation resulting from different product and client markets in computer services.

Project work

The great majority of our case studies organise their work around project-based service provision. Linear and sequential work tasks reminiscent of a taylorised production system are less common than interactive and sometimes flexible teamworking, where groups of people work together towards the delivery of a project or product. These may involve devolved responsibility and autonomy, as in the case of A2, the small Austrian IT services provider. Here there are permanent teams, and all management, including human resource management is handled by the team leaders. Regular team meetings take place. Work is then organised into projects, and small project teams of between two and five staff are assembled by the project manager by drawing upon staff from the development teams according to the project's requirements and the skills available.

On the other hand, companies may use the term 'project teams' to describe their organisation of work, whilst in practice there is no day-to-day teamworking in the sense of members working interdependently. In software development, for example, project teams exist but

projects are modularised, interfaces between modules are defined, and task requirements are also pre-defined, so individuals work independently from one another

Project team-based working can take many forms and be carried out in companies' or clients' premises. In IR2, the Irish courseware and e-learning company, taylorist work organisation has been replaced with a new project team-based organisation of work:

> *... we are much more team-oriented. It is writing, editing and graphic work on a project and deadlines are very tight and we really need people to do team-based and focussed work in here, in the building (Human Resource Manager, IR2).*

Similarly, in IT2, the South Italian software house, products and solutions are produced by specialist project teams in the company's premises. The implementation process, however, often involves travel to clients' premises for technical installation and user training. In B1, by contrast, much of the work takes place at the client's premises, and the firm also has a number of offices throughout Belgium. Consequently, project work can be done on a mobile basis and individual desks have disappeared, to be replaced by 'hot-desking'. Working from home is also allowed; laptops and Internet connections allow people to work from anywhere.

> *Il y a des bureaux avec des tables et des connexions pour les PC. La personne arrive, prend une table libre, connecte son PC et puis va chercher un bac, qui est une armoire montée sur roulettes, c'est son armoire à lui, l'apporte à côté de sa table et commence à travailler. Ce qui permet d'avoir moins de postes de travail que d'employés puisque les employés, ceux qui sont dans ce type de travail, ne sont jamais présents en même temps. Ce sont des personnes mobiles, moins souvent sur le site. (Jacques, developer and trade union representative, B1).*

Organisational size and cultural legacy

It is often supposed that IT project work is flexible and non-hierarchical, being more effectively carried out in flat organisations with direct communication between management and employees. This image is only partly supported by the evidence of our case studies. We found that organisational size has a strong bearing on the organisation of work, and in particular on the presence of hierarchical forms. The small and medium enterprises are generally relatively flat hierarchies simply because of their small size and small numbers of staff. But even here, we found examples of companies which are hierarchical in culture and organisation. Small companies can be paternalistic or authoritarian, where they are the creation of a single (usually male) entrepreneur who retains central control of decision-making, or where they are acquired by a company with centralised managerial control. In IT2, for example, management power is highly centralised in the hands of the managing director and a small group of senior managers; management decisions have to be strictly followed by subordinates. IR2, a small Irish start-up company has been taken over by a US-based company, and with it has come the imposition of a distant and invisible management style and a "do it or leave it" approach to employee involvement.

> *We are totally numbers instead of names. I got an email recently to terminate somebody. No discussion, no anything, that's it (Human Resource Manager, IR2).*

The large companies, and the multinationals in particular, are structured into extremely conventional hierarchies. For example, A1, the big hierarchical software company, is the software house of a large multinational. It is subdivided into functional departments with numerous managerial layers, and remote senior management. Indeed, the structure is not

transparent to those working in it, and this creates a feeling that there is a glass ceiling which restricts women's aspirations for their own progression.

Other multinationals have complex structures and extensive managerial layers, yet employ a rhetoric of 'flatness' and organisational closeness. This is done possibly in order to motivate employees who are both numerous and geographically dispersed, and to generate a feeling of organisational cohesion, in which all are working towards a common goal. P1 and UK1 are branches of the same multinational software and services provider, a company which has undergone dramatic restructuring during the past decade in order to regain and retain market share. It has a global and regional structure, below which is a product-based divisional structure. The divisional structure is in turn organised around the company's client base. It describes itself as having a matrix structure, and a global strategy which is applied locally:

> *We are concerned, as a global company and a global structure, to apply a locally-based management, so we develop the strategy globally, and apply it locally (Communication and External Programs Director, P1).*

The company also articulates a powerful discourse of proximity and of informality between managers and employees, yet in practice because of its global structure, decision-taking is very remote from the day-to-day lives of most employees – not really local at all. Indeed, the experience of informants within the company is of a very bureaucratic organisation in which decision-making is done elsewhere and for most non-management employees there are clear rules and procedures to be followed.

Organisational structures clearly have an impact on the potential for women to develop in their roles as IT professionals. Rigid structures can create glass ceilings, or just the impression of them, whilst centralised management can militate against employee involvement in decision-making and consequently their empowerment. As we shall show during the course of this analysis, the fact that women are especially excluded from decision-making structures in organisations, coupled with their relative lack of confidence and assertiveness in organisational life, may mean that very hierarchical or centralised organisations are particularly hostile to women's development. On the other hand, we need to assess critically the theory that flexible organisational structures and management practices are positive for women in IT professions. Flexible structures may remove barriers to women's advancement, but they may simply crystallise and exacerbate existing gender inequalities in the new economy. For example, the evidence for team-working as a promoter of gender equality in the workplace is somewhat mixed (27). Equally, there is evidence to show that the flexibility and informality of many new economy firms may disadvantage women (28). This is an issue to which we shall return during the course of this analysis.

The organisation of work also affects working time arrangements, which in their turn have a gender dimension and a gender equality dimension. Companies respond to patterns of customer demand by instituting working time arrangements which best help them to meet that

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27 Goldmann, M., Kutzner, E., Riezler, M., and Auman, K. (1994) *Perspektiven von Frauenarbeit bei neuen Produktions- und Managementkonzepten,* Dortmund, Sozialforschungsstelle; Webster, J. (2002) *Innovations in Information Society Sectors: Implications for Women's Work, Expertise and Opportunities in European Workplaces*, Final Report of project 'SERVEMPLOI' to European Commission DG-Research.

28 Gill (2002) cited above.

demand in the most timely way, and they utilise their human resources accordingly. In all areas of European services, working time arrangements are being progressively reorganised beyond 'standard' working hours to allow companies to provide a more extensive service to customers. In computer services particularly, many companies are driven by the requirements of their clients and need to make their services available on the clients' terms. This has significant implications for working time, and consequently for the quality of working life of their male and female employees. Furthermore, working time arrangements can be decisive for men's and women's relative ability to progress and reach senior positions in their organisations, and consequently for gender equality in IT professions.

We now examine the working time arrangements in computer services companies, and we consider the extent to which these arrangements facilitate or block the development prospects of the women IT professionals working in these companies.

The Organisation of Working Time

Flexibility – functional, numerical and temporal

In almost all of the computer services companies, full-time working is the norm and the vast majority of employees work full-time, or even longer, hours. In general, our case study organisations employ around 90% of their work force on a full-time basis, and a very small proportion of part-timers, which is female-dominated and generally consists of women returning from maternity leave. A typical example is A1, the large hierarchical software firm, in which 92% of employees work full-time, but nearly one-third of female employees (31%) work part-time. This type of ratio of full-time to part-time working is typical of the computer services case study organisations, as is the fact that what part-time working is done, is the province mainly of women with domestic responsibilities.

There is nevertheless a degree of 'informal' flexibility in working time in many of the organisations studied. Whilst on paper employees are contracted to work at fixed times, in practice the semi-autonomous nature of project working means that working times can be variable, and some employers are content to allow their employees to organise their own work hours provided they get their work done.

> *Each person does what they want. They leave when they want, they arrive when they want, they can go to the doctors in the middle of the afternoon if they need to. Working hours are very adaptable here. All I make sure of – and I think this is natural – is that the work gets done (Manager, F2).*

> *When there is a project, you work a lot, and when it is getting more quiet again, you take time off (Human Resource Manager, A2).*

In practice, however, employees in computer services tend to give far more than they take in terms of time and work effort. Accounts of working very long hours to get work done and projects completed are widespread among the case study organisations and their staff.

The long hours culture in computer services

The computer services sector has a reputation for a long hours work culture. There is ample evidence of the intensity and 'pressure-cooker atmosphere' of IT project work, often carried out under 'siege-like conditions', in which programmers and technical staff work obsessively on a project behind closed doors for long periods at a time. This aspect of computer services

work has been found both in Silicon Valley and in computing firms elsewhere (29). In our case study organisations, long working hours were also commonplace. Often, full-time contracts involving 8-hour days are stretched to 9- or 10-hour days, but can stretch to 12 or 13-hour days when the professional is working at the client's site. Many of our informants state that they work well beyond the legal limit in their countries, and some have declared that they work up to 70 or 80 hours a week. This was particularly apparent in the UK, which has a generalised culture of long working hours, and at the time of writing, still provides for employees to opt out of the European Working Time Directive.

Nor are these working hours entirely imposed by employers. There is a strong element of 'self-exploitation' in IT professions which seems to stem partly from the pursuit of professional identity, and also partly from the apparently enormous workloads, particularly in IT management. JT, a Technical Sales Leader in UK1 exemplifies this 'self-exploitation':

> *I usually work between 70 and 80 hours a week. But that is my choice. I am on my own and I can give that time, and there is a lot that we have to do for the day-to-day job, but there is a lot more that I want to do for the community. So I do tend to spend time at weekends working, because I am now thinking of the next steps: what can we be doing better, what can we be doing next? (JT, Technical Sales Leader, UK1).*

> *We are contracted to do a 37.5 hour week, and I probably do that in 4 days. And then I still come in and do the fifth one! I work 50 hours a week easily. You do stuff out of hours, in the evenings and at weekends … the extras hours we do just around normal work, it is just something that happens, something you do to get the work done. You do a lot more than you are contracted to, and you just get on with it. It is just a way of life here. (MH, Software Engineer, UK1).*

There appear to be several reasons why the computer services sector is particularly subject to this long hours culture. The first has to do with the nature of the relationship between supplier and client, particularly where the supplier has to work to tight deadlines or is responsible for working on system installation and implementation on site. The supplier is expected to work to the client's rhythm, and to be available on a continual basis.

> *Working time? They are exaggerated because nobody can say a simple 'no' to the client. This is [the company's] policy. You have to give all your availability and energy to the firm: working overtime and sometimes also at home after work (Marta, IT1).*

> *The problem is that these rhythms are becoming the norm: every day another important deadline. There is no time to breathe any more (Paola, IT1).*

The expectation among employers and clients that IT professionals are totally available is bolstered by the fact that laptop computers, email connections to the home and other IT tools and infrastructures support and facilitate the encroachment of work into previously work-free times and places. Many of our informants reported taking work home to do at night after eating or putting children to bed, or working at home during weekends. Some experience this positively, others negatively.

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29 Hayes, D. (1989) *Behind the Silicon Curtain: the Seductions of Work in a Lonely Era,* London, Free Association Books; Cringely, R. X. (1992) *Accidental Empires: how the boys of Silicon Valley make their millions, battle foreign competition, and still can't get a date*, Harmondsworth, Penguin; Murray, F. (1993) 'A separate reality? Science, technology and masculinity', in Green, E., Owen, J. and Pain, D. (eds) *Gendered by Design: Information Technology and Office Systems*, London, Taylor and Francis; Kunda, G. (2002) 'Emotional Labor and the Culture of the Work Place', unpublished paper presented to 'Infowork' Project Workshop on *Paid Work, Unpaid Work and Social Life,* London, September.

> *... with these laptops, we end up working 24 hours a day (Informant in P1, Portuguese multinational computer services company)*
>
> *... with the technology we have got, it is easy to work at home when you want to (JT, Technical Sales Leader,UK1).*

A second factor which may explain the long working hours concerns the culture of masculinity which has been identified as surrounding a great deal of computing work. This has been described as a 'culture of masculinity' (30), because it is argued that, for men in particular, computing work is shot through with passion and excitement, and the computer is an object of intimacy. An expression of the excitement derived from computing work is found in the 'hacker culture' in which computing activity is obsessional, secretive and involves concentrated work which is carried out late into the night (31). It seems, however, that such passion and excitement is not the sole province of male computing professionals. Women, too, can become obsessed with their work in IT. A number of the women interviewed in the course of this project reported taking a similar pleasure in their work, and think of themselves as being just as 'nerdy' as their male colleagues are. Certainly it is common for IT professionals of both sexes to become very absorbed in computing activities, such that the boundaries between work and non-work begin to blur. The following remark refers to a phenomenon we found to be quite widespread among employees in the case studies:

> *For people working in this field, computing is as much a leisure activity as it is work. For some people here, when they get home, they surf the Internet, develop their own Web site ... At home, their computers are never switched off (Manager, F2).*

A third factor which perhaps explains the 'total' commitment required of, and given by, IT professionals concerns the pervasive culture of senior management in many IT companies, which notices, values and promotes people who work very long hours. Senior managers themselves typically work such long hours, and these habits communicate a message to other staff this is what is necessary, particularly for ambitious individuals who want to get to the top.

> *Certainly in the company there would be an expectation that when you reach the senior level that you would be available all the time (AC, Senior Engineer, IR1).*

Although this is by no means confined to the computer services sector, it is exemplified here. As RG, a senior executive in UK1 points out, however, it is a culture of management which discriminates against people who cannot or do not wish to work on this basis (typically women with commitments outside work):

> *[The UK General Manager] told me that in 2002 he had 15 weekends at home. Now, his job is to ensure equality of opportunity for everybody in the company. It is down to people like me to choose whether I want that lifestyle. Now I have some difficulty with that because I think actually that if large corporations*

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30 Cockburn, C. (1985) *Machinery of Dominance: Men, Women and Technical Know-How*, London, Pluto Press; Wajcman, J. (1991) *Feminism Confronts Technology*, Pennsylvania, Penn State Press.

31 Håpnes, and Sørensen, K. (1995) 'Competition and collaboration in male shaping of computing: a study of a Norwegian hacker culture', in Grint. K. and Gill. R. (eds) *The Gender-Technology Relation: Contemporary Theory and Research*, London, Taylor and Francis; Turkle, S. (1984) *The Second Self: Computers and the Human Spirit*, London, Granada; Hacker. S. (1987) *Pleasure, Power and Technology*, London, Unwin Hyman.

> *are really serious about having more senior women, then there are going to have to be some more compromises at the top (RG, Director of UK Government Business, UK1).*

Finally, the weakness or absence of unionisation in the sector, and the fact that employee relations – including pay and conditions - are predominantly individually settled, contributes to the general pressure for long working hours and to the absence of countervailing influences on this.

Flexible Working, Family-Friendly and Work-Life Balance Policies in the Case Studies

Except in countries where statutory childcare is widely available (such as France and the Nordic countries), long full-time working arrangements like those prevailing in computer services are generally antithetical to women's advancement in many professions. This is because they force women to make difficult choices between their careers and their domestic or private lives, choices which often involve women dropping off their career paths because they simply cannot both sets of demands. Companies wishing to attract and retain women in IT professions often introduce flexible working arrangements such as Family-Friendly (FFP) or Work-Life Balance (WLB) policies.

These kinds of initiatives are almost totally non-existent in our computer services case studies. In some organisations, families are regarded less as aspects of employees' lives that need to be acknowledged and catered for, but more as problems which may divert employees (and of course mainly women) from their work. The reconciliation of work and family life is treated entirely as a problem for women employees to deal with on a personal basis, but it also shapes some companies' policies concerning the recruitment and development of women:

> *Now, we have here lots of women … I think all of us already assumed that we have children … so it is like this, if we hire women, we have to think from the beginning that they will skip more work days than men (General Director, P2).*

> *I think there is a certain amount of feeling that a woman with children is not committed to her job. There was a woman, she was going to come back [from] maternity leave and she was actually to come back as a manager. The head of engineering said that management is not a part time job because she wanted to come back like three days a week in the company (AC, Senior Engineer, IR1).*

In B1, women who have asked to transfer to long part-time working (four days a week) have been stripped of their managerial responsibilities, with clear warnings from their superiors that this demotion is the consequence of choosing to work less than full-time. Only one company has a serious strategy for FFPs which is connected to its policy for advancing women in IT positions. P1/UK1 (branches of the same multinational) operates a suite of different working time arrangements, including part-time working, job sharing, compressed working week, flexible working hours. Information about these options is available on the company's intranet (but not available for downloading or reproducing by those outside the organisation). It is linked to the company's equal opportunities programme, both strategically and in the way it is presented to employees.

Ironically, at the same time as P1/UK1 offers these flexible working arrangements, it also has a very long hours culture, particularly among senior management (described above). This indicates that even companies which have excellent working time policies oriented to equal opportunities, still have practices which diverge from these and which are not always 'joined-up', that is, coherent and internally consistent. It also begs the question of how this

inconsistency is perceived by IT professionals keen to advance in the company's internal labour market: which practice is most likely to influence their own personal choice of working time arrangement? It may be that signals from senior management about the importance of long working hours are more powerful than written flexible working practices. Certainly our informants in this company work very long hours, as the quotes above indicate. Some informants complain that, consequently, their work is far from family-friendly and that their working patterns are negatively affecting their children. For example:

> *... what costs me more in all this is my son. Do you know that in some weeks I can only see him in the morning? (Informant in P1).*

However, it is also true that informants in UK1 take advantage of the provision for flexible working and take time off for personal activities when they want to do so. They perceive this very positively.

Overall, it is perhaps significant that the vast majority of informants across all the case studies are women who do not have children or other dependants, and who can therefore make choices to work long hours where necessary or where desired. And for computer services employers more generally, the issue of designing and implementing FFPs crops up very seldom as the majority of their employees are young, male and usually without family responsibilities. Even for them, WLB seems to be less of a pressing issue than elsewhere, so absorbed are most computing professionals in the work that they do. Only when companies wish to improve the representation of women in professional positions do they have to confront the issue of how working time is organised. To date, few have done so, and few may do so during the current recessionary period when the labour market is loose and IT skills are no longer in short supply. The Human Resources Manager in IR1 put this point quite baldly when he stated that FFPs are not relevant in a slack labour market:

> *... in my experience, a lot of those policies are developed to render the work attractive and bring people into work, and we are not under these market conditions (PH, Human Resources Manager, IR1).*

3.3 The Firms - Recruitment, career progression and development

The organisation of recruitment in the computer services companies

Recruitment into professional jobs in computer services is done through both external and internal labour markets in organisations. External labour markets are generally used for the recruitment of new entrants into relatively junior positions. In the case study organisations, the most common method of recruitment from the external labour market is through specialist recruitment agencies which advertise, sift applications and pass recommendations to companies about candidates for interview based on their possession of technical skills cited as entry criteria (for example, Microsoft certification or BAC+2) or of previous experience of similar work.

The larger organisations, and particularly the large multinationals (A1, P1, UK1), also recruit programmers and other IT staff through graduate fairs in universities and vocational schools. At this level, their recruitment criteria are usually diplomas or degrees in computer science. They have complex interview processes involving psychometric tests, computer science and sometimes English language tests as well as a series of oral interviews. Some of our case

study organisations use ageist criteria. IR2 particularly favours the recruitment of young people because they are both well-educated and cheap. B1 is aiming to keep its workforce below the age of 50 because it believes that 50+ year olds are not sufficiently able to update their skills in line with current IT professional requirements.

Another widely used method is through traineeships or student placements. Here computing students are employed by companies for periods during their studies, and may then be employed when they have graduated because their skills and abilities are by now well-known to their employers. Placement students account for fully 50% of the staff at F2, which is a particularly high proportion of total staff.

Informal methods of recruitment, for example, through personal contact or word of mouth are increasingly unusual, and are progressively being displaced by more formal systems of candidate evaluation, followed by formal test and interview processes. But they do still exist in a few companies, and employees there complain that such systems create unfair advantage.

Gender Equality Issues in Recruitment Practices

Certain recruitment practices from both external and internal labour market channels pose problems for attracting and promoting women in IT professions. When companies recruit IT professionals from external labour markets on the basis of their possession of technical qualifications like degrees in computer science, electronic engineering or software development, they are drawing from a male-dominated pool of labour power. This gender inequality is then reproduced in their recruitment. Most companies treat this as an issue which is beyond their control – a regrettable fact of life that the labour market is skewed before they even engage with it, but see the problem as lying elsewhere, for example, in the education system. A second type of organisation, a very small number of companies already committed to improving women's participation in IT professions, endeavours to intervene in the external labour market by raising awareness among female school and university students of the job possibilities in IT in order to encourage them to study computer science or similar subjects at school and university. UK1 is one such organisation which runs a number of initiatives aimed at awareness raising among girls (initiatives which we discuss in more detail in the section of this report dealing with equal opportunities policies and practices).

Internal labour markets which work on the basis of work of mouth or personal contacts also tend to discriminate against women who generally have less extended networks or less visibility than their male counterparts. Some of our informants complain of sexist cultures and practices in internal labour markets; promotion hinges upon being interested in football or being friendly with the boss.

Gender discrimination and sometimes direct sexism entered the recruitment practices of a few of our case studies. Throughout the 1980s and 1990s, IT2, an Italian computer services provider, had an explicit and deliberate policy of not hiring women, which has only in recent years been overturned. This was justified on the assumption that women are unlikely to available or willing to travel long distances at short notice:

> *During the Eighties and also at the beginning of the Nineties, the Group had many clients also in North-Centre Italy … which called at 5 o'clock in the afternoon needing urgently one of our highly-qualified system administrators and software developers for the next day because their software applications didn't work any more. Thus, to send a man or a woman is not the same thing holding in mind the mentality of south Italian women who are rather lazy and prefer the job close to their home which I can*

> *understand. It is not the same thing to put a man or woman on the last midnight train in the direction of north Italy: it is much easier for the former than for the latter. This is totally objective. There are objective things that complicate women's life (Manager of Research and Development Centre, IT2).(32)*

Equally, maternity takes women out of the labour force and as highly-qualified IT professionals, they are not easily replaceable. For that reason, during the past two decades the company found it acceptable to discriminate against women in general, regardless of maternity.

> *I checked on my statistics of our female employees and also on national statistics: women are more absent from work than men (Manager of Research and Development Centre, IT2).*

Such an assumption also affects the recruitment policies and practices of P2, as we have seen earlier in this report. For P2, hiring women carries with it the risk that they will regularly be absent from work. In other companies, however, 'female' characteristics are seen as assets. F2 recruited a female placement student, despite the fact that her expertise was not one relevant to the company's activities, because it wanted to introduce a "feminine touch" into the company. Such recruitment policies can be based on equally essentialist notions about womanhood as can the discriminatory policies in IT2 and P2 described above, and in this case seem to have stemmed partly from a wish to employ a woman to improve the domesticity of the workplace, an issue of gender culture which may be significant for the overall ability of companies in the sector to attract and retain women.

> *[We did it] to bring a feminine touch to the company: there is nothing but men here, with a single, unidirectional way of looking at things. We need female qualities: meticulousness, refinement, sensitivity, order (Manager, F2).*

> *Before she arrived, we lived like pigs – everywhere was a mess: paper, empty Coke cans, even dirty clothes in one corner … When we heard that she was coming, everybody tied up, and agreed not to make dirty or sexist jokes (Partner, F2).*

Career progression and development possibilities

In all the companies in this study, management and executive positions are filled through internal labour markets. This may be done on an open basis, in which posts are advertised internally in the first instance so that employees can apply, and if necessary they are subsequently advertised on the wider labour market. However, the preparation of employees for promotion is left very much up to individuals. Alternatively, internal promotion can be carefully managed and employees groomed for development into senior positions. This generally entails assessment of their training, together with their skills and achievements, during regular appraisals with line managers, coaching, mentoring and other preparation for certain professional or managerial jobs.

Several of our case study organisations have very clearly defined internal career paths and have implemented systematic progression programmes and policies in order to foster and develop their internal talent. This is particularly true in the large companies where structures are clearly identifiable and where there are large Human Resource or Personnel departments

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32 The female employees in the company strongly rejected this claim when it was put to them. One said: " The fact that the South Italian women like to stay close to their home is a tale! When I was hired I knew exactly that I had to travel which I like very much and which I think is very stimulating."

with the resources available to design and implement such policies. In A1, the large Austrian software firm, there is a variety of training programmes with specified career paths. The MOVE programme, for example, prepares young staff with 2-3 years service for higher-grade jobs in management, project management and sales, and this preparation is done through both training and mentoring. The company also offers leadership programmes, and publishes a 'development map' to make transparent the kinds of career paths employee can expect to travel on (Figure 3.1).

Figure 3.1: The Development Map of Career Possibilities in A1

B1, which is also a subsidiary of a multinational, operates a formal career progression system. This turns on an annual appraisal of the employee by her/his line manager which takes place in two parts: the first to agree targets and the second an appraisal process. This appraisal sets the agenda for the employee's subsequent progression and also sets the wage grade for the coming year. There are two possible types of career path in B1, the first a technical career path which travels from developer to project manager to consultant to specialist in a particular technical field, and the second a managerial career path which can take staff into executive positions. However, despite this apparently transparent system of promotion, few women seem to progress up the organisational hierarchy, whilst those in management positions who have opted to move into part-time work have lost their managerial status as a result.

UK1 takes both training and development very seriously, and has a very systematic approach to developing its employees. It also has specific programmes for women's development. Employees undergo an annual appraisal process of training requirements and development objectives. The outcome of this forms part of the Individual Development Plan which is agreed bilaterally between the employee and her/his manager. There are several schemes in place for developing 'talented' individuals and ensuring that they progress within the company. It is also possible that these schemes serve the purpose of motivating staff and ensuring their long-term commitment to the organisation. Two such schemes are a Fast Track Scheme for Technical Leaders, and an Executive Resource Scheme. As their names suggest, these channel employees into technical and managerial careers.

> *I don't feel as if I have been hanging around waiting for [promotions]. I feel like I have been moving very fast through. I am on our Fast Track scheme – Technical Leaders' Board. They put the people they think are going to be the technical leaders of the future onto this list, and they make sure that they are doing all the right things to get promoted. I have been on that list and I am sure that helps me move slightly faster.*
>
> *At the beginning of this year, I was told that it was time for my next move now. Because I am on what they call their Executive Resource List, which means I have the potential to get to what they call 'Director', or higher up. So it was "Right, you have been doing this job for two years. It is time to take the next step." Which is at least a second line position. So I started this in January. So I have two managers and eight professionals reporting directly to me, and then dotted lines from second line managers within the brands (JT, Technical Sales Leader, UK1).*

There are many internal initiatives aimed at encouraging women to apply for jobs and for promotions, and supporting them when they do so. These activities include women's networking groups, mentoring, women only mentoring, offering women-specific versions of development activities which are available for all staff, and holding round-tables with executives. There are education sessions on various matters of interest to women – e.g., assertiveness, confidence, travelling alone for business. There are groups which do book reviews of interesting books. There is a team looking at best practices elsewhere that can be brought back into the organisation and shared.

Although a small company of just 40 employees, A2 also has systematic employee development practices in place. Employees have regular discussions with their line managers about their future aspirations and agree on training courses that will help them to achieve these. Development plans are drawn up for each employee, evaluated by the human resource department in relation to the company's human resource strategy, and on the basis of them, training programmes are developed across the company.

In some organisations, particularly small and flat organisations, progression works very slowly as there are few openings for people to progress into. This may be a problem which is particularly acute in 'new economy' organisations and also in SMEs, which are more likely to be flat than those in more traditional sectors. B2, a small internet service enterprise, runs annual informal appraisals, but the opportunities for staff to progress as a result of these is very limited, because of the flat structure of the company. IT2 is also a small, flat company in which progression is also slow. This seems to demoralise staff.

Progression out of technical work and into management

In our case studies, as in organisations in most sectors of the economy, career progression in IT involves a move away from detailed programming, coding or design work, leaving this to

more junior staff, and moving into one of several types of IT management. The managerial jobs into which the informants in our case study organisations progress include:

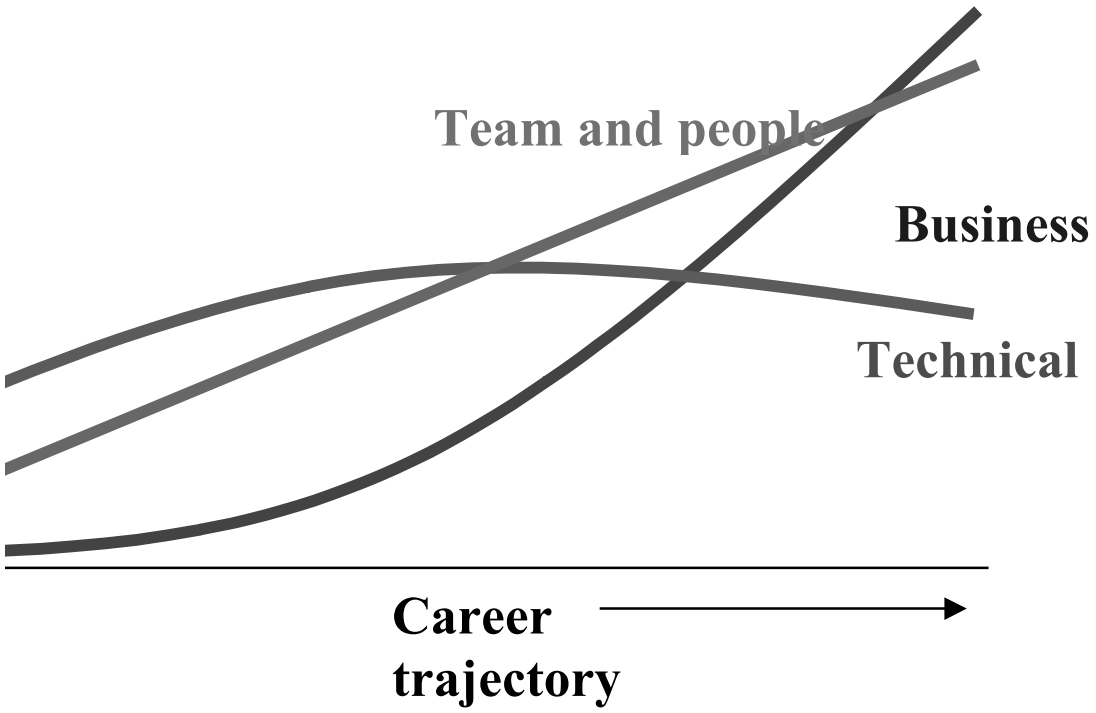
- Project management, which is generally a junior or middle management job in which one member of a work team is promoted to manage the resourcing, timing and co-ordination of work done by the project team.

- Team management or 'people management'. Team management or team leadership is also generally a junior position, and may involve one member of a work team being selected to administer some human resource aspects of the rest of the team, for example, holiday requests, work rosters, appraisals. 'People management' is a more generic description of line management tasks which are usually part of the responsibility of managers at a variety of organisational levels.

- Business management, which is a category of management typical of matrix organisations in which departments or sections of the organisation are managed as relatively autonomous businesses with customers and suppliers elsewhere in the business as well as external to it.

This progression away from technical work and into management seems to be virtually inevitable; there appears to be little or no possibility to progress and at the same time continue to perform a predominantly technical function. Figure 3.2 shows what we have found to be a generalised path of career progression in IT professions, bringing with it a decline in technical work and activities and an increase in business and people management activities.

Figure 3.2: Typical career trajectory and balance of managerial activities in IT professions



There is a widely-held common-sense assumption that women in particular are enthusiastic about moving into certain jobs, such as project management, for example. Indeed, this is often seen as a promising avenue into which to promote women in IT professions. Underlying this is a further assumption that women are 'naturally' suited to organising and co-ordinating activities and other staff, as opposed to doing technical tasks.

> *We tend to say "Do you want to be a manager? Have you considered project management?" If we have opportunities for our younger people to help them out, if it is an organisational opportunity we will quite often help that woman into it, if it is a technical opportunity, less often. ... we have observed, and are concerned about, and roundtables of women have said, that they get encouraged towards management.*

> *One of the girls I was talking to today told me that when she goes to do extra-curricula, organisational tasks, she gets lots of praise, so she is good at them. She doesn't get any praise for the day job, so she is not good at that. I suspect if you do something extra, you get praise (BH, Web Services Architect, UK1).*

While for some informants, the move into management is welcome, others prefer to continue to work 'at the coal face' and are reluctant to give up technical activities. For example, an informant in the same organisation states that:

> *I would love to be able to make a career just writing code, but it seems like you can't. You have got to move away from that in order to progress, which I think is a shame. I mean, the kind of role models I had up till now were the people I am largely on a par with – the people who are considered experts in the department, that know everything, that if you have a question about something, you go and ask so-and-so and they know the answer. You just know they have that at the top of their head. And now people come to me with questions like that, and I have the answer on the top of my head. So having got that far, I am now looking round and thinking 'What do I do next?' I don't want to let go of the coding, but it sounds like in order to progress, you have to. I know I don't want to be a people manager, but I think the next role for me is probably project management. I am kind of doing a lot of that now (MH, Software Engineer, UK1)*

It would seem that organisations (or at least large organisations with formal career ladders) are steering technically-talented and technically-interested women and men away from technical work when they promote them. It is unclear whether this organisation of careers creates positive or negative role models for new female entrants into the profession. Is it, for example, encouraging to them that senior IT jobs seem to involve less IT and more management? Or does this put aspiring IT engineers off working in large IT companies? This is a question which certainly merits further investigation. It is clear that purely technical career progression paths are rare in large organisations, and it is possible that the creation of such paths would help to retain motivated and able women IT professionals and to provide alternative, technical (rather than managerial) role models for younger women contemplating IT careers.

Gender equality issues in career progression

Formal systems of appraisal and development seem to be very positive for women, because they provide strong encouragement for them, together with structures for them to develop within and, very importantly, formal criteria against which they are evaluated. These systems remove informality and potential discrimination from career development. Informal and personalised systems seem to carry plenty of scope for discrimination or preferential treatment by managers on the basis of personal prejudices, personal knowledge of particular candidates for promotion, or just shared interests.

> *Basically the last couple of promotions I applied for in the writing department with the same manager I was turned down in favour of these male colleagues who had had all these common things, like being into football and being friends of the boss (IOD, Technical writer, IR2).*

The computer services sector is full of companies where long hours of working are the norm, as we have already seen. It is also true that this poses particular problems for women (and indeed men) with domestic responsibilities who often find themselves painfully torn between their work and their domestic demands. It becomes a more acute problem when career progression is linked to long hours of working, or to being at the office and visible, as it is in many computer services organisations. As we have seen, senior managements often send out informal messages that to get to the top, employees must put in longer than contracted hours. This also operates counter to the interests of women seeking to progress in these organisations and clearly communicates to them that they are unsuitable for top management simply because they have families. The message is that, a priori, the company considers there to be a certain type of person who is top management material, and other types of people who are not.

Equally, career discrimination against women on the grounds of pregnancy or during maternity is still shockingly present in computer services, even in companies with otherwise excellent employee development practices. When a support centre specialist in A1 announced her pregnancy to her line manager, he instantly withdrew an offer of promotion to manager of the support centre and placed her in a programming job upon her return from maternity leave.

Women over-represented in slow-track progression systems. In IT1, there are two ways of reaching senior status. One is to be hired directly into a senior job, but the other is to be hired in a junior capacity and to progress slowly and steadily through the ranks of the company. It is perhaps significant that none of the women top managers have reached their positions through the fast track; all have had to 'serve their time' by working their way slowly upwards.

Several human resource or other managers in our case studies pointed out that women are also poor at promoting themselves and their own interests. The general point that they make is that women are often reluctant to make themselves visible, or they select themselves out of eligibility for better jobs before applying, and they understate their own skills and achievements. This is a common complaint by employing organisations, and one which prompts them to implement policies designed to encourage women to apply for promotion, for example, assertiveness training and mentoring arrangements (which we examine later in this report). However, it is significant that some women's self-confidence makes them anxious about such arrangements in case their actual abilities do not really merit them being supported and promoted. In other words, women IT professionals often worry about being 'token women', who are promoted because they are women rather than because they are able. Some worry about how their promotions will be perceived by their male colleagues. It is unlikely that men suffer from similar concerns about the legitimacy of their position. The following comment was typical of several made by women in UK1 which is energetic in its policies to attract and support women in IT professions.

> *The company cares about its investment in women. It can't afford to lose the investment. It can't afford to not use half the population to supply its talent. So the worry just has to be, are you the token woman sometimes? Is there positive discrimination, or is there a perception among enough of the men that there is positive discrimination? (BH, Web Services Architect, UK1).*

Redundancies and exit practices

In the past couple of years, declining markets and profitability within the IT sector have caused many companies to embark on restructuring exercises and redundancy programmes. Employees who had hitherto occupied a privileged position in the labour market have recently found themselves vulnerable. Although we have not systematically collected information on redundancy programmes and practices in our case study organisations, two issues are worth highlighting because they have emerged in the course of interviews.

The first is that ageism is a marked feature of the sector, and older workers seem to be particularly vulnerable to redundancy. Illustrative evidence comes from B1, the Belgian international computer services company. Here, a restructuring programme in 1990 involved a series of redundancies and a parallel reskilling strategy aimed at staff who were considered to be worth investing in. The company conducted an inventory of competences and skills needed, and a similar inventory of staff and their competencies. Those on the company's list of staff with low employability were principally those aged over 50. Consequently, staff over 40 are aware of the possible imminent demise of their livelihoods and careers:

> *En informatique, vu les évolutions, que ce soit pour une femme ou un homme, à partir de 45 ans, vu les nouvelles technologies, je crois qu'il faut laisser la place aux jeunes, parce que ça va trop vite, parce qu'on n'a plus la même motivation à suivre des formations tout le temps ... ce n'est plus un métier qui est adapté. On en parle souvent entre collègues, une restructuration est en cours, la tranche d'âge 45-55 a du mal à s'accrocher à ce métier, mais il y a des exceptions. (Analyst programmer, B1).*

The second issue concerns the fate of women aged over 40 in the IT sector. A senior Director in UK1 stated that she believes that some women are more vulnerable to being targeted by redundancy schemes than their male counterparts, and that this may account for the industry's difficulty in retaining women with long service or in senior positions.

> *I believe that the 40-50 year old age group is divided into two. There are the really good women who are a real asset to their companies, and who the companies don't want to leave, who are choosing to go. And I think that possibly there is another group of women who aren't such an asset, but they are probably no less of an asset than their male counterparts. But I think they are being picked up more in voluntary redundancy programmes. I have no data to back this up, but we are going to try and get it.*
>
> *There are a couple of hard questions which I think need to be asked. One is: are more average women being targeted for voluntary redundancy programmes than their average male counterparts, especially as they get older? ... And I don't know whether it is an ageist thing or what. But I do think it is a hard question that people don't want to ask, and I am not sure they want the answer ...*
>
> *I suspect that we have a type in our minds that we are conditioned to see in front of us at interview. And in an IT company, you are conditioned to see somebody walk through the door who is in their late 20s, early 30s, with x number of years' experience of certain type of things, and they are likely to be a good fit for [the company]. Well, I think we should change that (RG, Director of UK Government Business, UK1).*

This possible haemorrhaging of older staff, and particularly older women, by IT companies during times of market contraction is of considerable concern. In the short term, it runs counter to good practice on equality and diversity. And by allowing companies to revert to a traditional workforce profile of young men, it may also have a strong bearing on the longer-term ability of the industry to attract, retain, develop and promote the female talent for which it declares a need. In the light of this, companies may need to rethink their redundancy, as

well as their recruitment practices, and may need to intervene to ensure that women are not disproportionately targeted.

3.4 The Firms - Skills requirements

We now turn to an examination of the skills which our case study companies declare to be important for the performance of technical work. In our consideration of the daily work of our employee informants which follows below, we discuss their work processes and the skills which they actually use in the pursuit of that work. An important issue will be the extent to which there are discrepancies between the skills that companies say they need, and those which employees actually find that they use when they work in technical jobs.

Skills requirements for the IT sector are difficult to define, and indeed one of the abiding problems besetting IT companies in their recruitment processes is the problem of specifying skills requirements sufficiently clearly to get appropriate applicants for particular roles, whilst at the same time leaving themselves sufficient flexibility to allow for continual changes in technologies, knowledges, and other job requirements. Moreover, many of the job functions into which companies are recruiting are 'fuzzy', that is, they are hybrid functions, and, because many are newly emerging, are constantly subject to change. What emerges clearly from the case study organisations is that few companies recruit solely on the basis of the technical skills of job applicants for professional roles, and most look for a mixture of technical skills and personal qualities when they recruit.

Over the last two decades, skills shortages prompted some companies to recruit from a wide pool of applicants with very loose technical requirements. They employed people with degrees in any discipline and not, as one might expect, solely computer science degrees. In the past, for example, B1 recruited graduates in medicine, geology and architecture to work as programmers.

Nowadays, there are some minimum technical skills requirements for most IT professions which are non-negotiable. The precise nature of these requirements varies between organisations and between different jobs. It also depends on the amount of in-house training offered by the company concerned. However, most common among our case studies was the requirement for a degree or diploma (for example, BAC+2) in computer science or software engineering for development functions. Recently, Microsoft examinations have become the basis for recruitment by some companies, and they provide a clear criterion for selection because of their growing visibility in the market.

> *Il n'y a vraiment que pour les programmeurs qu'il y a une qualification bien précise qui est demandée parce qu'on s'est orienté plus Microsoft, mais c'est relativement récent cela. Les gens qu'on engagera dans le futur devront être certifiés Microsoft, cela permet de mettre un critère de niveau relativement clair. Cela nécessite aussi des budgets parce que ce sont des gens qui valent de l'argent, mais au moins c'est un critère de sélection qui est plus au moins reconnu sur le marché, pour les deux autres fonctions, c'est moins précis. (Director, B2).*

In addition to their requirements for technical qualifications for programming or development work, most of our case studies prefer to recruit candidates with some form of experience of the software or technical environment in which they will be working (Open Source Software (OSS) in the case of F2, Java in the case of IR1, C in the case of UK2, for example). The exception to this pattern is IR2, which prefers to recruit new labour market entrants with only

university degrees but without previous work experience, because they are cheaper than experienced workers.

Most significantly, our case study companies are placing increasing emphasis, not on skills in the conventional sense, but on other characteristics when they recruit into technical positions – which can be summarised as a mixture of personal qualities and attitudes. Experience of IT work, though required by a few employers, seems much less important than the personality of the employee, and consequently several employers report recruiting people with non-IT backgrounds but with appropriate personal qualities. In the IT services sector, this seems to reflect a generalised move away from a Weberian, hierarchical and bureaucratic approach to work organisation emphasising paper qualifications and rigid job descriptions. In place of this model of work organisation, an approach is emerging which is based on more direct relations between managers and employees, devolved responsibilities and decision-taking, and team-based working with day-to-day autonomy. Consequently, many IT employers recruit people who will work effectively in this kind of environment. When they recruit, they look for a mixture of technical qualifications and experience of similar technical environments in candidates, coupled with certain personal qualities.

The personal qualities they seek are therefore related to the employee's ability to work on her/his own initiative and with others, to adapt to new situations and to work flexibly. Frequently mentioned is the capacity of prospective employees to learn in new situations. These are the kinds of adjectives and phrases used by employers in our case studies to describe the profile of employees they seek for professional jobs:

- 'reliable', 'disciplined', 'self-motivated', 'adaptable in fast changing work environments', 'able to take initiative', 'autonomous', 'creative' (IT2).
- 'hire for attitude, train for skills', 'someone who is going to learn fast' (B2).
- 'well-built minds, rather than pure brains', 'the ability to find and research', 'the ability to adapt, to fit in', 'flexible, manageable people who have an open mind' (F2).
- 'personal attitude', 'knowledge', 'contacts' (P2).
- 'used to pressure' (IR1).

The IT services sector seems, from these quotes, to exemplify a new approach to employee recruitment which is in stark contrast to traditional qualification-based hiring. It is also a growing practice in a number of industries, both newly-emerging and established ones. Call centres, for example, also recruit for personal qualities and in particular seek employees who are self-motivated, able to take their own initiative, and able to work closely with others in teams. Other services sectors such as banking, insurance, and even retail, are beginning to do likewise, partly because of a heightened emphasis on front-line customer service provision (33).

Although the IT sector is rather different from any of these sectors in that the work undoubtedly requires a minimum level of technical skills and knowledge, this emphasis on

33 Valenduc, G., Vendramin, P. et al (2000) *FLEXCOT: Flexible Working Practices and Communications Technologies*, Final Report to European Commission, DG-Research; Mermet, E. and Lehndorff, S. (2001) already cited; Webster, J. et al (2002) *SERVEMPLOI: Innovations in Information Society Sectors: Implications for Women's Work, Expertise and Opportunities in European Workplaces*, Final Report to European Commission, DG-Research.

personal and interpersonal skills and abilities raises two questions for further consideration which are of relevance to women's position in IT professions. The first is, to what extent are recruitment criteria actually necessary for the work involved? What are the consequences of their use, particularly for women entering IT professions? Second, given that women are often supposed to be particularly strong in their relational skills due to what has been dubbed their 'apprenticeship in womanhood' (34), does the emphasis on personal qualities and interpersonal skills favour or disadvantage them in entering IT professions? To start to answer these questions, we have to consider the gender practices and gender cultures of the organisations within which they work, and it is to this issue that we now turn.

3.5 The Firms - Labour and Employment Relations

The computer services sector is, in its labour relations, a world away from the old, industrial, corporatist and collectivist framework. It is emblematic of the 'new economy': trade unionism and collectivism play a very marginal role in the relations between employers and employees. Employee relations are individualised and personalised. Hierarchies and adversarial structures are abolished. Labour contracts, pay and conditions are settled one-to-one between workers and their managers.

The WWW-ICT case studies are typical of 'new economy' labour relations. Trade unionism is notable by its absence in all of them. Even in the large companies, such as B1, P1, UK1, where national and European law requires at the very least the presence of a Works Council or a European Works Council, these Councils are marginal to the everyday conduct of employee relations, and trade unionism is weak.

Consequently, only a small minority of our case study organisations have a noticeable trade union presence, and even here, this hardly impinges upon the labour relations of the firms. Human resource management increasingly works through individualised wage negotiations (and sometimes secrecy about pay rates, bonuses, etc.), non-standard pay grades and bands, individually-negotiated training and the devolution to employees of responsibility for their own career progression and management. Culturally, the atmosphere in most of our case studies is one of consensus and shared interests, a 'family' atmosphere in which employees and employers have a shared commitment to the work and the organisation. In the small companies with very flat structures, where conflicts do occur, senior management takes a direct hand in the resolution of these.

But even where employee relations are more exploitative (IR2 for example), and where the company pays low wages, offers few career opportunities, and accepts high labour turnover from its young workforce, trade unionism is not seen as a solution by or for employees. And further, even in redundancy situations, which have been numerous in the sector in recent years, including in our case studies, the role of unions in negotiating terms has been negligible. This is not to suggest that IT professionals are disinterested in each other's fate, more that they prioritise their own situations and prospects and see the only way of handling these as individually and directly with management.

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34 Barker, J. and Downing, H. (1980) 'Word processing and the transformation of the patriarchal relations of control in the office', *Capital and Class*, 10, 64-99.

Some IT professionals view trade unions in negative terms, as bureaucratic organisations which are not relevant to their working lives:

> *Un syndicat ? Je pense que ça ne serait pas très bien vu … et je ne conçois pas un syndicat dans une entreprise telle que celle-ci… Parce qu'on est … Je ne sais pas si c'est lié à l'entreprise ou au secteur, on sait que quand on rentre ici on ne va pas travailler dans les règles qui doivent être appliquées, ça on le sait, on rentre en connaissance de cause. (Project chief, B2.)*

There are three main factors involved in the labour relations culture of 'new economy' companies such as those in computer services. First, some of our IT companies are positively hostile to trade unions and make every effort to organise their employee relations outside a trade union framework. This is particularly the case with inwardly-investing US multinationals, which bring with them an American culture of employee relations that tends to be anti-union. US companies often go to considerable lengths to ensure that trade unions cannot and do not organise there. Even operating within the framework of the European Social Model and obliged to establish European Works Councils, they tend to marginalise unions and even penalise trade union officials – usually in terms of career opportunities. This type of regime does not encourage employees to organise through unions. Second, the current downturn notwithstanding, IT professionals have a relatively privileged and strong labour market position. Their work is absorbing and offers interesting career prospects. Employees in our case studies are in general very committed to the work they do, and do not seem to feel the need to express themselves or their grievances through trade unions. And third, as we have seen, IT professionals are in general young people. In all our case studies, our informants were on average aged between 25 and 35. These are people who do not come from a trade union tradition, and in countries such as the UK, do not even remember an era of strong trade unionism (which ended with the Conservative Government elected in 1979). They live and work in economic conditions in which trade unionism seems less relevant than it did in the past: relative wages are higher, interest rates are lower, work is in general less hazardous. Indeed, this difference in attitude between younger and older workers is apparent to people who try to organise IT professionals:

> *C'est un secteur où les gens sont relativement individualistes. Je ne dis pas ça dans le mauvais sens du terme, mais les gens, beaucoup de gens, sont conscients de leur valeur sur le marché de l'emploi. Alors, plutôt que d'essayer de changer les choses dans une entreprise, c'est mieux et ça va plus vite d'aller voir ailleurs. Mais les anciens, une fois qu'on commence à toucher à ce qu'ils avaient en leur disant que ça va changer, là alors ils réalisent peut-être. Mais généralement ils m'ont toujours donné l'impression de dire: « Ben écoute, si on en a vraiment besoin, on sera content que vous soyez là. » (Developer and union delegate, B1).*

3.6 The Firms - Organisational Cultures and Practices: 'Doing Gender'

Understanding the position and prospects of women in IT professions involves analysis of the organisational practices and cultures within which they work. Organisations physically produce commodities – material objects or services, but at the same time, they produce and reproduce social relations, including those of gender, class and race. Organisations are themselves consequently gendered; their processes and practices reproduce the pervasive and

persistent structuring along lines of gender that we see in the economy at large and in the IT professions in particular (35).

In organisations, gender may be embedded in the ordinary procedures, processes and policies which contribute to gender differences and inequalities. It may be present in ideologies, beliefs, symbols and images which portray and legitimate gender inequalities. People also 'do gender' when they do the ordinary work of the organisation, through their interactions, through their behaviour and through their expectations of one another (36). They perform roles in organisations which have subtle gender differences.

The gender structures and gender relations of new economy organisations such as those in IT services and electronic publishing contribute to the achievement or otherwise of gender equality, creating the context within which women can advance in IT professions and the terms on which they may do so. This part of our analysis examines the nature of gender relations underlying organisational cultures and practices in the case study organisations, in order to further our understanding of their role in shaping women's prospects for advancement in IT professions. We turn first to a consideration of wider cultural changes taking place in our case studies, as the context within which gender is done.

The 'New HR' and Gender in IT Professions

Organisational gender relations are not enacted in a vacuum. They are played out in the context of wider structural and cultural regimes, and intersect with those regimes to reshape and in turn to be conditioned by them. Each of our case study organisations is, naturally, characterised by a myriad of cultural arrangements and social relations. There are, however, some general patterns of organisational culture change which can be highlighted and discussed in terms of their implications for gender relations.

In the case study companies, we have found a widespread move from hierarchical and centralised organisational cultures, to less formal, more individualised cultures. This cultural change is particularly strongly expressed in an organisation's human resource practices and procedures. Although HR practices and procedures take different forms in the different companies, in general the individualisation of human resource management – what has been labelled 'the new HR' - is characterised by the devolution of responsibility for day-to-day working to individual employees, including responsibility for their own learning and development, and individualised performance management, by individualised employment contracts, pay arrangements and terms and conditions, and by the decline of collective bargaining and trade unionism. Such policies and practices seem to be particularly common in firms in the 'new economy' (37).

It is worth raising the question of how far the 'new HR' is positive for women attempting to enter or already working in IT professions. As IR1 and several other case studies show, there

35 Acker, J. (1992) 'Gendering Organizational Theory', in Mills, A. J. and Tancred, P. (eds) *Gendering Organizational Analysis*, London, Sage.

36 West, C. and Zimmerman, D. H. (1987) 'Doing Gender', *Gender and Society*, 1, 125-151.

37 See also Gill (2002) who finds this same phenomenon in the new media industries in Europe, particularly small firms.

is increasing emphasis on personal qualities, including self-direction, self-management and self-advocacy, in companies' recruitment and promotion practices. These rely on the ability of individuals to publicise their own merits and promote their own interests. Such self-advocacy has been found to be problematic for those who lack strong self-confidence, women in particular. It can also be problematic for equal opportunities where it substitutes for more formal, more explicit recruitment, development and progression procedures and criteria and introduces opacity into the management of progression.

The 'new HR' is sometimes, though not always, coincident with the entry of US-owned IT companies or at least company cultures into the European arena. P1 and UK1 are both branches of the same US multinational, and both exhibit very similar organisational cultures with similar discourses which, despite a rhetoric of informality, are generated globally and implemented locally – in other words, this is a highly structured and engineered culture. The ideology which the company promotes is of itself as a participatory and open organisation, in which all employees can easily gain access to senior executives, all identify with the same goals, and, rather than being divided or segmented in any way, all comprise the same 'winning team'.

> *... [we have] a climate of openness and a team spirit. Therefore, there isn't competition ... No, I am not saying there isn't competition, but people compete mainly with themselves, to evolve (Informant, P1).*

In P1 and UK1, the new HR promotes a culture of consensus through HR practices, office design, organised social activities among colleagues, and so on. In another company which has implemented the new HR, IR2, there is a more competitive culture and much more dominating management style, arising from the acquisition of the company by a parent company based in the US. Longer working hours are demanded and fewer holidays sanctioned, informal rewards and social activities have been abolished. By contrast with P1 and UK1, the company's senior management seems 'distant' and 'invisible'.

The individualised organisational culture exemplified by the policies and practices of the new HR is as much as anything else a gender culture. It is a culture of empowerment and autonomy, in which individuals are responsible for their own progression. Organisational structures and practices exist less to support than to facilitate the basic self-developing activities of the employee. In most of our case studies, this culture relies on self-confidence, self-assertion, and self-promotion.

Irrespective of the merits or disadvantages of such cultural change (and there is evidence for both), our case studies suggest that in general, this is a culture which carries a danger of overlooking the particular needs of women in IT professions. Very informal organisational practices based on self-promotion and self-advocacy (for example, personalised negotiations with line managers over pay or promotion) are problematic for those who have difficulty in 'selling' themselves, and favour those who are self-confident or who have good networks. In IT professions, it is often the case that women have lower self-esteem and find individualised practices effectively discriminatory. On a more practical level, women or others with domestic responsibilities outside the workplace often find it more difficult to manage the requirements for self-development in IT which demands continual learning and immersion in the subject:

> *Quand je vois les informaticiens, enfin les programmeurs, ils doivent continuer à se former tout le temps ... Je pense que ce côté-là est difficilement conciliable avec une vie de famille. Suivre les programmes,*

> *c'est déjà pas évident mais alors tout ce qui est programmation … Il y a tout le temps des nouvelles technologies, des nouvelles possibilités, donc je pense que ça doit d'abord être une passion et puis qu'ils doivent être à ça tout le temps. Enfin, ceux qui le font ne sont pas mariés, n'ont pas d'enfants, mais … je ne sais pas. (France, computer graphic artist, B2)*

In most of our case studies, women are in a minority in IT professions, and almost totally absent from senior management positions. The companies themselves often seem to be unaware of the roots of such inequality, of gender differences in social life which affect the presence of women in their ranks. For example, A1, despite an equal opportunities project to promote women, does not facilitate flexible working for women with domestic responsibilities so that they are effectively pressured to work full-time, particularly if they do not want to forego promotion opportunities. This is a common scenario, particularly in companies which have apparently democratised their employee relations through individualised HR management. In the process of introducing informal practices and procedures, such as informal dress, egalitarian language, open plan office environments, team-based working, they forget that there are still gender differences, both in society at large and in their own ranks. In this way, as Korvajärvi (2003) has argued, gender becomes invisible in organisational thinking, and consequently policies and practices become gender-blind (38). IR1, for example, declares itself to be a gender-neutral organisation because women are well represented in team management and in the management of entire phases of product development. Its female employees are aware of the gendered nature of other aspects of organisational practices (for example, working time organisation); but they themselves promote the organisation's values and so reproduce the ideology of gender neutrality. Similarly, P1 and UK1 operate, as we have seen, contradictory practices: they promote women's development on the one hand, but operate very long working hours at senior levels on the other hand. Again, this effectively serves to make gender invisible: because they have put policies in place to address women's under-representation in IT professions, that continuing under-representation surely reflects problems elsewhere. In other words, official discourses of gender neutrality or gender equality take primacy over a reality of continuing gender inequality. F1 sees itself as a company with a good awareness of the need to attract women into an IT environment, which it can achieve by recruiting a woman to fill a secretarial vacancy:

> *… it can only be a woman, for several reasons: firstly in a company that supports equal opportunities, it is not good for there to be no women, it sends out a negative, sexist image … it has to be a woman because that disarms men. Her voice and the smile that can be heard in her voice on the phone is always disarming for men (Manager, F2).*

Organisational gender cultures are indeed redolent with essentialist ideologies which can inform recruitment and development practices. These are often stereotyped notions of women's competences which are used to justify particular management decisions. A senior manager in IT1 deploys a militaristic discourse to describe the company, as an army that conquers markets. This he uses to justify hiring men in preference to women, as its 'soldiers'. Essentialist notions of what men and women are, are pursued in place of objective employee appraisal criteria, and may affect the progression opportunities and openings made available to women in these organisations:

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38 Korvajärvi, P. (2003) 'Conceptual Considerations Around Gendered Organizations', paper presented to *Gender, Work and Organization* conference, Keele University, 25-27 June.

> *[The senior managers] tend to have these clichéd views that women are good at certain things, they are more sensitive, better communicators, they are more persuasive, so particularly [good at] marketing.. and public relations (Human Resource Manager, IR1).*

In IT professions, this widely held belief about women's 'natural' communications skills often seems to result a channelling of women into functions connected with customer requirements, such as systems analysis, business consultancy, project management, or helpdesk work. Male IT professionals, on the other hand, are generally held to be uncommunicative and nerdy. And indeed in organisational gender relations, both sets of stereotypes are widely accepted: women in IT often try to compensate for men's reserve or use their interpersonal skills to fit into a culture of masculinity. In addition to their communications skills, it is sometimes asserted that women are better at creative work in IT than men:

> *... women are better at the creative side of the job (design) and men, who are not very creative, are better at the technical side, development (Manager, F1).*

Organisational gender cultures infuse non-work as well as work activities, and can be equally damaging to gender equality. Often leisure pursuits are formally organised by companies to create team spirit and foster solidarity and are in a sense part of the formal employment contract and work regime. In P2, go-karting and fishing are leisure activities designed precisely to create this type of team spirit. However in many IT companies, sports and leisure activities effectively become 'boys clubs' in which men come to identify with and relate closely to one another. It has been noted in the past (39), and is commonly reported by our informants, that IT organisations include male sub-cultures organised around drinking, football, and often, the exclusion of women. These sub-cultures are important for career progression because their participants are likely to be more visible to senior managers, themselves predominantly male, and to reflect their ideas about people who fit into the organisation and make natural successors. They therefore have major consequences for women's IT careers:

> *He had a very clear idea how to make the department work and then he left to fill another vacancy in the company and the guy who took over from him was just dreadful. I left shortly after he got promoted. Apparently he promotes the guys he plays football with (TB, Technical writer, IR2).*

> *While I was on maternity leave, the guy - and as I said, he has the HTL (vocational high school) and no academic degree – but he [had] the right kind of appearance (K, computer scientist, A1).*

Even where women are not physically excluded, they are sometimes excluded from organisational discourses, in the use of male-oriented language which appears simply informal but also makes women invisible. For example, Americans use the phrase 'guys' in an apparently gender-neutral way. Similarly, in UK1, the convenor of a work-in-progress meeting addresses his memorandum to 'Chaps!', although there number among them five women and five men.

Men and women do gender in the roles they play in everyday work situations. Participant observation of a status meeting in A1 illustrates this point. The meeting is organised by a woman, R, who declares her pride at having selected a pleasant meeting room. Much of her

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39 Tierney, M. (1995) cited above.

work satisfaction, she declares, comes from playing a maternal role, particularly in relation to clients. During the meeting, one of her male colleagues takes an inappropriately aggressive stance in order to assert a spurious authority. He behaves aggressively and subsequently ridicules his female colleague with the words:

> *Normally R prepares the coffee and fans the air. Today she was allowed to participate since you (the WWW-ICT project team) are present.*

In the same company, another female project leader is systematically ignored by her older male colleague who routinely goes above her head to her boss in order to undermine her authority.

Gender cultures in organisations may also reflect wider the cultural milieux within which they are situated. Thus, for example, we found that in very general terms, case study companies in northern European countries are – in their rhetoric at least - gender-aware in their policies and practices. On the other hand, case study companies in the south (particularly our case study in south Italy) are more explicitly sexist in their culture and behaviour. This may reflect the fact that in wider south Italian society equal opportunity politics and equality cultures are in their infancy and women's labour market and employment prospects remain rooted firmly in their childbearing and family-rearing roles.

However, the connection is not that simple. The entry of US multinationals, among other things, with their generally more advanced politics of equality and diversity, can lead to a conflict of gender cultures between the firm and the wider society. In this situation, firms tend to develop gender cultures which are far in advance of, or clash with, those in their host societies. We are not able to conclude from this research which culture takes primacy over the other. But this is a key question for policy-making: it shapes the nature, protagonist and target of equality policy. An understanding of the dynamics between national and organisational gender cultures in the IT sector, and in the economy more generally, is of key importance.

3.7 The Firms –Equal Opportunities Policies and Practices

Over two decades have passed since information and communication technologies were first developed and taken up in organisations, and the work associated with them first became a matter of widespread public debate. At the time, the absence of women from IT professions was striking, and was recognised as an organisational and public policy issue. The evidence from our case study organisations of today shows that the gender divisions in IT professions remain firmly in place. Across our case studies and in all countries, women are under-represented in IT professions overall. Within this general heading, they are in a minority in very technical work such as software development, but better-represented in other IT professions – content development, project management, for example. We found very small numbers of women in senior management or executive jobs; in most companies, there are none at all. This, then, seems to be an intractable and enduring state of affairs.

Do organisations think this is a problem? If so, what initiatives do they put in place to remedy the situation? What differences do these make to the opportunities available to, and progress made by, their women IT professionals?

Towards typology of equality practices

The WWW-ICT case study organisations fall into three broad categories in relation to their equality practices:

- A first group contains those companies which are gender-aware. Companies in this group clearly recognise that the under-representation of women among their employees, and particularly in more senior positions, is a wastage of potential talent. These companies are aware that a combination of external conditions in the education system and labour market, together with their own internal organisational practices, are decisive for the representation and progress of women within their ranks. Consequently, companies in this group have taken decisive steps to address the problem, and try to evaluate their own practices.

- A second group recognises a problem in general terms, but companies in this group locate the cause outside their own organisational structures and processes. In relation to their own practices, they are gender-blind, and take no specific measures to attract or retain women.

- A third group of companies operate directly discriminatory policies and practices. In the view of the representatives of these companies, women's under-representation is not only not a problem, but it is a natural and desirable outcome of women's general lack of suitability for IT professional work. Consequently, these companies operate an array of practices which perpetuate sex discrimination.

We now summarise the equality orientations and practices of the case study organisations using this typology. Table 3.1 summarises the equality practices, and their effects upon the attraction and retention of women in IT professions in the gender-aware companies. Table 3.2 summarises the situation of women in companies which are gender-blind, and Table 3.3 summarises the discriminatory practices and their effects in companies which take a discriminatory approach to women in IT professions.

Table 3.1: The Motivation for Equality Measures and their Implementation in Gender-aware Organisations

	Motivation for EO Measure	**Perceived problem in company**	**Measures taken**	**Situation of women**
A1 – large Austrian software company	Better use of the potential of women, attract more women into higher management. Introduce more creativity at senior levels, promote diversity and improve work-life balance. Also increase the motivation of employees, improve the company's performance and its image.	Leadership circles all male. Women have difficulty in promoting themselves and making themselves visible. Part-time working not possible in management jobs.	Development of equal opportunities programme. Survey of 100 men and women in the company including interviews. Report of findings containing measures to improve EO.	Women appreciate the positive and supportive work culture, but still have very limited career aspirations, towards middle management at the highest. Lack of transparency in the organisational structure gives them a vague awareness of a continuing glass ceiling.

A2 – small Austrian IT services provider	Wish to improve participation of women in development teams.	Women make up 25-30% of employees but executive board is all male.	No explicit equal opportunities strategy or measures. But flexible working time and individual development plans are in place. Culture of company is supportive.	Enduring culture of masculinity in development teams excludes women.
P1- multi-national IT services company in Portugal	Improve recruitment and retention of women in IT and senior positions	Under-representation of women at all levels, leading to 3 spheres of intervention: – 'building the pipeline' of women joining and progressing within P1 – changing mindset of management and executive team – improving work-life balance	Specific measures implemented on regional basis include: – European Women's Leadership Council (no Portuguese reps) – Global Work-Life Fund to support parents of both sexes – Mentoring – MOBILITY programme for flexible working – Conference on women in P1	Company publicises success stories of women who have reached senior positions as managers and directors. In P1, still strong gender inequalities: senior positions are still 80% male, and technical positions 76% male. Clerical jobs 64% female.

UK1 – multi-national IT services company in the UK (same company as P1)	As P1	As P1	Measures quoted in UK1 include: – Community activities, including IT workshops for teenage girls in deprived areas – Talks to women in university computer science courses – Mentoring – Courses for women – Women's networking groups – European Women's Leadership Council – Flexible working arrangements – Evaluation of best practice elsewhere	Success stories are publicised, and case study showed several examples of women (including parents) reaching executive positions. Senior positions still male-dominated and there remains a long hours culture which the company is aware it needs to address. In recent downturn, EO policies have suffered.

It is interesting to note that, of the companies which are aware of the gender imbalance in IT professions and which operate systematic equal opportunities policies in order to address this imbalance, the majority are large multinationals. It seems that these large IT companies are more advanced in recognising the under-representation of women and some of the reasons for this than their smaller counterparts. They are also more systematic in their equality practices, linking recruitment, training and development and work-life balance together as component issues within an overall equal opportunities framework. In part, larger companies have more scope to develop equality strategies and practices than other companies. They have specialised and substantial human resource functions, often with main board representation, which themselves have the awareness and resources necessary for these programmes. Previous research has found this to be a decisive factor in the development and implementation of gender equality programmes in organisations (40). In addition, their equality strategies are often driven by those of their parent companies, which help to import good practice into environments which might not otherwise develop it. This is very much the case in P1 and UK1 which have adopted the equal opportunities orientation and measures developed at global management level. The exception to this general pattern is A2, which is a small company with none of these resources. However, it has not developed formal equal opportunities policies for its women professionals. Rather, it has developed an overall climate of supportiveness, and policies related to broader working conditions which benefit women and men.

There is a striking contrast between the very programmatic approach to improving the gender imbalance in IT in three of the companies described above, and those listed in Table 3.2. Here, we are summarising the HR culture and practices of companies which do not see that

40 Olgiati, E. and Shapiro, G. (2002) *Promoting gender equality in the workplace*, Dublin, European Foundation for the Improvement of Living and Working Conditions.

there is a problem of gender inequality, at least not in their own internal structures, and consequently do not see the necessity to take explicit measures to tackle inequality. This may be because a culture of informality and flexibility runs counter to formal equal opportunities practices which tend to be centralised, implemented from the top down, and emphasise very formal systems of recruitment, training, and progression, as well systematic self-evaluation processes. In other cases, it is due to a belief that gender inequality originates in the external labour market, and resides in the fact that women do not choose to enter IT professions so there is nothing that an individual organisation can or should do to change this state of affairs.

Table 3.2: Human resource culture and practices in gender-blind organisations

	Human resource culture	**Human Resource Practices (including treatment of women)**
B1 – multi-national e-business services company in Belgium	Recently become extremely competitive as consequence of restructuring. Emphasis on long hours and total availability of management staff.	Neither human resource management nor worker representatives recognises any particular problems for women in IT professions or in the firm. Women themselves report that working time demands are becoming increasingly difficult to balance with their family responsibilities, particularly at management level. A senior analyst wishing to work 80% time was demoted from her management job.
B2 – small internet services company	Very informal and friendly culture. Emphasis on responsibility and dialogue rather than power relations, which is supportive but also creates gender blindness	No specialist HR function. Any employee issues are dealt with directly by directors. Enduring gender divisions are not recognised. Managers and programmers are all male. Computer graphic artists all female; project managers mostly female. No strategy for addressing this.
F1 – French website creation company	Rhetoric of devolved responsibility and lack of sex discrimination, but in practice the company is hierarchical and poor at employee involvement.	No positive action to attract or promote women. Only 1 woman out of 7 has reached a senior post. Female employees express anxiety about their ability to manage the work in combination with family responsibilities. "I can't imagine doing this work now with a child."
F2 – small French software services company	Culture of small owner-managed firm. Staff all male and in 20s. Informal culture and work invades all other areas of life including sleep.	Women are noticeably absent in this company. Only 1 woman out of 8 staff, a temporary employee on placement. The company does not see any problem in its own practices and is content not to hire women. Ironically, however, to improve its gender balance, it is recruiting a woman into a secretarial role.
IT2 – large Italian e-business services provider	Strong emphasis on acknowledging and rewarding talent in the company, regardless of sex.	The company does not pursue explicit EO policies because it feels that no sex discrimination occurs there. Examples of both good and bad practice in relation to women returning from maternity. There are female managers; most are unmarried and childless which may be a reflection of realities of work in the company. And 74% of IT2's female staff are in blue collar and clerical positions.
P2 – small Portuguese knowledge mgt company		Comparatively high level of participation by women: 33% of directors, 43% of technicians, 55% of overall staff. No equal opportunities or family-friendly policies have been put in place, as the company sees no need.

UK2 – small e-business software company in UK	HR culture emphasises recognition of ability over gender or other forms of disadvantage	Only 2 women IT professionals in the company, but one has been promoted into a management role. The company does not operate any EO policies or seek to address the under-representation of woman.

As Table 3.2 indicates, the vast majority of the case study organisations in this project fall into this group of 'gender-blind' companies. Despite glaring imbalances in the numbers and positions of men and women within them, they do not appear to find these imbalances problematic. In the present economic climate and faced with a glut of labour power, large numbers of whom have been laid off across the IT industry, this is not altogether surprising. It may be, however, that as labour market conditions alter, companies become more aware of the need to recruit and retain women as well as men, and aware of the part they can play in improving their recruitment and retention of women.

The final group of companies, summarised in Table 3.3, is those which are (still) pursuing directly discriminatory practices of one kind or another. Some operate with sexist stereotypes and organise their human resources accordingly. Others belief that their internal practices and processes are gender-neutral, favouring neither men nor women, when in fact the effect of their working arrangements is to disadvantage their female staff and place them on an unequal footing in internal promotion and progression contests. The following two comments by employees in IR1 exemplify the way in which working arrangements which are typical of the sector, and which are not problematised by employers, can effectively disadvantage women who wish to progress within their companies.

> *There are no women on the senior management team in [IR1] and none that we would think of at VP [Vice President] level. This would be about the thirty most senior people in the company … Also, of the men in that group whose personal circumstances we are aware of, only one out of six with children has a partner who works outside the home. I guess it means that to get to this level in this industry requires some very family-unfriendly work practices (MM, Engineering Manager, IR1).*

> *I think to be honest at a higher level the demands are much graded on your personal life in terms of travel. I was asked to go to [the American office] for three months and I went on my own. My wife and I talked though the implications: our children at school … too disruptive … But I doubt a woman would have been free to make that decision (PH, Human Resource Manager, IR1).*

And time and again maternity is still used as a pretext to demote or marginalise women.

> *While I was on maternity leave there was a complete reorganisation and my job had gone. I was told that there was an assumption that I would not be coming back … In the end I figured that they had to give me a job back so I came back and I did nothing for about a month when I came back. I had no job […] You have to work hard to make a position for yourself and then you have to do it again when you come back (AC, Senior Engineer, IR1).*

Table 3.3: Overt discrimination in case study organisations and its effects on women in IT professions

	Management discourse	**Management practice**	**Effect on women in IT professions**
IR1 – medium-sized Irish middle-ware company	Management belief in gender-neutrality of career organisation. Widespread assumption that women are best suited to non-technical jobs.	Internal promotion based on informal networks. Demand by company for managers to be available and able to travel extensively. No family-friendly policies are pursued. Managers assume that women will not return from maternity leave so do not hold their jobs for their return.	No women in senior management in IR1, because work demands are impossible for women with children to manage. Women in this company are concentrated in non-technical areas.
IR2 – medium-sized Irish coursewar e company	IT manager believes women know nothing about computers.	IT manager pays women in his department less than their male counterparts, also ignores and marginalises them. Flexible working has been withdrawn following restructuring.	Few women apply for and are recruited into software development. Content development is female-dominated. Those women who were working flexibly have suffered from withdrawal of flexible working arrangements.
IT2 – Italian computer services provider	Belief that south Italian women are 'lazy' and prefer to work near to their homes. Also that men are brighter workers, women more steady.	Formerly, the company would not recruit women at all. Today, they are recruited but generally men are sent to clients' sites because of management assumptions about women's reluctance to travel.	The main barriers to women's development in the firm are cultural. There are no women in middle or top management.

The following comment illustrates the way in which gender discrimination in the IT sector can operate at several levels at once:

> *Apparently the women who worked in that department [IT consultancy] got paid less than the men did, and I also heard that the guy who ran the department thought that women couldn't know anything about computers at all, so he just ignored them. A lot of women who worked in that department [said] they wouldn't stay there (TB, Technical Writer, IR2).*

Equality programmes in organisations – the problem of sustainability

To be effective and to create change in organisations, equality programmes must have support throughout the organisation, including from the most powerful managerial groups, be carefully designed, adequately resourced, and be sustainable over time (41). Yet here many equality programmes in IT have recently run aground. Even where they have met all other success criteria, companies have recently found it difficult to sustain their gender equality activities in the current environment of downturn, slowing markets and employee redundancies. It is clear that this objective has ceased to be a priority and instead has become a 'luxurious' undertaking even for organisations with significant resources and cultural commitment to expend on the project. This concern was voiced in particular by two of our case studies, both large multinationals with extensive gender equality programmes.

41 Olgiatti and Shapiro (2002), cited above.

> *... in the current situation there are other concerns, people have to look for contracts. This is in my view not good timing for such a project ... people are busy looking for how to survive. And to invest in this kind of topic is almost a luxury, I would say (S, human resources department, A1).*

It has also been suggested that in recessionary conditions, senior management decisions in very large multinationals are re-centralised and revert to a concern with quantitative measures of organisational performance which are often antithetical to more qualitative or value-driven approaches to equal opportunities. For this reason too, it seems that the project of advancing women is itself retarded during conditions of economic downturn.

Two issue arise from this state of affairs. First, downturns are generally cyclical, which raises the question of how quickly and effectively equality programmes in IT organisations can be resuscitated. Secondly, and related to this, it is not apparent whether this will do lasting damage to the cause of advancing women in IT professions. But the comments below indicate that the current generation of women entrants into the profession may be particularly disadvantaged by the current economic situation:

> *My view is that we are not recruiting now, but we will be desperate in the future again, and we will be crying out for people to come in. So I think it will change, and in response to the external situation at the moment, I focus all my energies on retention as opposed to recruitment and retention. So we have quietly dropped the recruitment related activities ...*

> *In times of recession, it is harder to find the people to help with the initiatives. But also I suspect we make great strides backwards through the programmes. Because if you have a lot of redundancy programmes, and most companies have had quite a few over the past few years, the most vulnerable people go. And one hypothesis is that this is a 'point in time' problem – point in time being that we have a lot of men who are of an age to have taken early retirement in the last 8-10 years in the UK at the moment. And therefore it is likely that their partners might be of an age where they could also afford to take early retirement, so they may be coming forward more for the programmes now than perhaps they will in the future or may have done in the past. And as the environment changes again, and with the age legislation coming through (but also the fact that we won't be able to take early retirement because we won't have a pension to do so), I think we might see a swing (RG, Director UK Government Business, UK1).*

3.8 The Employees – Work processes and skills deployed

It is often supposed that women are less skilled in and oriented towards technical work than men are. From early education onwards, they tend to opt out of technical subjects or are in some way excluded from them. Consequently, at the point of labour market entry, the pool of workers with technical skills, including IT skills, is dominated by men. As we have already shown in the State of the Art and the Conceptual Framework developed for this project, a range of arguments have been advanced by feminist researchers and others to explain this state of affairs, particularly concerning the workings of the education system, the labour market and the culture of technological work generally.

The case studies conducted for this project provide information on the minority of women who *have* successfully entered and progressed within IT professions. They allow us to explore the question of women's role in, experience of, and relationship to, IT work once they are involved in that work. Drawing on their accounts, we can pose and try to answer several key questions. Is there something specific about the nature of IT work which in some way prevents or discourages women from doing it or is antithetical to the intellectual or professional interests of women? Or is the work mystified, in ways give a misleading

impression of what is involved? What exactly do IT professionals do, what skills do they use and how do women who work in these professions experience the work they do?

The following descriptions of IT work processes confirm both the job profiles defined by Career Space, and those extracted from the biographical interviews (D6). Detailed information on IT professions has been extracted from the case studies, together with reports of informants on their responses to and experiences of the work. These descriptions amplify those drawn from the biographical interviews, but here we focus on three work families which are extracted from the accounts of informants in the case studies, the features of which we have generalised. However, it is important to note that IT jobs vary between organisations. Different patterns of work organisation generate different job functions, and companies use organisationally-specific job titles arising from their HR practices and their organisational cultures. Some companies allow self-definition of functions, and this can make comparability problematic (we found this in B2). There are also sometimes differences in the terminology of IT professions across countries.

Development work

The work of a developer is one of the fundamental functions of IT services, and one of the most purely technical. It is concerned with the job of writing the program code which drives IT devices.

In the case studies, development work is predominantly concerned with writing code. This is most likely to be as part of a wider modular development project, but may be done as a whole task performed by a single developer. The code writing process itself can be repetitive and intensive, involving long periods spent in front of a computer screen entering, correcting, and checking the code. This is not essentially a sociable process. “Design and development work is solitary work that requires silence and concentration”, is the judgement of an informant in F2. Surrounding this central activity may be other tasks such as liasing with project managers or even clients about project specifications, managing other team members, testing software, installing and modifying software, writing manuals, and providing customer support for finished products.

The level of technical skill involved in the code writing process itself varies depending on the product, the language used to program the product and the extent of modularity designed into the development process. C, a developer in case study A1 (the large Austrian software firm), writes in high-level languages like C++. JM, the head of Development in UK2 (a small e-business software house in the UK), works in C and Visual Basic. N, a developer in A2 (a small Austrian IT service provider), works in C Sharp, Delphi and UML. In F2, staff work in open source software, so program in a variety of languages according to customer needs.

In essence, therefore, programming or development work is one of the basic activities of an IT professional, and a programming job is often on the bottom rung of the professional ladder. In some organisations, the addition of client liaison or team management introduces a variety of non-technical tasks and skills into the work. Some programmers work entirely at their own

company premises, but many find themselves working at clients' sites for at least some of their time (42).

Although there is a stereotype of 'nerdy-ness' associated with development work, many programmers find the work very satisfying because they experience it as creative. Our female informants are no exception to this, and indeed one proudly identifies herself as a 'geek' because of her fascination with coding.

> *Formerly I thought, no, programming [is] not really [something for me] in such a hardcore way. I mean, our teamleader is a real hacker. I will never be able to keep up with him. And we have some quite heavy hackers. And I just don't have that knowledge. But that does not matter. And that is also the reason why I wanted to do only GUI [Graphical User Interface] in the beginning, where I thought: 'You can do it. It is not so technical.' But now I do the very technical things and I like to do them, because they are challenges.*
>
> *[It is a challenge for me] that I do something where you can see a result afterwards, that it works. So mostly also, that I can always make progress, that I learn something new, whether a new programming language or a new programming paradigm or whatever. Yes, that it is simply good, what I do. Be it that the source code is programmed well or that the whole product is good. That is fun for me (N, developer, A2).*
>
> *I am a geek through and through. I love it. That is exactly what I have always wanted to do. I think there is a selection of both geeks and non-geeks who would work in this industry, that are female. And I happen to be on the geek end of it. I am definitely a geek, but I think the majority don't like that kind of outlook. So in a development area like mine, you will see more men than women because that is the kind of mental set-up that tends to work with a particular logical [way] (MH, software developer, UK1).*

And R, the Technical Project Consultant in A1, also enjoys technical work because of its practical and immediate nature and the closeness to clients that she enjoys. She finds her work "totally interesting, since this is so concrete, something you can touch".

Other informants, however, find purely technical work of limited interest. They do not find intensively writing code sufficiently stimulating, and they aspire to develop other roles, particularly team management:

> *It is fun. It is not enough but it is fun. Because just the programming and developing the concept, this just too small for me, content wise (K, programmer, A1).*
>
> *I like the technical side. I like knowing how something works. I don't want to do it [permanently], because I would rather manage the people who do it(JM, Head of Development, UK2).*

Some programmers in our case studies do other tasks in addition to coding. For example, in IR2, development staff also write manuals and technical courses. C, a developer in A1, leads a small team of 6 staff in developing a firmware product, and so she is the project leader for that group. She enjoys the range of tasks and the sense of overview of the whole product development process:

> *[My job is] to make the components, the people talk to each other, to define interfaces, look that people stick to them, and integrate the document. Everyone writes their own documentation and I produce an*

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42 This part of the work process poses considerable childcare difficulties for women who live a distance away from their clients' offices, and may be a material factor inhibiting their participation in this type of programming work. We come back to this issue later in this report.

> *integrated version … I am the only one to review the whole document … And when there are open questions, people come to me, and I try to help them find a solution. Another responsibility is producing catalogue descriptions C, developer, A1).*

Both the biographical interviews and the case studies show that development work is a diverse work family including different combinations of tasks in different organisational settings.

Project management

This is a function in IT work which is becoming increasingly important as project working becomes the dominant method of organising the design and delivery of IT products and services. Project management essentially involves co-ordinating the personnel and resources necessary to all the stages of a project, from conception through design, development and implementation. This can be at the level of team leader, with a very specific set of team management tasks, including personnel management. At a higher level, project managers provide the interface between project teams and clients, receiving requirements specifications and modifications, discussing them with clients, and communicating them to the team (D6). Among our informants, project management tasks include liasing with clients, managing budgets and other resources, and co-ordinating the work of the project team by setting project milestones, monitoring project progress, solving problems within a project team and ensuring timely delivery of the end product to the customer. Ancillary activities among our informants involve system testing, writing manuals and producing product documentation.

Project managers generally need to have an understanding of the technical aspects of the work they are co-ordinating, but do not necessarily need to be able to program or do other in-depth technical work. L, a project manager in A2, is such an IT professional. She has made attempts to learn to program in C++, but does not find it central to her work or particularly interesting. It is, in her work process, simply 'a means to reach a goal'. Others mention the need for an understanding of the technical issues involved in their products simply in order to be credible as managers of their teams.

As we have seen, there is a tendency among some employers, and indeed among women themselves working in the IT professions, to direct female IT professionals towards project management on the assumption that the 'soft skills' required are particularly appropriate to their 'natural' skills. This may be because the main component skills of project management are not centrally technical, but are concerned with co-ordination, communication, liaison. It is commonly assumed that these are the activities most women are interested in and adept at. It is also remarked that project management affords an overview of a project process that women find interesting.

> *I only know few women who really go nuts with the last bit that turns from 0 to 1 … In our area, the women are more into project management, this global view (K, programmer, A1).*

L, a project manager in A2, conforms to this view. She expresses a desire to drop technical work and concentrate on project management. This is clearly the preference of some women who do enjoy using their organisational and interpersonal skills. But it is important to note that not all women favour project management over technical work, and it seems that their preferences are not very clearly heard or taken into account in the management of IT careers.

Two developers who have done some project management express a very strong preference for technical work:

> *Because this is too much 'waffling stuff' for me. Because I prefer to work on the realisation ... I don't want to sit there only drawing some bars in Microsoft Project and quarrel with the customer [about whether the project] will last longer [or whether it will not] last longer, or quarrel with the management that I don't get the personnel or why I overdrew the budget or such things. This is what I don't want. I'd rather work on something and finish it, and I tell the others what to do. So I like some project management things. It is not that I don't want to have contact with the customer. Actually I do have contact [with] the customer. I also do design. But I don't want to do only project management things. What I like most is technical management (N, developer, A2).*

> *It is more interesting when I get to do what I consider to be the real work, rather than all this managing stuff which I don't enjoy quite so much. And that is also more stressful, all that managing stuff. It is a lot less stressful just to be able to sit down, get on and write some code. The technical side of it, the designing stuff, the writing stuff, getting on and running it and making it work, that is still wonderful. I love that kind of thing. It is really interesting to me. New technology going in all the time. The other side, the project management stuff, I don't like so much, but somebody has got to do it (MH, developer and project manager, UK1).*

These comments remind us that different women have very different orientations towards technical versus managerial work. Feminist scholars have long warned that women and technical work should not be treated as antithetical, and that some women's gender identity is in fact shaped by their affinity with technology, not their rejection of it (43). Our informants confirm that not all women are disinterested in technical work or in the activity of intensive coding, nor are they necessarily enthusiastic about organising projects and liasing with others. Women's skills, abilities and orientations to professional work in IT are varied, in ways which conventional IT career pathways do not seem able to cater for. It seems as if they are being directed down restricted routes which do not cater to their gender identities in relation to technology or meet their diverse needs and requirements of their working lives. Possibly (but we have no data on this issue), this is a problem which is also experienced by men in IT professions moving into management roles, and a rethink of IT career pathways in general might help to improve diversity in the profession.

Business management

Many organisations attach the term 'manager' to all but the most junior of staff. However, in medium and large firms there are often extensive managerial career ladders up which IT professionals can progress, and in addition, managerial niches in which they can undertake very specialist management work. As a result, there are infinite types of IT managers in different organisations, some of which are represented in our case study organisations.

One category of senior IT management work which is represented in the case studies is that of business management. Business management is a grade of management into which professionals can move when they reach senior status in their organisations. In matrix organisations, with separated and devolved business units, IT managers are given

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43 See, for example, Henwood F. (1993) 'Establishing Gender Perspectives on Information Technology: Problems, Issues and Opportunities', in Green, E., Owen, J. and Pain, D. (eds) *Gendered by Design? Information Technology and Office Systems*, London, Taylor and Francis; Wajcman, J. (1991) *Feminism Confronts Technology*, Pennsylvania, Penn State Press; Hacker, S. (1989) *Pleasure, Power and Technology*, London, Unwin Hyman.

responsibility for running these units as if they were stand-alone businesses. And in small companies, particularly IT start-ups, owner/managers are usually IT professionals who cover all aspects of running the business.

As the title suggests, IT business management involves more strategic management than either day-to-day technical work or IT management generally. Typical tasks and skills include business development, finance management and budgeting, marketing, recruitment and personnel management, client liaison, technology foresight and development. The knowledge involved is both managerial and technical, though detailed technical activities are generally delegated to more junior staff – programmers, developers and engineers.

Although this is an important IT occupational category, because of the seniority of this type of work, women in IT business management are rare. They are under-represented as owners of IT start-ups, and also under-represented in very senior positions in large companies. Among our informants, only one falls into this group. It is worth describing her work, however, not least because this is a potential route for women to take in their IT careers, and one into which policy is surely encouraging them to progress when it places stress on the advancement of women in IT professions.

AC, a 'solutions manager' in UK1, runs an emerging technologies business area of her own, with a team of about 65 staff working for her. Her tasks are very varied ones characteristic of second line management. They include developing the business strategy, budgeting, marketing, recruiting, designing services, working with clients, doing technology foresight.

On a day-to-day basis, her work is extremely varied, involves a lot of mental labour and decision-taking, and is consequently hard to describe in concrete terms. She is working with a management team of 7 people in a matrix-managed organisation. She has 2 personnel managers and 4 programme leaders reporting to her, managing a total of 65 professional staff. The latter are responsible for running business lines, ensuring that work is coming in for a particular technology, looking for customers to go and work in to break even at the end of the year. AC's daily work involves a considerable number of meetings, many of which are concerned with the strategic issues of her business. The issues which she has to address and cater for on a daily basis include ensuring there is sufficient finance to embark on new developments and new projects, ensuring that business is being brought into her organisation at the rate needed to make sufficient profit, ensuring that the organisation has the skills and the technology at its disposal to do the work it receives, and planning for emerging technologies and their likely market among her customers.

A large part of her work involves assessing emerging technologies developed elsewhere in UK1, in the context of her customers' needs. She works closely with customers to find solutions. "So we are really selling the possible, if you like."

> *All the time we are looking at what technologies can do for different industry areas, and we will always focus on two or three different areas rather than trying to do loads of them, because we have to keep it well focussed. So we are really doing research (AC, solutions manager, UK1).*

As in almost all IT management jobs, her work requires technical knowledge but not a close or detailed skill in using specific systems or software.

> *I have to know what is coming up to be credible with the team, really. Throughout my career I have found that … I did start as a programmer, and then I moved into doing various different jobs, testing and*

> *service for products, and then I moved into team leading and management. Each time I have done a management job it has always been a technical management job. It is not just a people management job, so it has required some different skills, whether it is project managing a release of a software product, or managing the collateral that goes alongside a software product, the web pages and the information manuals and that kind of thing. So all the time it is using the technical skills without using them completely, but I am not a techie because I have business management responsibility as well (AC, solutions manager, UK1).*

This, then, is the kind of senior IT management in which women can potentially move. As AC's account indicates, it is characterised by an advanced technological knowledge (AC has a Bachelor's degree in Computer Science and a Masters Degree in Business Administration), but the main components of the job are managerial and strategic. The fact that women are so markedly under-represented in this type of work may be due to the fact that to enter it requires some years at the cutting edge of technological work. Women are already under-represented in such work, and with each rung of the management career ladder, they drop steadily out of technological work, so that their chances of reaching strategic management positions are strongly reduced in comparison with their male counterparts.

One factor which may have a bearing on women's progress, or the lack of it, into the higher reaches of IT professions is the availability of training and learning opportunities which they are able to pursue in their careers. Such opportunities may be helpful to women IT professionals not only in developing and maintaining their up-to-date technical knowledge and skills, but also in supporting the development of those managerial and organisational skills which seem to be critical to the pursuit of an IT career. Furthermore, given the problems of self-confidence and lack of self-promotion which have been widely observed in women IT professionals, training may be an important support mechanism. We look now at the training opportunities to which our informants in the case study organisations have access.

3.9 The Employees – Training, Learning and Development Opportunities

Training and learning – the rhetoric and the reality

In interviews with company management representatives in our organisational case studies, there is an almost unanimous message concerning the importance of providing training and development opportunities for IT professionals in their employment. Companies state that they believe this is important for two reasons. First, continuous employee training improves their stock of human capital and so contributes to the maintenance of competitiveness, particularly in this fast-moving professional field where the technological state of the art is developing more rapidly than in almost any other field. Indeed, given that these companies are central to the 'new economy' - a hypothesised knowledge-based economy - one would indeed expect them to have a strong commitment to the skills and knowledge development of their employees. Second, training and employee development is seen as motivational, helping them to retain their staff and reduce attrition rates. A small minority of companies are also aware of the importance of development activities for improving the participation and prospects of women in IT professional areas, and some have established specific programmes for their female staff.

Despite this declared commitment to providing employees with training and learning opportunities on the part of our case study companies, their employees are not necessarily receiving the training that is apparently crucial to their development and to company

competitive advantage. There is a significant gap between the declared intentions of companies, and their training practices. One important reason why many of our informants in IT professions do not enjoy employer-provided training lies in the recent downturn in the IT industry. Several of our case study companies – A1, A2, B1, IR1 and P2 - report having had to make cuts in their training budgets or activities, and consequently employees have missed out on training opportunities. This may be a temporary problem which can be corrected as the IT market recovers.

However, many of our informants report that they receive little or no professional training simply because in the normal course of events their companies do not offer it. In B1 and F1, this is attributed to a shortage of time for training and to pressure of work demands. In F2, there is as yet no formal training framework, because a large proportion of its employees are students on placement, and so they are in the course of being educated outside the company. The company has plans to offer training in project management in the future. Informants in IT2 also receive no formal training, although the company is committed to the idea in principle.

There are a number of reasons why IT professionals have such variable access to training and professional development. Some receive no training because their employers do not consider that their jobs require it. B1 allocates ten days' training allowance per year for three years to each employee, but many of its employees do not benefit from this training because the company feels they would not put their newly-acquired knowledge into practice in the course of their work. Only consultants who work on 'high-tech' projects are considered to be worth the expenditure of training resources. In F1, what little training is available is given to production staff only, on the grounds that theirs are the key skills of the business. In IR2, software developers are given whatever technical training they request and whenever they require it. This is mostly supplied internally within the company, but delivered by training consultants. However, content writers are not considered to be so strongly in need of professional development, and so get significantly less training on a very infrequent basis. Given the gender division of labour in the two areas of work (software development is male-dominated; content development is female-dominated), this effectively disadvantages women's professional development.

The size of company in which an IT professionals also affects their access to training and development opportunities and the nature of the training they receive. In general, we found that very large companies (for example, A1, IT1, P1, UK1) have more systematic and thorough-going approaches to employee training than do small and medium enterprises which are generally less able to budget for training and less likely to be conscious of the importance of training for employee motivation and competitive advantage. SMEs are also more likely to offer less costly and informal types of training, given by company staff at lunchtimes, or coaching by staff of other staff.

So employees in A1 and UK1, for example, are able to participate in company-wide employee development programmes - the MOVE programme for senior management development in A1, the Fast Track Scheme for Technical Leaders and the Executive Resource List in UK1. These programmes support their training requirements and are designed to ensure that they have access to the training they need in order to develop. C, a computer scientist in A1, has taken part in a series of training courses within the firm, including technical training, training in project management, moderation techniques and presentation skills. In A2, staff receive

training according to their stated needs and requirements, including in training techniques where they are responsible for training their colleagues. Employees in IT1 receive continuous vocational training throughout their careers in the company, and find the experience very positive. They can request particular types of training that they require, and these requests are generally dealt with sympathetically. Two female systems developers in this study, for example, requested and took English courses in computer science in order to help them work in a field which is dominated by English. Developers and IT managers in UK1 are trained to develop various skills, both technical and non-technical, including ones which do not always appear to be directly connected to the everyday functioning of their current jobs. Training courses available to all IT staff cover the technical features of the different products, software skills, presentation skills, senior leadership skills, personal relations skills. Senior IT staff are offered opportunities to attend industry and professional conferences in order to augment their technical knowledge. The company has a forward-looking policy of investing in its human capital in the broadest way, and not simply for short-term efficiency. BH, a web services architect and very senior technical employee, is one of the beneficiaries of this policy, who comments that

> *It is good to realise that the company wants to invest in the personal growth of its people, rather than just the "here's-how-run-better-projects" skills.*

These employees are fortunate in comparison with their counterparts in companies which are less active in and committed to their development. They are also fortunate in having been selected for inclusion in development programmes which will take them into management and executive positions if they so wish. As K, a computer scientist enrolled on A1's MOVE programme, points out, inclusion in such opportunities can depend on a kind of sponsored mobility in which the employee's potential is 'noticed' by a superior who sponsors them through nomination and mentoring. This normally works routinely for men, but is a much less certain process for women.

> *That I got this chance is due to him. In A1 there are many more men and most of those who get there, are men. No, he did not talk to me about this. They have to present a list of candidates which they think are deserving of promotion. And this is his personal assessment of my capabilities, this is how I see it. He put me on the list, in 2000 … In this way, I have a mentor. Without him it would have been much more difficult to enter this programme (K, computer scientist, A1).*

> *I am on our Fast Track scheme – Technical Leaders' Board. They put the people they think are going to be the technical leaders of the future onto this list, and they make sure that they are doing all the right things to get promoted. I have been on that list and I am sure that helps me move slightly faster (MH, Software Engineer, UK1).*

Individual learning for employee development

Although a large number of our informants receive excellent training in their organisations, an equally large number do not enjoy access to formal training. This does not mean, however, that they are not undertaking professional development. It simply means that this is individualised, and that it is left to the devices of employees to organise and undertake their own skills enhancement.

It is commonplace in IT professions for at least some element of skills development to be done through individual learning. IT professionals learn by talking to one another, by reading literature, by surfing the web, and by posting queries there, as well by experience in the

course of their daily work. For a number of our informants, this is precisely how they have been building up their knowledge of the technical fields in which they work; often it is the only way.

In A2, lack of money for training in recent years has meant that, despite the implementation of individual development plans (IDPs), employees undertake training at their own initiative and largely at their own expense. In B1, the process of company restructuring has involved a regime of extensive training provision being displaced by a regime which places considerable emphasis on individual employees taking responsibility for their own development and employability. The firm offers a 'competence management system' which requires the active involvement of the worker:

> *Les employeurs veulent maintenant une plus grande flexibilité d'esprit au niveau de la gestion des ressources humaines ... C'est à l'employé de se manifester et de communiquer ses attentes en termes de carrière et de formation pour que la société [B1] puisse y répondre. L'employé doit s'occuper de son employabilité lui-même. (Human Resource Manager, B1).*

But employees find it difficult to be proactive in their own technical and professional skills development when they feel the skills needs of the company are not clear because it has not clarified its own strategic direction:

> *Il est facile de dire à un moment « vous n'avez pas les formations, on ne peut vous mettre nulle part », mais si la société ne sait même pas dans quelle direction elle va ... Il est difficile de choisir dans quelle direction se former. C'est impossible. Ils sont quand même fautifs. Ils le savent et ils sont en train d'y remédier, mais c'est très difficile (IT consultant, B1).*

In B2, employees are much more positive about the fact that they are largely responsible for their own development, but they also express regret that little is offered by their company. In IR1 and IT2 also, employees manage their own professional learning through reading, interacting with peers and researching technical solutions on the internet. And in P2, self-training is widespread and the only means by which employees can enhance their skills and keep them up-to-date.

In summary, then, IT professionals can expect and receive very variable training opportunities, depending upon the size and nature of the organisations they work, and the type of professions they are engaged in. In general, it seems that software engineers are much more likely to receive further technical vocational training from their employers than other types of IT professionals, particularly those concerned with content production or project management. In very large firms, however, training is widely available in a range of skills to all professional staff. But there is a widespread and growing tendency for the responsibility for training and learning to be shifted from the firm to the individual employee, and for the only learning opportunities to be those the individual her- or himself exploits through reading, research and interaction with fellow professionals.

Gender issues in training, learning and employee development

Individualised learning

Training and learning are not gender-neutral processes. Our informants indicate that men and women IT professionals have different training needs and requirements, and experience the processes of training and learning rather differently from one another. These differences are

not always recognised or catered for by their employing companies. A small number of our case study companies do recognise the particular needs of the two sexes and attempt to respond to them in their employee development practices.

First, it is clear that in IT work, continuous knowledge development is critical to maintaining a strong position in the profession and in the labour market. In a fast-moving milieu such as this, skills can become outdated or obsolete remarkably quickly. Company B1 provides a stark reminder of the problem of skills obsolescence in older workers. Maintaining up-to-date skills requires a certain amount of self-training and individual learning.

However, the trend towards wholesale individualised learning rather than formal training can be problematic for women. There are both material and psychological reasons for this. Employees need to make and have time for learning, and this can be difficult for those who struggle to balance the demands of their work (which can be considerable in this field) with the demands of their lives outside work. This principally affects women with domestic responsibilities. Evidence from IR1 also suggests that employee-driven learning can disadvantage women who are reticent about promoting their careers, or who are simply unaware of the opportunities available to them.

The effect of career breaks on training and learning

Informants also report that career breaks, such as those brought about by maternity, often interrupt their professional development. Breaks from work are effectively periods away from the company in which their skills are not constantly kept up to date. Consequently, when they return, they are unfamiliar with the latest technical developments and this can affect their career opportunities. Few companies recognise this problem or attempt to compensate for it, although there are pockets of good practice (outside our case study organisations) in which female employees on maternity are encouraged to visit their workplaces, with their babies, on a regular but brief basis to keep their skills up-to-date.

Dual labour markets within firms

As we have seen, some organisations operate dual internal labour markets in which only 'primary labour market' employees like software engineers have access to training resources, while their counterparts in 'secondary labour markets', such as content designers or project managers, have limited or no access to training. Given the gender divisions in these occupational areas, this effectively serves to create or reproduce inequalities in men's and women's access to training.

Gender-aware development practices

A very small number of our case study organisations recognise the specific needs of women in employee development and have put in place training and development arrangements to respond to these. In particular, we want to highlight the case of UK1, a large company which has a series of proactive measures to attract women into IT functions and to encourage them into senior positions. Aside from formalised training in the technical and other skills which we have described above, the company organises support activities for women, principally aimed at promoting confidence, self-empowerment and career awareness. These include women's networking groups, mentoring and women-only mentoring, round-table discussions with executives about the nature of their work, and training in assertiveness skills, confidence-development, business-travel when alone, and so on. Our informants all enjoy

access to these arrangements, and all see them as central to the company's overall approach to promoting women in IT.

4. Case Study Analysis – e-publishing

4.1 Introduction

In this chapter, we describe and analyse the 14 case studies in the e-publishing sector. As in Chapter Three, we are seeking to identify comparative and contrasting features of the organisations in question. Our objective is to understand how their structures, policies and practices can be understood in the context of their sectoral and national environments, and how in turn these affect the work processes and work experiences of women professionals.

The structure of this chapter follows the structure of Chapter Three. We begin with an analysis of the organisational features of the e-publishing case studies, before moving on to consider the detail of the work and employment circumstances of women e-publishing professionals. The purpose of this analysis is not, however, to draw out comparisons between the computer services sector and the e-publishing sector. Our analysis shows – and indeed this is indicated by the overviews of the two sectors in Chapters One and Two - that these are very different sectors, with different historical evolutions, different employment patterns, skills requirements, working conditions – and gender orders. They do not operate in the same product and labour markets, and there is little or no skills/personnel transfer between the two. Women working in e-publishing tend to have come into the work via a career in journalism or publishing, rather than via the IT professions, and they are very different women with very different work experiences. Rather than engage in a comparison of the two sectors with one another, therefore, we analyse the sectors independently of one another, and draw out the differences between employment conditions within each sector as opposed to across sectors.

It is worth noting at this stage a number of features which emerged consistently from our analysis of e-publishing organisations and employees :

- E-publishing organisations have their origins in conventional publishing organisations, and take many of their characteristics from the latter. For example, our case studies are predominantly the publishers of paper and online newspapers, and their patterns of employment and work organisation are constituted in the same way.

- E-publishing organisations are invariably flat organisations with few hierarchical layers, particularly those that are small companies, or small divisions of larger companies.

- Work organisation and work rhythms are generally based on a sort of continuous-process system of production, whereby online material is produced and continuously updated, particularly in the case of online newspaper production or other news services. Fixed publishing deadlines tend not to apply in e-publishing.

- Professionals working in the sector are generally people who have a qualification or experience in journalism. IT skills are less necessary to the work, which is generally concerned with the utilisation of IT applications more than with in-depth systems interventions. Consequently, editorial and journalistic skills are the main skills used by e-publishing professionals in our case studies.

- Skills in IT applications or other aspects of the work are acquired either prior to employment through higher education (a degree or diploma in journalism, for example), or on the job through colleagues. The provision of training by employing organiatisations is not widespread.

- As e-publishing firms have predominantly flat structures, progression prospects for staff tend to be limited to the progression from journalist to editor. Horizontal progression between specialist areas of journalism is, however, possible.

- There are widespread instances of low pay among our informants in the e-publishing sector, but despite this there is also considerable commitment and dedication to the work among professionals.

- Women are well-represented in e-publishing and there is no sense of the sector as one in which women are a minority. Moreover, their experiences of the work are generally positive and they are comfortable in this domain.

4.2 The Firms – Work Organisation and Working Time

Work organisation in our e-publishing case studies is largely contingent upon the nature of the published product. Our cases dealt primarily with the online publication of newspapers, though we also cover cases of companies which publish a range of electronic products (for example, online educational aids, websites, electronic journals). These products dictate the organisation of work, which falls also into two distinct categories:

- Organisations comprising autonomous working on continuous publishing (usually of products which are published on a recurring basis, like newspapers or journals)

- Organisations comprising one-off project working (on products like websites, internet services for clients) usually by teams of people with complementary skills

Almost every one of our case studies underwent a process of restructuring following the dot.com crash of 2002, and consequently implemented a reorganisation of work structures and working arrangements (including, in many cases, redundancies, which we discuss later in this part of the report). In the case of the large companies in the study, this restructuring included the flattening of their organisational hierarchies. Flat structures were an already established feature of the smaller organisations. In general, therefore, our case studies broadly conform to the stereotype of new economy organisations: they are flat, non-hierarchical structures. However, while some companies organise work into managed teams, others allow more employee autonomy and self-management, particularly where the work is routine and its content relatively stable over time.

F3, the digital content distributor (540 staff), replaced its hierarchical structure with an internal network of departmental representatives when it restructured its activities in 2003. This ‘entrepreneur network’ allows exchange of information across company areas. On a daily basis, the work – the design of internet services, the supply of content and interactive services - is organised into traversal ‘micro-projects’, usually involving 4-5 people working in multi-disciplinary teams over a six-monthly period.

In some environments, organisational structures correspond to product line. For example, editorial teams may be organised around different news banners, as in F4 (the electronic publishing section of a newspaper group) where five separate editorial teams design the online versions of five newspapers within a group. These editorial teams are supported by staff in advertising, marketing and technical departments which operate across the organisation. In IT4, a multimedia publisher and editing service (with 59 staff), 'editing cells' work on products in the different content areas of the organisation: IT (which in fact denotes handbooks), school, health, encyclopaedias and dictionaries, web, and various (fiction, cookbooks and other miscellaneous products). These editing cells are teams of people with complementary skills which work on a project within a content area, in collaboration with core HR and IT staff (44).

Absence of hierarchy is often accompanied by an organisation of work involving autonomous and self-directed activity. This particularly noticeable in the small companies, and where work is continuous rather than based around one-off projects. It is also particularly common in conventional news organisations which have an e-publishing activity, and which have work structures based on editorial rather than managerial authority. In these types of environments, staff manage their projects or work areas on a day-to-day basis, with neither immediate line management nor, sometimes, administrative support. In A4, the architectural archive (which employs five staff):

> *We have an extremely flat hierarchy, there are nearly no 'musts'. There is no list, and you know you have to follow the points listed there. One [person] likes to work in one way, and [another person] in another. This has advantages and disadvantages, but finally we all prefer to work this way. I think our people would be paralysed, if you [told] them, 'do that and don't do that' (K, Finance and control officer, A4).*

In B3, the multimedia cell within a press group (9 staff), there is a similarly flat hierarchy and an informal model of work organisation with considerable autonomy at employee level. To illustrate this point, employees draw a contrast between working in B3 and working in a civil service bureaucracy. P3, an online newspaper with 19 employees, also organises its activities on an informal basis with devolved daily management, partly an outcome of the routine cycle of online news production. UK1, an online newspaper, likewise leaves the daily management of work to journalists and technical staff, with authority being vested in an editorial structure which also carries managerial responsibility.

The Organisation of Working Time

The 'rhythm' of publishing and e-publishing

The organisation of work in e-publishing is based around the activities of research, assembly, presentation and publication on electronic media of the material in question. In conventional publishing, these activities are generally organised around publishing deadlines, and therefore the most strenuous activity comes at the end of the work cycle. For example, in physical newspaper publishing, work is organised around daily or weekly copy deadlines. A typical work pattern is that articles are researched and written by journalists, graphics and photographs are assembled, the material is sub-edited and laid out in the newspaper during the

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44 This refers to core IT staff who are IT specialists in the company's IT department, as opposed to those working in the 'IT' content area, which refers to the subject matter of content.

day before publication, and despatched for printing late at night or in the early hours of the morning of publication. This rhythm of work begins again the following day. Similarly, in magazine or book publishing, although the work takes place over longer cycles, the basic routine is that material is written or prepared, subjected to an editorial process and then the final result is printed and published. Once published, although subsequent modifications can be made (for example, in book reprints), in general publication signals the end of the process of work on that particular material, and the beginning of work on new material.

Electronic publishing follows a rather different chain of events. Although the precise organisation of work differs from one company to another depending on the product and the product market, in general, the work is not governed by the imperative of a print deadline as in physical publishing. This is because one of the principle characteristics of electronic publishing is, as we saw in our overview of e-publishing in Chapter Two, that material can be continuously revised, modified, and updated, to take account of changing events or different market segments. So the cycle of work is not geared around a daily or weekly publication point, and is not finite as in physical publishing – having reached completion with the publication of the material. In electronic publishing, on the one hand, a considerable degree of work effort is concentrated a the beginning rather than the end of the work cycle (in other words, in the design and initial setting up of the website or electronic medium). On the other hand, and by the same token, the publication of the material is not the end of the story and work may continue long after the material has appeared in the public domain. Moreover, because work is not geared to a fixed publication time, journalists and production staff in e-publishing do not work to a rhythm in which the pace and intensity of work speeds up as the deadline approaches, but rather to a steadier rhythm with fewer peaks and troughs. This allows e-publishing professionals to react to external events at any time and not in thrall to publishing deadlines. Their efforts are more likely to be intensified where and when external events, for example, news events such as the 11 September 2001 attacks on the US or the Iraq War of 2003, call for extra coverage or other activity.

> *... an online newspaper is permanently being updated. That time barrier that exists in paper newspapers, that we have to close it at a certain time, we have to send the material to the graphic at a certain time ..., in an online newspaper, we don't have that barrier(Director, P3).*

This can create either a continual work rhythm, or continual pressure, depending on your viewpoint:

> *... in a weekly newspaper, journalists leave [everything] to the last minute. In the case of an e-journal, that is impossible, since it is always closing time (MC, Editor of P4).*

Working Time Arrangements in the Case Study Organisations

In an era where working time arrangements are becoming less and less standard and increasingly driven (particularly in service organisations) by peaks and troughs in customer demand, working rhythms in e-publishing remain comparatively even and consequently working time remains remarkably conventional. In the vast majority of our case study organisations, e-publishing professionals work on a standard full-time basis, Mondays to Fridays. A normal working day is of eight hours and worked between the core hours of 0800 and 1800.

In several case study organisations, particularly online news providers, eight-hour shift systems operate throughout the day so that the organisation's operating hours are extended

but staff still work a standard eight-hour (or thereabouts) day. Shift working is very common in these organisations, reflecting their origins in news media production.

- In B3, web editors' work is organised into three daily shifts. The morning shift runs from between 7am and 8am to between 3pm and 4pm. The work of editors on this shift consists of checking the night news and sports results and putting new material online. The first evening shift runs from around noon to 8pm, and the work at this time is helping to put online parts of the newspaper, such as supplements, which have been completed mid-afternoon. The second evening shift runs from 2-2.30pm to 9.30-10.30pm, and during this shift the newspaper's web edition is completed. In addition, workers share four weekend shifts between them in order to cover news that comes in: Saturday morning, Saturday evening, Sunday morning, Sunday evening.

- In IR3, the offices are open seven days a week from 7am to 11pm, and all staff except journalists work a standard eight hour day. Working hours for journalists are broken down into 3 overlapping eight-hour shifts and each journalist works a combination of these shifts over a four-week period, and one weekend in four. The shifts run from 7am-3pm; from 1pm-9pm; and from 3pm-11pm.

- In IR4, the offices are open from 6am to 4am (so only closed for two hours in the early hours of the morning). Journalists work staggered eight hour shifts beginning around 8am, with the last shift starting at 8.30pm and ending at 4am. The work of support staff, including editorial staff, is organised around two 'desk shifts': from 6am-2pm and from 2pm-10pm. Since most news breaks during the early part of the day, the morning is the busiest part of the working day both for journalists and support staff. Within this broad pattern, the work is subject to considerable unpredictability as news breaks, which calls for a measure of flexibility on the part of employees.

- In P3, work is based on two eight-hour weekday shifts, partly to conform to Portuguese legislation. The first shift runs from 7am to 2pm, and the second from 2pm to 10pm. A very few staff are required to be present at weekends, and they work from 10am to 6pm. In fact, the online paper can be updated remotely by the Director of the company or the editors. Shift choices are the outcome of negotiations between workers and the Director.

- UK3's offices are open 21 hours per day from 7 am to 3am, in line with the production of the paper newspaper. The production of the online newspaper closely follows the production of the paper version. Most staff work eight hour day shifts within these hours. Night working is particularly common among journalists, and some IT support staff work the night shift from 7pm to 3am in order to ensure that the IT systems are supported throughout the production process of both paper and online versions of the news.

Flexible Working Time

Apart from the shift systems described above, few of our case studies operate formal flexible working arrangements. A number operate very informal systems. For example, within a full-time regime, A4 allows employees to choose their own arrival and leaving times. Similarly, in F4, employees are given autonomy over their precise working hours; more important to the organisation is to 'get the work done'. IT3 operates a very limited flexitime system, allowing staff to work eight-hour days in the 9am-6pm period. Only UK4 operates fully flexible working arrangements of a more varied nature, and these are negotiated unilaterally between

employees and their line managers (UK4 is one of the few e-publishing case studies with an extensive hierarchy of management). Flexible working arrangements on offer include:

- Part-time working
- Job sharing
- Working from home full-time
- Working partly from home, partly from the office
- Working an afternoon shift from 11am to 7pm.

The e-publishing professionals in our case studies have a generally positive attitude to the organisation of their working time. Most assert that their working hours and their workloads are manageable, and a number describe the 'foreseeable rhythm' of their work which lends it manageability. More than this, some programming and editorial staff are 'hobbyists' in their orientation to their work: for them there is no work/life divide. But very few of our informants have domestic responsibilities: most are young, single and without children, so the problem of balancing work and family life does not apply to them.

> *There isn't such a separation between life and work, since I consider this 'work which is not work'. It gives you plenty of chance for realising yourself (Editor, IT4).*

> *You often find yourself saying "Go home. Go home. I really mean it." And they say "I just want to do this." It is a medium where you can always finesse and refine what you have done, and people are very particular about getting things right. And there are so many opportunities to keep changing them (VS, HR Manager, UK3).*

Only in one organisation is working time a problem and this is in A3, where budget cuts have led to the cutting of editors' work contracts from 35 or 40 hours to 14 hours per week, and consequently to cuts in their incomes. Many editorial staff have found their working time fragmented, as they now have to work partly at home and partly in the office. They feel this has paradoxically increased rather than decreased their working time, though of course they are now paid considerably less than before.

4.3 The Firms - Recruitment, Skills Requirements and Career Progression

Recruitment and Skills Requirements

There are two broad types of job profile in e-publishing for which employers in our case studies are recruiting:

- Jobs involved with content production – journalism, research, design, editorial jobs. These make up the vast majority of jobs in e-publishing, and they invariably require skills across the production process – in research, writing, text and graphics entry and layout, for example.

- Jobs involved with technical functions – programmers, webmasters, administrators, project managers. Here, a distinction has to be made between technical jobs in development or programming which require training in IT, and those linked to the use of web publishing software such as HTML, Flash, X Métal, Editor, Manager, Word or Photoshop which are accessible to laypeople.

Recruitment and entry into both types of e-publishing work – creative jobs and lower-level technical jobs - take place mainly through the labour market in journalism. E-publishing firms concerned primarily with written media – online newspapers, journal publishers, web publishers, and so on - use this as their main pool of labour for recruiting content producers, editorial and even some technical staff. The majority of our case study companies belong in this category; they are online newspapers, and they employ staff who have a background in journalism or editorial work. Some stipulate previous editorial or journalistic experience (F4, IT3) or even a relevant degree, for example, in Journalism or Social Communication/Media Studies (P3). Others, with an overlap between the 'parent' newspaper and the online part of the organisation, with the latter either directly using journalists and editorial staff from the main newspaper (as for example in UK3) or recruiting staff from the newspaper to work on the online product (as in B3, where staff have gradually 'drifted' between the two). Only one case study expressly avoids hiring staff with previous experience. IR3, an Irish online news organisation, recruits college leavers because they are young, likely to be comfortable with computers, and can be trained internally for journalist and editorial functions. By the same token, the organisation prefers not to recruit older older people: an assumed facility with the technologies of electronic publishing is clearly considered to be more desirable than experience of working in news broadcasting.

A very small group of case studies deals in non-text-based publishing, for example, of images, sound or other content. In these organisations, recruitment criteria are harder to specify. F3, the French digital content distributor, employs staff with a baccalaureat at minimum, but other than this, its recruitment criteria are very 'basic', and centre on the possession of 'relational skills' and adaptability for content development jobs, as does IT3. For management jobs, experience and 'maturity' and experience are sought. A4, the content provider and architecture archive, employs editors with architecture and art history backgrounds. B4 has recruited staff from very diverse backgrounds, including someone from the tourism sector, a roman philologist, and a computer graphic artist with a degree in classical philology.

Notwithstanding this particular example of multi-disciplinarity, most e-publishing employers report that they are searching for a mixture of journalistic and basic technical skills in recruiting into web journalism or web editorial positions. If they cannot recruit these skills, they at least wish to develop this mixture in their staff once recruited. This is because e-publishing journalism involves a greater mixture of functions, and perhaps more work manipulating text electronically, than in conventional publishing. Not only researching and writing are involved, but also editorial, layout and technical competencies. It is this mixture of required skills which leads the management of F4 to observe that

> *... recruiting a pure journalist would be inevitably be a failure. He or she would be frustrated.*

It is striking that, even for technical functions such as web mastering, HTML programming or computer graphics work, technical qualifications or even experience are not always sought by e-publishing employers. Many case study companies are happy to take staff on with journalistic or editorial experience, and allow them to learn their technical skills on the job. It is indicative of the relatively simple nature of these skills that this is possible at all. It is mentioned by some informants responsible for HR in e-publishing that web authoring and programming skills are becoming progressively simpler as systems become more powerful, so that technical knowledge is diminishing in importance for all but the highest level

programming jobs (45). Certainly, the case studies indicate that a large proportion of e-publishing professionals working in technical areas need and possess much lower-level technical skills compared to their counterparts in technical professions in other sectors, and specifically in relation to this project, in IT services.

There is, however, a small group of programming and development jobs in e-publishing for which employers in our case studies do require high-level technical qualifications and/or previous experience. IT3, the Italian news and information provider, requires the technicians working on its 'server farm' (which supports IT3, its partners and customers) to have an engineering degrees or high school diploma. UK3, the online newspaper, also has relatively stringent entry requirements of its technical staff who are managing the server, programming the website, and adding new functionality to the website. The person specification for a developer, for example, includes:

- "technical skills in programming languages, in Unix, in web application architecture, database design, and
- experience of sophisticated technical environments" (46).

> *The ways the technical jobs are here, unless you have those [technical] skills, you won't be able to do the job. Apart from the technical specification for a developer, everything else is fluid. You need to be able to work in a team, you need good communications skills, although that is sometimes an issue. You need to be able to hack it in this kind of outfit. Professionally, you need to be comfortable with the technology and you do need to be quite focussed on what you have done.*
>
> *Typically, a junior developer who comes here will need to have 1-2 years' experience, but they have got to be professionally quite sophisticated and advanced. It is their profession, it is not a job, so they are interested in it anyway. The skills are not general, but very specific things that people need to have experience of before they come here. They might have had it in their education, or working as a contractor. We often interview people who do not have a degree, but you can see from their CVs that they have been in this market. What happened in the 90s was that lots of people didn't finish their degrees, they were being offered so much money, their skills were highly marketable. It is nice if they have had some formal qualifications. (HR Manager, UK3).*

These, then, are the types of skills and competencies which e-publishing employers recruit for. Technical skills are, in general, not of a high order, and are secondary to the need for skills and experience in journalism, editing and other content production skills. Of importance to many employers is a mixture of journalist skills and a technical facility with computers, again with the emphasis primarily on the former. Personal qualities such as adaptability and flexibility, the ability to work in a team and to learn on one's own are being increasingly quoted by employers as desirable qualities for potential employees.

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45 On the other hand, we also have a complaint from an Italian informant of a gradual increase in emphasis on technical skills at the expense of traditional journalistic skills in higher education courses, with serious implications for the profession:

> At present, curricula are more and more characterised by technological skills, resulting from different kinds of so-called "masters" in multimedia publishing, but the danger is that it means a loss in basic culture, editing skills, expertise in writing. I believe that while you can fill the "technical gap", the editing product has to be good (HR Manager, IT4).

46 Taken from Person Specification for developers' job, UK3, online newspaper.

Recruitment – Alternative Practices

Personal Networks …

It is striking, however, that recruitment is often managed very informally within e-publishing organisations, without recourse to the formal labour market. There are several reasons for this. First, many e-publishing companies, particularly those publishing online newspapers, are closely connected to parent or partner organisations, and often draw their staff from the ranks of the other company. An example is B3, an online newspaper in Belgium, whose staff have simply moved across from the main paper to work on the online version. As a result, recruitment processes and procedures are unnecessary and non-existent, a state of affairs which may potentially cause problems for the pursuit of any kind of equality policy. Also, several e-publishing companies have all the characteristics of small start-ups: they tend to manage their internal processes informally, and certainly without a dedicated and formalised HR function. In these circumstances, recruitment is often carried out by word of mouth: existing staff tell their friends and contacts that there are openings in their company. This is possible for organisations operating in small local labour markets, and it is how B4 handles its recruitment of new staff. Each collaborator has joined the team through knowing an existing member of the team. A network of relationships underlies the company's activities:

> *Quand je suis arrivé, je connaissais un ami de X (l'administrateur). Ils ne font jamais de pub pour les « recrutements », tout se passe par connaissances. Les projets viennent aussi par connaissances … C'est un petit monde où il y a beaucoup d'interactions, c'est un monde d'indépendants où il y a beaucoup de croisements (Xavier, e-learning specialist, B4).*

…or Externalising Employment

More than this, many e-publishing companies do not need to manage their recruitment at all, even on an informal basis. Instead, they manage peaks and troughs in demand and consequently in their activities by using freelancers on a widespread basis. We found the use of freelance staff to be very common in our case study companies.

Freelancing is a well-established practice within conventional publishing, and appears to be no less common in e-publishing. It is usual for journalists to work on a freelance basis, and in our case studies we also found examples of editorial staff working in this way, particularly web editors. In the two Italian case studies, 45% and 63% of the organisations' workforces were 'faux independents' – that is, with self-employed legal status but contracted to work for only one client, in this case, IT3 and IT4.

Career Progression Prospects

Across the case study organisations, there is a uniformly bleak picture of career prospects in e-publishing. The story that emerges time and again is one of flat hierarchies, absence of formal evaluation or appraisal processes, and consequently, very truncated progression routes for e-publishing employees. The journalist career path runs from journalist to editor, and possibly to editor-in-chief or to another category of management, if the organisation has an extensive managerial structure. Most e-publishing organisations, being small and flat, do not. The career path in IT is similarly short:

> *Although we are very hot on development, one of the problems with a smallish company and not a lot of headcount is that development is literally development. It doesn't lead automatically to promotion or*

> *career progression in the normal sense. There are not a lot of steps for a developer to go on. You are either a Junior Developer, a Senior Developer, or management (VS, HR Manager, UK3).*

Computer graphics professionals have slightly better prospects for progression, certainly between organisations, linked to newly emerging techniques in computerised animation which are creating demand for their skills. But for freelancers working in e-publishing, progression prospects are even less promising than for employees. For most e-publishing professionals therefore, career development comes about not through progression but through changing jobs altogether:

> *Il n'y a pas de perspectives de carrière dans le multimédia, sauf peut-être si on rachète d'autres sites. Pour les journalistes papier, c'est la même chose, il y a peu de perspectives : chef de service, chef de l'info, rédacteur en chef adjoint, rédacteur en chef. (Renaud, webmaster, B3).*

> *In the actual structure it is prohibitive in a way for the people who are regular journalists, because there are so many senior journalists already. I don't think that there is a career path (BT, web news editor, IR3).*

There are some exceptions to this picture which are worth highlighting. In recognition of the fact that it cannot offer its staff upwardly mobile careers, A4, the Austrian content provider and architectural archive offers its employees the option of widening or in some other way varying their work tasks. This indicates its recognition of the motivational importance of career structures. F4 is aware of the lack of career openings due to its flat structure, and is trying to encourage staff to think about other possible avenues for development. It is also encouraging very able female staff to consider management careers. IT4 is introducing a hierarchical structure in order to formalise roles and boundaries between them. UK3 is similarly introducing new roles to try and create a technical career path:

> *We made in-between roles, between the main help desk and the main support teams. Because before you were sitting on the help desk and then you left and got a job in somebody else's main support team. So we brought in these roles where they can move to the other teams, and then the other teams can move onto the development side. So there is a lot of internal promotion goes on.*

> *For example, on the editorial team, the 7am shift does some really quite routine maintenance. They go through a tick-sheet and they make sure that certain servers are up and so on. It is a routine maintenance shift that ensures that everything is up and ready by the time everybody gets into work. But actually there is always a very experienced manager there. They are safe, they are not exposed to frantic journalists at 9 o'clock at night who need something like that [snaps fingers], and need somebody who is very very experienced and knows all about every system and can troubleshoot. So we start them off by doing one shift. And we move them on, as they get more comfortable, to a slightly more difficult one, and their money goes up as they go through the shifts, and through the levels of responsibility, and inconvenience to their social life. On the PC team, there are two levels of support staff – one who do all the support calls, and then there is a team of people who do more project-based work. So they would move from the service desk onto the support roles. But at the moment, they all go on secondments to the main support teams, regardless of what their abilities are. They decide which team they might like to go to in the end, so they are giving knowledge of their potential (JM, Staff Development Manager, UK3).*

UK4, an online journal publisher and information provider, has an extensive organisational structure in place, and this creates classic career paths, particularly in the editorial and IT areas. In editorial work, an employee starts as an editorial assistant, then moves up to editor and then senior editor, managing editor and publisher. In IT, the career path starts with helpdesk assistant, then the employee can progress to helpdesk supervisor, helpdesk manager.

There is a separate career path in project management, starting in junior project management and moving upwards with experience built up. 'Broadbanding' (47) has been implemented recently, with the aim of making career ladders more transparent than they previously were. These two exceptional cases are a result of, in one case, managerial recognition of the importance to morale of some type of employment trajectory, and an organisational structure which facilitates substantial movement, in the other. In all other cases, these two conditions for career development are absent.

4.4. Labour Relations in the Case Studies

Although in terms of work processes, skills and working rhythms, e-publishing companies are more like their counterparts in conventional publishing, in their labour and employee relations, they bear a closer resemblance to 'new economy' organisations – IT providers, dot.coms, small technology start-ups.

Employee relations in the e-publishing case studies are predominantly individualised, with pay and conditions set bilaterally and without transparency between employees and companies. Trade unions are noticeably absent from most of the case studies; both membership and collective bargaining seems to be almost totally non-existent in this sector. Exceptions to this are in four organisations but in only one is the influence of trade unionism concretely felt by employees. In F3, five different trade unions organise employees but appear to have little influence on the individualistic employee relations of the organisation. In IT3 and IT4, working hours are covered by collective agreement but again trade unionism appears to play little role in management/employee relations on a daily basis. In UK3, however, a strong branch of the National Union of Journalists (one of the few remaining in UK news production) is widely consulted by management on all aspects of organisational strategy and behaviour, and its presence pervades employee relations.

Elsewhere, there is little by way of employment protection and e-publishing employees must preserve their pay and conditions as best they can. Most of our case studies have undergone some contraction in the past two years, following the dot.com crash which had an enormously destructive impact on firms in the sector, as it did in the IT sector. Part and parcel of that contraction has been cutbacks in wages and training budgets, or restructuring of companies and job opportunities. For many of our informants, the consequent decline in their terms and conditions has resulted in resentment and loss of morale.

> *There was a lot of very bad feeling. A certain number of people were let go … people have left and this cut the numbers down. A lot of people were very unhappy… There was a horrible atmosphere for a certain time (BT, News Editor, IR3).*

An internal employee survey in F3 recently showed that 25% of staff were close to breakdown following the intensification of their work. Many other informants feel their situations to be extremely precarious, but also feel relatively powerless to address the problem in a labour market which is not currently operating in their favour. Others are politically or personally committed to their work, and reluctantly accept their deteriorating working conditions:

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47 'Broadbanding' involves a move away from task-based job descriptions to more flexible, generic role profiles which are multiskilled.

> *Some people ask me if I am crazy, that I do this [for so little money] – sure, this is hard to understand when you have no attachment to fem.at which is our baby. This is something you don't give up once you are in, when you experience the enthusiasm of our users and how this grows and moves up. I do this out of pure idealism, pure joy, because fem.at offers such a fantastic opportunity to realise oneself (IL, editor, A3).*

> *We have to have some spirit of sacrifice and have always the hope that someday this is going to change and that someday it will have more people and we are always renewing that hope (CB, Journalist, P4).*

In all the e-publishing case studies, considerable use is made of freelancers, whose pay and conditions are particularly precarious. Low pay and lack of pay rises creates major dissatisfactions among these staff, but they seem powerless to challenge this state of affairs:

> *Mon salaire est horriblement bas mais des journalistes sont ici depuis 10 ou 15 ans et gagnent à peine plus ! Ce n'est pas un métier où l'on fait fortune … L'un dans l'autre, ça me fait un 1160 euros nets par mois, tout compris … J'avoue que je ne mets absolument rien de côté. (Laurent, freelance web editor, B3)*

> *Mon forfait n'a pas évolué depuis 1996 ! Chaque fois que j'ai demandé une augmentation, ça a été refusé pour des raisons diverses. Mon statut me pèse … Si c'est justifié pendant un temps, pour évaluer les gens, mais aussi pour des impératifs financiers, après autant de temps, ça n'est plus tenable. Ce n'est pas légal et ça va me jouer des tours au niveau de la pension. Quand j'ai voulu prolonger mes congés de maternité, ça n'a pas été possible à cause de mon statut mixte (mi-temps salariée et mi-temps indépendante). C'est une question d'égalité, de confiance et de confort. Après 10 ans dans la presse, j'espère autre chose. (Laurence, web editor, B3).*

In general, then, employment relations in many e-publishers are based on informality and individualism, individual initiative and commitment, whilst collective labour relations are little in evidence. This culture of employee relations is underpinned by the predominance of a young workforce which is less steeped in a collective culture than its older counterparts. A webmaster in B3 compares his work to that of a football coach, stressing the informality and friendliness of the work culture. In F3, it is declared that "Everyone has a chance". This is designed to convey a sense of equality, but this individualistic culture may actually be negative for gender equality, depending as it does on disparities in employees' situations and negotiating power. Certainly, it forces women in the firm, in particular, to make uncomfortable choices between pursuing careers and managing family life.

The more positive side of these informal employment relations is that there is considerable openness and trust in many companies (A4, B4, F4, IT4, P3, UK3). One of the benefits reported is that employees have time autonomy, another is the very positive daily working relationships between management and employees. They report the development of a work culture which emphasises collective working and collaboration rather than competition and individualism, one in which responsibilities are shared and where there is a climate of support from management to employees on issues concerning individual reconciliation of work with domestic responsibilities. Such a culture of employee relations of course depends very heavily upon individual managers' style and approach, given the absence of formal or institutionalised collective bargaining structures governing these issues. And in some environments, it is complementary – rather than antithetical – to an individualised and competitive climate of labour relations.

4.5 Organisational Gender Cultures and Practices

In the e-publishing case studies, we see clear structuring along the lines of gender - gender divisions of labour and gender labels which are attached to e-publishing jobs. And even as organisations declare their commitment to gender equality (and practice this through their policies), gender inequalities are at the same time perpetuated and legitimated by beliefs and ideologies about what is suitable work for women and men. We found that gender is also performed by men and women in their informal organisational practices, exclusionary and inclusionary behaviours, and expectations of one another.

Gender divisions of labour

On the face of it, e-publishing appears to be comparatively gender-equitable. It is not a male-dominated sector, and there are many examples of women in professional positions, even in managerial and senior executive roles. However, there is a horizontal form of gender segregation, in which women are concentrated in content development - editorial and journalist roles (including web editorships), and men are concentrated in technical development functions. In the majority of our case studies, IT functions were entirely or predominantly performed by men (48). E-publishing jobs – like jobs in the wider society - have gender labels. In simplified form, they are presented here (and see table in Appendix I for more detailed statistics on men's and women's employment in the e-publishing case studies):

- Journalists – male or female, but sports journalists are male; lifestyle journalists are female.
- Editorial professionals – female.
- Chief editors – male.
- Wed designers – male or female.
- Web masters – male.
- Developers – male.
- Helpdesk staff – female.
- Computer graphics artists – male or female.

Many of our HR informants report that the vast majority of job applications – two-thirds or more - come from men, creating problems even for companies wanting to recruit more women into these roles.

This horizontal segregation of e-publishing work is supported by commonly-held beliefs about what is appropriate work for men and women. In general, it is assumed that men are better at technical work because they are inherently more creative, while women are better at detailed work, including web-related jobs, because they are intuitive, attentive to people's needs and requirements, and attentive to detail.

> *I find that men are better at dealing with IT matters, they are more accurate and more able to compose in a creative way what they have learned. You don't only have to repeat what you once have used, you have always to ask 'why?' (Informant, IT4).*

48 Indeed, we found it difficult to locate female informants in IT functions for these case studies. Most of our informants are consequently in content development areas.

> *I have found that women are generally better suited to teletext. I don't know if I would say the same for online. I have worked the tele-service since 1994 and I would say that for most of that period the majority of people working in the area have been women. I think it has something to do with the way a woman's brain works or something, or a second sort of housekeeping. It takes a certain way of organising (News editor, IR3).*

> *Je trouve qu'elles ont un bon feeling, plus de ressenti, de compréhension des besoins. Je me rends clairement compte que les trois femmes de l'équipe ont du feeling, et pas les hommes avec qui je travaille. Coïncidence ? Je ne sais pas. Elles sont plus orientées « look », elles vont plus dans le détail, mais il faut aussi que le secteur leur plaise…. Est-ce le cas ? (Web project chief, B4).*

Such assumptions, held by managers and company chiefs, both reflect and reinforce the gender labels attached to e-publishing jobs. They can also shape hiring practices and certainly limit the possibility of transcending established gender patterns. In IT3, for instance, 50% of applications for technical jobs have recently been from women with high-level programming qualifications, yet women make up only 25% of IT postholders.

Just as hiring practices are indicative of the ways in which organisations 'do gender', so firing practices may equally be. IR4 made disproportionate numbers of women redundant during a severance programme two years ago, confirming the theory that women, particularly older women, are more vulnerable in redundancy programmes than their male counterparts at similar levels and with similar skills.

'Doing gender' in everyday work

Men and women 'do gender' in their everyday work interactions. In e-publishing, we noticed similar practices to those which occur in other organisations: for example, women making the working environment pleasant and 'cosy', men putting up posters of nude women or telling lewd jokes in the workplace.

With their roots in the mainstream publishing sector, e-publishing organisations come from a tradition in which technical work (originally manual technical work) was male-dominated, and from which women were actively excluded. Cockburn's (1983) account of the technical transformation of the printing industry in London's Fleet Street shows how the introduction of new technology, replacing hot metal printing, effectively and literally emasculated the work, enabling skilled male craft workers to be replaced by 'typists' (49). In this environment, women were deliberately excluded or were put through hostile experiences in order to test their ability to survive in a male world. One of our informants – a former newspaper sub-editor – also remembers these days:

> *Another colleague and I were the only two women for quite a number of years. When we left one office and went to another office where the composing room - which was all hot metal, rows of linotype machines - was open plan with the Daily Mail, the first night that we moved in and I walked across to work on the stone to see in my pages, the Daily Mail practically dropped their hot metal.*

> *And years later I was phoned up and asked to do night shifts, and I was told that it was only because the Chief Sub-Editor was away on holiday, because he wouldn't have a woman in there.*

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49 Cockburn, C. (1983) *Brothers – Male Dominance and Technological Change*, London, Pluto.

Once it was discovered that we were decent sub-editors and we could take the swearing, we were in. … When I had my interview down here, a radio personality did the interview, and he used lots of Anglo-Saxon four-letter words during my interview to see if I curled up and died. Because the composing room was an entirely male preserve. There were never ever any women there.

I have never felt that being a woman has been a problem for me. In fact, I have paved ways and more women have come in behind me. But we still don't have as many women sub[editor]s. There is still a certain amount of macho culture – not a lot and it varies between departments. There are very few women in Sport (LM, former sub-editor, now Editorial Systems Developer, UK3).

Today, one of the gender cultures of e-publishing is a culture of young men – unmarried, without domestic responsibilities, able to work long hours, have fun at work, socialise together, share lewd jokes and nude pin-ups. This perhaps reflects a slightly different form of masculinity and certainly a different professional culture more rooted in white-collar technical work. But it is one which older women with domestic responsibilities still do not share and are outsiders to (for example, Laurence, the web editor in B3, who considers her work colleagues to be 'teenagers'), although like their predecessors, they are largely unimpressed and unintimidated by it:

Le fait d'être une femme, je ne pense pas que ça joue, je ne sais pas … ça ne les empêche pas de mettre des posters avec des dames à gros seins sur les murs, de raconter des blagues salaces … mais ça ne me gène pas, j'en raconte aussi, le problème n'est pas là. A la limite c'est plus une taquinerie entre nous. (Laurence, web editor, B3).

Formal equal opportunities policies and practices

Companies implement equal opportunities policies and practices for diverse reasons. One of the main motivating forces is a belief that unequal structures or processes hamper their ability to recruit and retain staff, to utilise their human resources to its full potential, and consequently impede their economic performance (50). In the IT services sector, we found that skills shortages and consequent recruitment and retention problems have motivated many companies to introduce equal opportunities or diversity policies in order to enable them to utilise more fully the potential of women in the labour market. The e-publishing case study organisations do not seem to be confronted by such problems. Few firms reported having introduced explicit equality or diversity policies. In general, women are strongly represented in e-publishing, albeit in editorial rather than technical occupations, and it may be that this is seen as satisfactory evidence of equality of opportunity by e-publishing companies (51). Despite acknowledging that the majority of job applications for technical positions come from men, several companies, and indeed employees in our case studies, reported that gender equality is not an issue in their workplaces. Only one organisation, UK3, has made attempts to improve the rate of applications for development jobs from women, by relaxing its strict recruitment criteria. However, the problem lies in the labour market: there is a very small pool of women ready to apply for such jobs in the first place:

I have said off the record to [the recruitment agencies], 'If you have got any women there who are not dead on our spec, let me see what sort of CVs they have.' But they really have very few women. Very few women apply for this kind of work. If you advertise for an editorial job, it is 50/50, if not 60/40 women.

50 Olgiatti and Shapiro (already cited).

51 There are exceptions to this gender order. In IR4, e-journalism does not attract many women applicants, it is supposed because of the night shifts involved.

> *Our sales team is 50/50. The response to technical ads is just completely skewed. We are happy to consider people to work part-time, where we can manage it. If you had a pool of people, and that was the issue, it would be different. But you don't even have a pool to pick from (VS, HR Manager, UK3).*

Although our e-publishing companies seem generally unconcerned with the issue of improving equality and diversity in terms of representation, some recognise the need for family-friendly policies, or at least informal practices which allow for family-friendly working, as a means of encouraging women's participation. F4, IR3, UK4 all offer suites of family-friendly working arrangements which can be negotiated between individual women and the company. P3 operates family-friendly working on an informal basis: if employees confront family-related problems, the company will accept absence or lateness to work

> *The bottom line is, we are not an obstacle to familial harmony and we understand that relationships and above all when the kids are younger … when [the kids] are sick, they need to go to the doctor, and if people need to take a day off, if they need to take a few hours … because the child didn't sleep or because there is sickness …, there is no problem (HS, Director, P3).*

It would not seem accidental, however, that most of our informants in e-publishing are young, single and without domestic responsibility. For, despite employers' good intentions, such policies and practices are sometimes undermined by the editorial work process which often demands working long and/or unsocial hours. Editors and sub-editors in P3 speak constantly about the "sacrifices" they make in their personal lives in order to manage their work. Editorial work in IR3 is sufficiently demanding as to work/family reconciliation problematic:

> *I would not like to be doing what I am doing today with having a child. Now I am exhausted and I don't have anybody to look after except myself. If I had a child I would certainly work less hours (BT, news editor, IR3).*

4.6 The Employees – Work processes and skills

In e-publishing, jobs fall into two essential categories. The first category of jobs is concerned with the preparation of the content to be published: journalists, writers, editorial staff, designers. The second category of jobs concerns the technical development, maintenance or management of the media or systems on which the material is to be published: developers, systems administrators, webmasters, computer graphics professionals.

We describe below the work processes and skills involved in four typical e-publishing jobs. On the content preparation side, we describe the work of editors and e-journalists. On the technical side, we cover the work of developers and webmasters. The large majority of our informants in the e-publishing case studies fall into one or other of these categories.

Content preparation work: the editor

The work process

Editorial work in e-publishing mirrors its counterpart in conventional publishing. It involves the following activities:

- taking decisions on the nature of the material to be published, sometimes in collaboration with other editors and e-journalists
- researching source material on the web, on other electronic media and on paper,

- writing articles using text preparation or authoring software,
- finding, editing and inserting pictures, graphics and other pictorial material into articles using image editing software
- modifying articles and material supplied by other journalists for e-publication
- arranging material on the 'page' or electronic space.

Editors generally have significant autonomy over the tasks they do, the way in which they do them and the order in which they work. They have the discretion to organise their work as they choose, and increasingly, to work from the location they choose, including from home if they wish. They have greater autonomy than their counterparts in print, where topics for articles and designs are more tightly pre-defined, and where physical presence in the workplace is more necessary. The information rhythm of e-publishing work is also different from that of conventional publishing, because print deadlines do not exist so work can be paced more steadily and peaks and troughs in activity are reduced.

The skills involved

As with paper-based editorial work, the skills involved are text-based, rather than being highly technical. Computerised authoring, word processing and image processing software have automated the processes of preparing material for electronic publication. The software is easy to learn; much of it is self-explanatory. E-publishing editors are essentially advanced users of computer software, with technical at application rather than at programming level. Their use of this software is described in several case studies as simply "cut-and-paste work", sometimes involving the addition of, for example, HTML codes. Many editors come from backgrounds in journalism, literature, humanities, or the social sciences.

However, editorial work is creative and autonomous work. The creativity resides in the preparation of stories, the production of text, the arrangement of the material. E-publishing – web publishing in particular – provides a fast route to turn stories into articles that can be accessed worldwide, provides freedom to create unique multimedia representations, and allows for almost instant feedback from readers.

Content preparation work: the e-journalist

The work process

The work of electronic journalists is very similar to that of conventional journalists, and also to that of editors. It involves:

- Researching and composing stories
- Converting newspaper-based stories into online versions through editing, modifying and synthesising/compressing material for online media
- Updating stories in real time based on events as they occur

The skills involved

As with editorial work, the skills of e-journalists are more journalistic than technical. In addition to researching and writing skills, e-journalists must have particular skills in presenting material very concisely for online media – more so than their online counterparts.

Technical work: the developer

The work process

In summary: developers do programming work. The material that they program and the languages that they use vary between organisations, types of e-publication and technology platforms used. The type of activities involved in developing work include:

- Building websites, newsletters, and other published material and updating them periodically
- Inserting hypertext tags and links into electronic publications
- Developing electronic filing systems and databases
- Incorporating data into databases
- Converting pictures or graphics into data that can be placed into databases
- Writing programs to extract material from databases for publication.

The skills involved

E-publishing developers need to have system programming skills. The level of these skills varies between organisations, depending on the complexity of the product, the programming task, the extent to which automated publishing software handles elements of the programming task, and the level of programming language.

Programming languages used are typically Java, Flash or HTML. Developers may also need skills in programming for operating system platforms (for example, Unix), in web application architecture and database design. Some developers report needing organisational and relational skills in managing technical documentation, time management and communications.

Technical work: the webmaster

The work process

The work of a webmaster in e-publishing is closer to that of an information specialist than to that of an internet specialist. The webmaster's work includes:

- Collating, formatting and uploading material
- Launching and maintaining web-sites and their security
- Creating links between sites
- Monitoring visitor rates and managing the housekeeping for the site.

The skills involved

A webmaster in e-publishing does not need in-depth technical skills, but rather a basic knowledge of web technologies:

> *Je ne suis pas informaticien de formation. Dans le multimédia, il n'y a pas d'informaticien, ça c'est important de savoir … La technologie et moi, on s'entend bien. On s'amuse bien ensemble, on a des bons rapports mais je ne suis pas informaticien, je suis un journaliste. Je délègue toutes les tâches de développement parce que je n'ai pas les compétences. C'est pour ça que le terme de webmaster quelque part est mal choisi dans le milieu. Parce qu'un webmaster, c'est quand même quelqu'un qui est un king en informatique. Je ne suis pas un king en informatique, j'aurais plus la fonction de chef de l'info, l'équivalent de chef de l'info pour le papier. Webmaster, ça fait déjà un peu pompeux … Mais je connais*

> *l'informatique, je connais les programmes, je ne suis pas un manche, mais je ne suis pas comme les gens du service informatique ici qui ont fait des études. Ce sont des développeurs; quand ils écrivent, tu ne comprends rien à ce qu'ils disent, comme les médecins. Ils sont un peu dans leur monde. Moi, je ne suis pas ça du tout. (Renaud, Webmaster, B3).*

Webmasters in e-publishing often come from a background in conventional publishing – journalism, typesetting, graphic design, having acquired some computing and internet skills through work experience or self-teaching. Some webmasters in our case studies have come from a social science academic background.

4.7 The Employees - Training, Learning and Development Opportunities

The e-publishing companies we have investigated are weak in the provision of formal training for their employees. Some have cut their training budgets following the downturn in the dot.com sector. This has particularly affected web editors and other e-publishing professionals concerned with content production. None of our case study organisations operates a system of formal and regular training, where employees' requirements are identified and met through periodic appraisals.

Some organisations circumvent the need to provide training by hiring only applicants experienced in development of online or electronic media, or in editorial work. Many companies use freelancers expressly in order to be able to buy in the skills they require, rather than train for them. As we have seen, the use of freelancers in widespread in our case studies.

For e-publishing employees – both editorial and technical workers - the consequence of this is that most acquire their skills through self-teaching and learning. This was the predominant pattern among the professional informants in this study. Two exceptions to this general pattern are F4, which offers regular training, in technical skills and writing skills, and UK3, which has instituted a specialist team to train editorial staff and journalists in the use of editorial systems. But generally in the case studies, we found that editorial staff enter e-publishing either through conventional publishing, or from other routes in literature and humanities, and most learn additional e-publishing skills (for example, in authoring systems, or Photoshop) on the job, by doing and with assistance from colleagues.

> *Now I am able to edit images so that I can put them into the Internet. This was learning by doing. Or CM [a colleague] gave me an introduction for half an hour or so, showing me how to do things (IL, editor, A3).*

> *Mes compétences techniques sont limitées par rapport à mes compétences journalistiques. J'ai appris pas mal par moi-même et avec les collègues. L'infographiste nous donne quelques trucs, puis on apprend sur le tas comment insérer une photo, créer des tableaux, ... Mais c'est très limité. Le service informatique nous aide pour des questions de maintenance beaucoup plus ardues que des questions de présentation. Je pense que cette part limitée de connaissances informatiques doit être développée ; c'est une évidence quand on travaille sur le web. C'est une de nos revendications : avoir plus de formation. Il paraît qu'un budget vient d'être alloué, les formations devraient suivre, nos revendications ont été entendues. (Laurent, Web editor, B3).*

Informants in technical positions also report that many of their e-publishing skills are self-taught on the job, even if they enter this work with IT qualifications and previous experience of working in this field. Web developers and support staff often consult the internet for technical solutions, and there are internet communities which answer questions and solve technical problems. Additionally, web-based publications provide support for IT professionals

developing e-publishing systems. In UK3, the development team manager pairs people together so that they work to develop their skills and support each other – "which is not their natural inclination, because they tend to be heads down and let's got at it." (VS, HR Manager, UK3). However, if limited training is on offer by companies, technical staff tend to have priority over editorial staff for access to the training that is available.

Informants raise the following problems in relation to their access to training opportunities:

- Many professionals have heavy workloads and are extremely short of time at work. This is particularly the case where headcount has been cut by companies following financial difficulties, and where the remaining staff are expected to take on the consequent extra workload. But this does not leave staff much opportunity to engage in exploratory learning of systems or techniques, only to the elements of the systems with which they are already familiar.

- Professionals in both editorial and technical functions, but particularly the latter, find that there is a constant need to update their skills in order to keep up with latest technological developments and potential ways of working. There are times when our informants feel they need more structured training – as opposed to unstructured self-learning – in order to keep their competences in line with technological developments.

- Freelancers and part-timers suffer from unequal access to even the small amount of formal training which is offered by e-publishing organisations. Part-timers are often excluded because the timing of training does not coincide with their working hours. Sometimes they are not even made aware of training opportunities (as in B3). The part-time problem is particularly acute for women, who make up the vast majority of employees in e-publishing, as elsewhere. Freelancers are excluded by virtue of their employment status, and by the fact that employers generally hire them expecting them to bring themselves, already fully- and appropriately-skilled, to the work. Yet freelance workers complain that the expense of meeting their own training costs is prohibitive because of their low wages. They take advantage of free training schemes where they are offered, but these do not always meet their very precise needs:

  > *Comme je ne gagne pas assez de sous pour me payer des formations, il faut que je trouve des formations gratuites. Jusque là je m'étais bien formée toute seule mais pour des langages de programmation ce n'est vraiment pas possible. (Informant, B4).*

5. National and Contextual Issues

In this chapter, we briefly review the national and institutional contexts of the case study findings. The objective of this review is to allow us to consider specific factors which may shape the policies and practices of companies in different national settings, to assess the intersection between these national and organisational factors, and to draw out some comparative conclusions.

We deal with three types of contextual issue, considering country differences and case study results in the spheres of:

- Employment and industrial relations
- Training regimes
- Equal opportunities regimes

The conclusions arising from this comparative analysis are summarised in Chapter Six under the heading of 'social, cultural and institutional arrangements'.

5.1 Employment and Industrial Relations

Employment and labour markets – the position of women

Women's employment and labour market participation rates vary significantly between countries in Europe, though in all countries they are rising. Table 5.1 summarises the rates of women's employment in the countries participating in WWW-ICT.

Table 5.1: Women's Employment Rates in WWW-ICT countries in 2003

Country	Employment Rate of Women
Austria	63.1
Belgium	51.4
France	56.7
Ireland	55.4
Italy	42.0
Portugal	60.8
UK	65.3

Source: Employment in Europe 2003.

In IT services generally, women are weakly represented compared to their representation in broader national labour markets. Our case studies suggest that this under-representation is strongly related to hostile organisational cultures, and individualised HR practices including long hours working. But do our case studies reveal any important differences in their representation which we can attribute to national labour market structures?

The cultural acceptability of women working varies considerably between countries, and this emerges in some case studies. Broadly, in the northern European countries, it is now widely

accepted for women to participate in the labour market and for women and men in households to share the role of breadwinner. By contrast, in southern Europe, women's entry into the labour market in significant numbers is still a relatively recent phenomenon. In Italy, for example, the breadwinner model still emphasises women's primary role as domestic labourers rather than employees (52). As a result, we find that welfare support for working women, such as affordable and available childcare, is considerably greater in northern European countries than it is elsewhere.

In the case studies, we found minor national (and indeed regional) differences in attitudes to employing women among managers in IT services. For the most part, there is little resistance by companies to the employment of women. On the contrary, many reported valuing the particular (often assumed) skills which they believed women bring to bear in the IT workplace – skills in project managing, communicating, working in teams, handling clients, for example. But in two cases there was direct hostility to employing women (and indeed direct discrimination) reported, in Ireland, and in a southern Italian company. In both cases, this may be a result of the cultural legacy of a very strong male breadwinner welfare model (53) which assigns women to domestic labour and motherhood, despite the fact that that model is now being undermined by the reality of growing female labour market participation. Perhaps more noteworthy is the fact that so few companies expressed reluctance to employ women, although they still under-employ women in technical functions.

National childcare regimes vary greatly across European countries, and in the WWW-ICT countries, the strongest (most widely available, most affordable) childcare provision is made in France. Weak countries are Ireland, Italy and the UK. We might expect this to strongly affect the participation and progress of women in a sector where most work available is full-time work. Yet we found no particular advantage enjoyed by, for example, French women working in IT services over their counterparts in other countries. In weak childcare regimes like the UK, women's employment and prospects were more dependent upon the willingness of their employers to accommodate to their domestic situations, so in these conditions, employer behaviour seems to be more critical than in countries where the state or other institutions provide support to working women.

There is marked segregation by sex within the IT services and e-publishing case studies which can be attributed partly to long-standing gender labels attached to certain occupations, and partly to newly-emerging cultural patterns. In IT services, women are much more numerous in clerical and administrative functions than in technical ones, as they have been in many other sectors. In e-publishing, they are employed in considerable numbers, but predominantly in editorial functions whilst being almost entirely absent from technical ones. The cultural association of technological work as 'man's work' also seems to be widely-made, certainly within the western European countries covered in this study. Several case study managers articulated essentialist assumptions about women's and men's fitness for different types of work, although there were occasional contradictions between stereotypes. (Women are assumed to be painstaking and attentive to detail, or easily distracted, suitable for

52 The exception to this pattern is Portugal, where women's labour market participation rates have been relatively high compared to those of its neighbours in Spain and Italy.

53 Pfau-Effinger, B. (1998) 'Gender Cultures and the Gender Arrangement – A Theoretical Framework for Cross-National Gender Research', *Innovation*, 11, 2: 147-166.

project management or adept in relational skills.) Regardless of the form the stereotype takes, it seems uniformly to be used as a mechanism for making a priori decisions about women's fitness for particular functions which generally overlook their potential for working in technical areas. These cultural associations and the segregation of the IT labour market by sex operate across national boundaries, with few, if any, local moderating influences.

Employment relations

As our sectoral overviews indicate, employment and industrial relations in both the IT services and e-publishing sectors are very far removed from the industrial relations scenarios of the 'old economy'. In place of trade union density, institutionalised social dialogue and regularised collective bargaining, these sectors are characterised by strongly individualised employment relations. Employment terms and conditions (wage, additional benefits and perks, etc.) and mechanisms of human resource management (promotion, training, mobility) are all individually negotiated. There are few rules, few job or employment standards.

There are both country and company differences in employment and industrial relations arrangements, which might be expected to have an impact on the nature and extent of individualisation in different organisational settings. In general, union density and collective bargaining arrangements are strong in France and Belgium, for example, but weaker in Ireland and the UK. These different situations are the result of differences in legislation, industrial culture, and, to some extent, the widespread presence of US multinationals which are conventionally hostile to trade unionism and its related arrangements. Yet in IT services and e-publishing, there is little discernible variation between the employment relations within companies in countries with strong collective bargaining environments, and those in countries with more generally individualised arrangements. This leads us to conclude that the industrial relations patterns of the 'new economy' seem to be more influential on these companies than their national contexts are.

Even where collective agreements are in place (as in the e-publishing sector in Italy), they appear to have little impact on the daily employment practices of companies in the sector. Neither does firm size affect the extent of individualisation and informality in employment relations. We found no difference between large and small firms in their employment relations. Large firms have more regulated industrial relations systems, not least because EU-level labour legislation organises social dialogue and workers' representation (including through European Works Councils for multinationals). However, they too have implemented individualised employment systems, and the role of trade unions in negotiating pay and other conditions is minimal. Employees also seem to prefer to manage their own problems and concerns, without any intermediary.

5.2 Training régimes

The importance and degree of activity attached to vocational and workplace-based training varies considerably across European countries. Other research has distinguished between 'training-rich' and 'training-poor' countries (54). The former are countries with

54 See for example, Webster (2002) already cited, though this research dealt with the retail and retail financial services sectors. The work of Regini (1997) also makes the distinction between national and

comprehensive vocational training, a strong cultural emphasis on training and education, and strong employer commitment to providing both training and learning opportunities in the workplace. Examples are Denmark, Sweden and Germany. The latter are countries in which vocational training is slim or non-existent, where there is no cultural importance attached to education or learning, and little expenditure by employers on developing their staff. In these countries, the emphasis has largely shifted from training to learning, placing the onus on individual employees to take responsibility for their own self-development. Examples of training-poor countries are Italy and the UK. At European level, however, there has been a shift in emphasis within training policy, stressing active labour market policies designed to improve employability and adaptability. Part of this shift includes a greater emphasis on lifelong learning by the individual.

As we have noted several times in this report, continuous training and learning is paramount in the IT sector where the pace of technological change demands that skills refreshment is constantly attended to. Yet in the case studies in both sectors, the trend is firmly away from formalised training and towards individualised learning. And this is the case across the case studies, regardless of the national approach to training in the countries under study. Indeed, national regimes seem to have little if any bearing on the training available to, and undertaken by, IT professionals in the study.

The case studies show differences within rather than between countries with regard to the training and learning opportunities available to IT professionals. In general, the large companies have substantial training budgets, allocate human and other resources for training provision, and consequently operate well-developed and systematic training programmes. In contrast, smaller companies have none of these resources and programmes. So, for example, although Italy is a country with a weak training régime at national level, one of our case studies, a large company, offers extensive training to its IT employees. By the same token, in Ireland - a country which has invested considerably in state-provided education and training for the IT sector - we have a case study which does not conform to this national pattern in its training behaviour. Its training provision is shaped more by the management strategy of the (US-based) parent company than by the national training culture in which it is located.

These management strategies differentiate training arrangements within as well as between companies. Some categories of IT professionals concerned with content development, and editorial staff in e-publishing, do not enjoy the same training opportunities as software developers and other technical staff. Even companies which overall have generous training arrangements discriminate within their labour forces depending on the level of technical skills they wish to foster. And company training behaviour is affected by budgetary and profitability considerations. Several case study organisations have recently been obliged to cut their training budgets and provision following the profitability crisis in the dot.com sector. Overall, then, macro-economic conditions and company management strategies are far more influential than national training cultures upon company training behaviour.

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regional differences in training demand and practices, and points to the rise of active labour market policies which are oriented to improving adaptability and employability of workers and so are more individualised than in the past; Regini, M. (1997) 'Different Responses to Common Demands: Firms, Institutions and Training in Europe', *European Sociological Review*, 13, 3: 267-282.

5.3 Equal Opportunities régimes

Despite the existence of European level legislation on equal opportunities, there are national differences in gender cultures in the different European countries. These cultures are composed of policies and processes (such as the existence and weight of national level legislation on equal opportunities and equal pay), beliefs and attitudes about gender equality, and signs and symbols of gender equality. We have given these approaches to gender equality the term 'equal opportunities régimes', and we have hypothesised that these régimes partially influence the behaviour and practices of companies with regard to advancing gender equality within their own ranks.

From our case study evidence, we cannot establish whether there is a cultural link between the discourse and behaviour of companies and the equal opportunities arrangements within their host countries. We know that companies are impelled to improve gender equality through increased participation and progression of women for economic and competitive reasons. We do not know for certain whether this link transcends simple performance issues – the imperative upon companies to hire, retain and promote women in order to meet their skills needs and improve their economic performance. Certainly, most of the case study organisations are operating in a climate of contraction in which their need to recruit or retain labour has been significantly reduced, and in fact, employees are being made redundant in many companies. This implies that, while companies have a key role to play in increasing women's participation through changes in gender culture, the national gender cultures may also be important in the formation and maintenance of that culture. Consequently, member states – their legal, educational, and cultural institutions, organisations, but also their active initiatives and measures, practices, symbolic artefacts and beliefs – may have a central role to play in the entry and progress of women in IT professions. To understand this relationship an analysis of the behaviour of organisations in the context of an in-depth examination of the equal opportunities régimes of the different European countries would be required.

6. Conclusions

This chapter presents the main conclusions from analysis of the case studies in IT services and e-publishing. Referring back to our initial model of explicative variables, the case study data are relevant to two areas of the model: the labour market sphere, and organisational structures and practices (55). National and contextual issues discussed in Chapter Five relate to the part of the model covering social, cultural and institutional arrangements. Accordingly, across these three areas, we can now assess the extent to which our initial conceptual framework is supported by our empirical findings. We present our conclusions from the case studies and from our discussion of national and contextual issues under three headings:

- Labour markets
- Organisational structures and practices
- Social, cultural and institutional arrangements

6.1 Labour markets

Entry to the labour market

- Traditionally, IT professionals have entered the sector with degrees or similar qualifications in computer science or electronic engineering. The case studies show that most professionals still do so, though a small but growing proportion enter technical occupations through clerical, project management or sales and marketing routes. This may work in favour of women without technical qualifications but with other desired personal qualities, such as communications skills, in the longer-term. The case study data do not, however, shed light on this issue at present.

- IT professionals working in e-publishing are as likely to enter with previous work experience as with formal vocational qualifications. Editorial professionals enter the work with a background in journalism, literature, humanities or social sciences, and do not require IT knowledge to enter this employment.

- There is a move towards private certification within the IT sector, for example, through supplier-based training and examinations. This raises questions of how competence recognition is to be handled across the sector where differing curricula are in operation and different competences, or competence labels, are created.

- Case study organisations in both sectors recruit IT professionals through a variety of channels, including specialist recruitment agencies, graduate job fairs, traineeships and placements, open advertising and, to a declining extent, through word of mouth. A few case studies persist in using sexist or ageist criteria in recruitment.

55 The explicative factors and variables in these spheres of the model are set out in Tables 4 and 5 of the model, in Vendramin, P. et al (2002) *WWW-ICT Conceptual Framework and State of the Art*, WWW-ICT report, September.

- For most case study companies, the problem of women's under-representation in IT professions stems primarily from the fact that they are under-represented in the pool of graduates who first apply for jobs. Companies which are very eager to recruit more women report a marked shortage of female applicants for technical jobs. A few companies are experimenting with relaxing their recruitment criteria deliberately to create a larger potential pool of applicants containing more women. Most, however, treat this as an issue over which they feel they have no leverage.

Employee training, learning and development

- All case study companies declare the importance of workplace-based training. Not all provide it, however. Training provision for IT professionals is widespread in IT services. In e-publishing, we found few examples of companies providing training opportunities.

- Some professionals are seen to merit training more than others. Software engineers or developers tend to receive periodic formal training by their companies; content developers and editorial staff are not generally seen to need workplace training. This tends to reproduce gender inequalities, for women are clustered in occupations which are given lower priority for training.

- The nature and extent of professional training offered by firms do not appear to be entirely related to firm size or wealth. Large multinationals generally have structured, programmatic training provision, but equally some small companies have been found to have systematic training programmes in place. However, in general, SMEs have fewer resources available to spend on training and employee development.

- Differences in training provision across organisations also reflect the national context and the extent to which vocational training is embedded within the industrial culture. Other research has found that strong training regimes are present in the Nordic countries, in France and in Germany. Weak regimes are present in the southern European countries, and in Ireland and the UK.

- Training and development are cut back during recessionary periods, in almost all organisations. The case studies for this project were undertaken during a period following the bursting of the dot.com bubble, when company profitability was reduced and there was a sharp contraction in the IT labour market in almost all countries. All case study organisations reported being affected by the recession in the IT industry, and most cut their training provision during this period. This may have serious implications for the ability of the industry to maintain skills and knowledge levels, to innovate and to recover from the recession in a sustainable way.

- Training has been sacrificed in organisations where pressure of work does not allow time for employee development, either by the firm or by the employee her/himself.

- In a small number of organisations, access to training opportunities depends on being noticed by a line manager and singled out for development. This is potentially discriminatory and runs counter to good practice in equal opportunities.

- Few organisations operate individual development plans to enable them to assess and meet employees' training and learning needs. In e-publishing, none do.

- Continual learning is vital in IT professions in order to keep pace with technical developments. Knowledge and skills requirements evolve very rapidly and also become obsolete rapidly. A considerable amount of skills development is done individually by employees, through internet news groups and help sites, conference attendance, magazines, and through day-to-day support from colleagues and peers.

- Continuing training in the IT sector involves not only the enhancement of IT skills and knowledge, but also the development of managerial, organisational and interpersonal skills. These are generally incorporated into in-house professional training programmes, and reflect not only the requirement for a combination of skills when working with clients, but also career paths which (particularly in large organisations) often take IT professionals away from technical work and into managerial functions.

- The growing tendency for employer-provided training to be replaced by individualised learning raises several issues of concern for women's professional development. It requires the employee to have and to make time outside work demands for learning new skills and techniques, which is sometimes particularly difficult for women. It also tends to get interrupted during career breaks or periods of leave (for example, maternity leave), so these can be detrimental to an employees' ability to keep their skills current.

Employment

- IT professionals in both IT services and e-publishing are typically male, young (in their mid twenties), and without domestic responsibilities. Where women are present, they too are likely to be young and without children.

- Case study reports with time series data on employment by sex clearly show a decline in women's participation in professional areas of IT services over time. However, women remain strongly represented in e-publishing, though predominantly in editorial rather than in technical professions.

- The 'skills shortage' which has traditionally affected the IT services sector has recently abated, due to the slump in IT and e-commerce activities following the dot.com crash of 2002. This has had an enormous impact on employment, with freelancers and contractors particularly hit by declining job opportunities. It is conceivable that this may also negatively affect efforts – by companies, by professional associations, and by public authorities - to attract women into IT professions, as organisations retrench and are under reduced pressure to widen the labour market from which they draw. Even though there are now signs that employment rates in IT professions are beginning to rise again, this is a longer-term issue which will only make itself felt in future years. It has important implications for equal opportunities initiatives and their reliance on the skills shortage issue as the motivating imperative upon companies to take action. These may need to be rethought or re-oriented around other issues.

- Redundancy programmes have been widespread in recent years, particularly in e-publishing. It has been suggested by a senior informant in IT services that women may be

more vulnerable to redundancy than men of equivalent ability and status, though there is no data to confirm this hypothesis.

Employment status

- Companies within the IT services sector generally take a conventional approach to working time, so that most IT employment is full-time permanent employment. Sub-contractors and freelancers are used in some organisations to meet variations in market demand, but this has been reduced with the recent decline in the market. In some IT services case studies, programming work is outsourced to outside the EU, in particular to Romania and to India.

- Throughout the IT services case studies and the participating countries, part-time and other forms of 'non-standard' employment were exceptional. In e-publishing, employment contracts are more varied, possibly reflecting the diverse (usually shift-based) working arrangements within the publishing sector in general.

- The assumption in our conceptual framework that women take non-standard jobs in order to be able to balance work and domestic responsibilities is only partly supported by our empirical findings. In general terms, it remains the case. However, in IT services and e-publishing specifically, few employees of either sex work part-time. The small number of part-time contracts in IT services were indeed held by women, usually following maternity. In some cases, moreover, women who worked part-time were construed by their employers as having less commitment to their work and their organisations than their full-time counterparts, and as being uninterested in progression or promotion. However, we found that most employees in these two sectors are young, single and without children or elderly dependents, so do not face the same work-family reconciliation challenges as their older counterparts in other areas of the economy.

- There is an 'employment paradox' at work in IT services: despite a very conventional approach to working hours in most organisations, many employees are accorded autonomy over their working hours. They are not formally able to work flexibly, but in practice they can arrive at and leave work according to their own preferences. In practice, this results in IT professionals working extended hours and carrying out their own 'self-exploitation'.

6.2 Organisational structures and practices

Work organisation

- Organisations in both sectors have been affected by the recent dot.com crash. E-publishers have been strongly affected, and all have engaged in restructuring and redundancy programmes over the past two years.

- Most IT services organisations are flat organisations with few hierarchical layers. This is particularly true of smaller organisations. In organisation design and restructuring, there has since the late 1980s been a generalised move away from hierarchical organisations and a tendency to develop flatter structures with fewer layers of management. This organisational restructuring has been widely taken up in both the IT and E-publishing

sectors. In IT services, and increasingly in e-publishing, market growth is now seen as residing not in standard products but in value-added services oriented towards the specific requirements of users and markets.

- In the large companies where hierarchical arrangements are most likely to persist, there are more potential progression opportunities than in flat structures. However, women still experience glass ceilings which prevent them progressing beyond middle management levels, and remain excluded from higher decision-making structures.

- In the IT services case studies, work is predominantly organised around project teams, led by a project team leader or manager. These teams can be temporary for the duration of the project, or semi-permanent. In E-publishing, work is generally organised around functional teams or groups concerned with a particular element of the production process, which generally operates according to more repetitive schedules than in IT services. It is important, however, to distinguish between teams of interdependent workers with complementary skills, and those in which members work independently of one another but in the same organisational entity. Our case study evidence does not show whether women are particularly undervalued within those teams.

- We found some limited evidence to support the theory that women are assigned to less technical work in project teams. One IT services case study reported that women are directed towards project management even where they prefer doing technical work - possibly because it is assumed by employers that this sort of work is compatible with their assumed interpersonal and organisational skills. This issue might merit further and systematic investigation.

- There is a paradox, among large multinationals in both the IT services sector and the e-publishing sector, of a rhetoric that flat organisations create a 'closeness to management' for all employees, in the context of global strategic decision-taking which means that management decisions are very far removed from individual employees. The centralisation of management appears to be more pronounced during periods of recession or market downturn, with particular implications for organisational equality programmes.

- From the point of female employees, there are both advantage and disadvantages associated with flat organisations. On the one hand, they are informal and flexible and therefore tend to make pleasant working environments on an interpersonal level. On the other hand, career ladders are short or non-existent, while employee and industrial relations are individualised and can be exploitative. The lack of formal structures and progression processes can make it difficult for women to gain advancement, particularly given their well-known difficulties in showcasing their own abilities and arguing for their promotion. Women seem more able to thrive in organisations where career paths are clear and extensive and where formal progression practices operate.

- The recent crisis in the dot.com sector has led, particularly in e-publishing, to redundancies and budgetary cuts which have in turn created a marked intensification of work for those remaining employees. Several informants in e-publishing complain of the work pressures placed upon them as a result, and their consequent problems in finding time for training or self-development.

Skills

- Technical qualifications, and specifically computer science degrees, are generally the main entry requirement for IT professionals in the IT services sector. For programming or development work in e-publishing, entry qualifications are lower-level than in IT services: degrees are not always required, but programming qualifications or experience usually are required.

- Editorial jobs in the e-publishing sector are concerned with content production, journalism, or project management, for which technical skills are required to work on advanced applications (for example, desk-top publishing or image processing applications) rather than on programming.

- Skills requirements for IT professionals are constantly changing, and there is a perpetual need for them to update their professional skills.

- Currently, there is a progressive hybridisation of skills taking place in IT professions in both sectors. Business and management skills are increasingly used alongside technical ones, and indeed, technical skills seem less important in comparison to business and management skills as IT professionals progress into more senior positions.

- The assumption that women are not attracted by jobs that require technical skills is not borne out by the case studies. Many informants report that the use of technical, and particularly problem-solving, skills is one of the most satisfying aspects of their work because they see it as creative. For some, creative work simply means being engrossed in coding and programming; for others, it means designing and developing a web site or service; for others still, it means developing an overview of a project through project management.

Employee Progression Policies and Practices

- In IT services, there are considerable opportunities for progression, along two basic career trajectories. One is a technical career path, the other a managerial career path. It is most common for IT professionals to progress into management. There is sometimes an assumption among employers that women are more comfortable in management than in technical roles, particularly in project management. This may be an essentialist and mistaken assumption; some women informants in the case studies report a preference for retaining their technical activities, finding them more creative and providing concrete outcomes.

- In e-publishing, there are very few progression opportunities, largely because of the truncated career structure in journalist and editorial areas. E-publishing professionals often find themselves stuck at the same level in their organisations for many years. Professionals may move horizontally between different specialist areas of publishing.

- Large companies tend to have well-defined hierarchies and career paths, together with formal progression arrangements. In general, senior management positions are filled through these internal routes. Small companies are less likely to have these arrangements. Some case study organisations have specific programmes, such as ‘fast track’ schemes to groom employees with strong potential for managerial and executive positions. These

often go together with specific policies for encouraging female potential specifically, and we have found these suites of policies to be effective means of improving women's progression and retention in IT professions. However, even in these organisations, women remain under-represented in executive jobs, so these initiatives have not solved the problem of inequality in progression.

- One informal route into management or a senior position is through visibility to existing management. There are complaints that football and drinking clubs privilege men in this respect. The persistence of these informal men's networks supports the idea that companies still lack experience of developing women, and that managements still lack experience of working with women at all.

- As suggested in our framework of explicative variables, role models of women in senior positions are rare, but we have found them to have an important motivating and empowering function for other women both within the profession and outside it. They exist primarily in organisations with formalised HR and equality or diversity policies, usually large companies.

- Our contention that women are over-represented in low-grade and/or insecure areas of work is strongly supported by our evidence from e-publishing, where there are complaints of low pay, low status, and poor progression prospects. In both sectors, women are very strongly under-represented in management and executive roles in the case studies. Few case studies have in place programmes designed to retain and promote women into senior positions.

- There are striking examples of prejudice among male managers against employing and/or promoting women, usually on the basis of assumptions about their availability for and commitment to the work. We found little evidence of fear or ambivalence among male colleagues in relation to women's advancement.

Working time and work-life balance

- In IT services, it is common for IT professionals to work long hours, or frequently to work overtime on a voluntary basis. There is a high expectation of availability by companies, and also by company clients. This particularly affects those in technical (e.g., programming) jobs, and those in senior management roles. It is a pattern that has been found across the countries participating in the study, and not simply in those countries which have a reputation for long hours working (such as the UK). Italy is the only country in this study in which working hours are settled by collective agreements at sector level.

- In e-publishing, working hours are generally organised around full-time shifts, as in the conventional publishing sector. The pace of working is generally steadier and more constant than in traditional publishing, without the peaks and troughs in activity dictated by print deadlines, or by client demands.

- Companies in both sectors emphasise availability and 'presenteeism'. In many IT services organisations, career development appears to depend on working long hours and thereby demonstrating commitment to the work and the organisation. Where senior managers themselves work very long hours, they send implicit messages through their organisations

that this kind of working is necessary for career advancement, which may discourage people who are unable to engage in these kinds of working arrangements.

- Where it exists, part-time working is female-dominated in IT services, principally among women returning from maternity leave, but it can severely limit progression opportunities, Women and others with caring responsibilities find it difficult to work according to this kind of model, and are consequently indirectly discriminated against. We have one example of an Irish company demoting a woman after she transferred from full-time to part-time working, and another of an Italian company making the assumption that its female employees are unwilling to travel to clients' premises because of family demands – an assumption which was flatly contradicted by the women in question. This indicates that women with caring responsibilities nevertheless make strenuous efforts to work effectively, and that it is employers who assume they cannot do so. We found no examples of women opting out of promotion opportunities.

- Our assumption that the conditions of IT work are therefore incompatible with domestic responsibilities is supported by the case study evidence. We found considerable evidence to support our contention that IT jobs are typically full-time, with long hours and often locationally flexible. Consequently, reconciliation between professional and private life is difficult for employees (of both sexes) in IT professions. However, in the case study organisations, informants were predominantly young, unmarried and without children or other caring responsibilities, so were largely unaffected by the reconciliation issue. It is unclear whether the industry attracts such workers because of the working conditions, or whether the working conditions have been developed by employers because they have a particular type of employee.

- Hot-desking and client-based working are common among IT professionals, and may be problematic for women or men with domestic responsibilities, where they involve long distance travelling or periods away from home. Home-based working is also common among IT professionals (with infrastructures often provided by companies), and employees report that it is very convenient, allowing them to work in family-friendly ways.

- With some notable exceptions, explicit family friendly policies are unusual in the case study companies covered by this project. Some companies regard families as problems that distract employees from their work, and see families as the specific problem of individual female employees. One organisation sees the use of family-friendly policies as only necessary in tight labour markets when it has to attract and retain women; currently, it does not find a need for such policies. This confirms the view that recessionary conditions can damage programmes designed to increase women's participation in IT professions.

- In both sectors, organisations rather use informal flexible working arrangements, in which they allow employees to organise their time autonomously and take time off where they need to, as long as their work gets done. In practice, this usually means more time spent at work by employees, rather than less.

Human resource management, labour relations and equal opportunities

- Both the IT services and e-publishing sectors have emerged relatively recently. In many companies, human resource management and labour relations have little in common with longer-established industries. Most companies operate individualised employment contracts, pay and grading systems, rather than collective agreements. In both sectors, union density is very low, and in IT services, the presence of US multinationals hostile to trade unionism, together with a young labour force unused to a culture of trade unionism, seem to have created this situation.

- Individualised human resource management also includes a growing use of periodic appraisals and individual development plans for assessing pay, training needs and career development potential. These are particularly common in large companies. The theory that they have positive implications for women's career development is confirmed by the evidence, which shows that they formalise the criteria for progression and promotion, and move away from informal systems based on friendships, visibility or 'men's clubs'.

- In general, our evidence confirms the view that *formal* organisational policies and practices have a major impact on women's participation in IT professions. Several case study organisations committed to the project of improving women's participation throughout their ranks also understand the need to implement consistent policies for recruitment, training, appraisal and development, as well as working time, and implement these policies as whole packages. This coherence of approach communicates clear and encouraging messages to female employees about their prospects and opportunities, and provides the infrastructural channels through which they move. Women were most likely to be found in senior positions in these organisations.

Organisational cultures

- A culture of work which originates in the US is gaining ground in European IT services organisations. This principally involves long working hours, and competitive, individualised relationships between workers. In such a work culture, gender becomes invisible and the organisation appears to be 'gender-neutral', but it can be negative for those women who lack confidence in being their own advocates.

- The evidence for the existence of a 'masculine culture of computing' work is patchy. It exists in some companies, and takes several forms. In some environments, it is reminiscent of the 'hobbyist' or 'hacker culture', and involves working long hours late into the night, constantly experimenting with technology, and treating IT problems as leisure pursuits, rather than only as work activities. In others, we found informal networks of men constituted around football, pubs or other leisure pursuits which were of more interest to men than to women, and tended to raise their visibility. The culture of masculinity also involves groups of young men decorating workplaces with pictures of nude women, sharing sexist jokes, and socialising together in all-male groups. We also found considerable evidence of persistent stereotyping of women by managers and executives, particularly in relation to their skills, their availability for work and their career commitment. However, such a culture is not always offputting to women; some women are able to transcend it.

- Many case study organisations claim to be 'gender-neutral' in their culture and practice. In fact, however, they are generally more likely to be 'gender-blind', in that they fail to notice and act on problems of gender inequality, treating gender as invisible.

- On the other hand, several IT services companies have sought to create cultures which are strongly woman-friendly, by, for example, discouraging sexist language, images and behaviour, encouraging women's networks, recruiting and promoting women, valuing their skills, and insisting on equal treatment for women and men. This leads us to conclude that not all organisations in the IT sector are redolent with a masculine culture of work which excludes women; many are explicitly woman-friendly. It is unclear, however, whether they are more gender-balanced than their counterparts.

- Editorial and journalist areas within e-publishing are more gender-balanced and in some cases, female-dominated. Consequently, women are not culturally marginalised in these areas, and generally report feeling comfortable with the workplace culture in their employing organisations. One case study is an e-publishing organisation with an explicitly feminist project, to which its female employees are strongly politically committed.

- Our evidence therefore confirms the view that organisational cultures in the ICT sector are hostile to women, but it would seem from the case study evidence that it is competitive cultures, together with individualised HR structures and practices which are more decisive for gender inequality than is the masculine culture of computing.

Social, Cultural and Institutional Arrangements

- There is little discernible variation between the employment relations within companies in countries with strong collective bargaining environments, and those in countries with more generally individualised arrangements. The individualised employment relations culture of the 'new economy' is widespread across companies and countries, and overrides national industrial relations arrangements in influencing local working conditions.

- National training régimes have little bearing on the training available to IT professionals in firms, which seems more strongly connected to the size of company, its skills strategy and the resources it has available for developing this.

- In countries with enduring 'male breadwinner-female domestic worker' models and relatively low rates of female labour market participation, there are examples of direct hostility to the employment of women in IT services organisations.

- Women in countries with strong welfare support arrangements (for example, childcare provision) have no advantage over women in IT professions in countries with weak support provision. Here, however, women's employment and prospects are strongly dependent upon the willingness of their employers to accommodate to their domestic situations. In these conditions, employer behaviour seems to be more critical than in countries where the state or other institutions provide support to working women.

- Gender stereotypes are widespread, though their precise content varies slightly in different national and organisational settings. These stereotypes provide a rationale for companies to prejudge women's fitness for technical work.

Annex: Summary of Case Study Organisations and Informants

Summary Descriptions of IT Services Case Studies

Austria

A1: Large multinational software company

A1 is the software and electronic house of a large multinational company. It has 3500 employees in Austria and a further 1700 elsewhere in Europe and in the US. It produces a wide variety of electronic equipment and applications, offering services in the field of product and system development, system integration and consulting. The company has a very hierarchical structure, and most IT service work is organised around projects. There is a clear internal labour market, and formalised training and development processes including a scheme for identifying and developing management and executive potential. Despite this, employees complain that the hierarchy renders the company structure opaque and that this obscures their view of potential career moves. The company operates equal opportunities initiatives, but like many of its competitors, has recently suffered from the economic downturn in the sector which has created difficulties in pursuing its equality programme.

A2: Small IT service provider

A2 is an IT service provider specialising in the development of software tailored to customer requirements. It is the result of a merger between three companies dealing with management consultancy, internet services and technology. Its customers are large firms, for which it builds software products for the management of processes, quality and projects. However, following turbulent times and cutbacks in the company, it has a weaker market position than in the past and has shed labour. It now has around 40 employees, some of whom are freelancers. The workforce is young, with the majority aged under 30. Developers are organised into permanent teams, and their work is done on a project basis. They have strong daily autonomy around their working methods and work rhythms. Despite the informal culture of the organisation, training and employee development is systematically provided. Women in the firm have a positive response to the work and the sociable working relationships, and find the flexible working time system very sympathetic to their circumstances.

Belgium

B1 Large computer services company belonging to an international group

B1 is the subsidiary of an international group whose core business is not IT; it counts around 670 employees in Belgium. This firm is moving from the paternalistic and planned work organisation (now outdated) based on work provided by its captive clientele to the dynamic IT culture, more open to competition and more sensitive to the market. In this context, the biggest risk for the workforce, older than the IT sector's average, is competences obsolescence; workers have become very sensitive about their evaluation. Another consequence of the workers' seniority is the paradox of a firm in overcapacity outsourcing work to external consultants, because they are less expensive; in the firm itself, work is not

equally shared. Instead of taking on, a re-skilling policy has been set up as well as proactive management rules in which workers are now responsible for their own employability. More flexibility and a new system of time management through time sheets replace office timetable and voluntary working time reduction is a presented as a solution to avoid lay off.

B2 Small Internet services enterprise

B2 is specialised in Internet services; it was created in 1998 by the repurchase or three other companies. Work is organised by teams of 3 persons: one project manager, one developer and one computer graphic artist, all in a permanent contract. Part-time is present in the firm but only concerns women with children. In a state of permanent evolution of technologies, the firm is not yet stabilised and this state is brought on the employees - all young and committed, like the managers - by requests of availability, adaptability and permanent progression. If technical skills are important, managers put the emphasis on ability to learn and self-training is permanent. Personal trajectories and degrees are all different and hybrid, mostly built on self-training; this is shown by the self-definition of functions. Private certification becomes a manner to certify acquired competences. Human resource management and wage are individualised and unclear and there is not any real hierarchical structure.

France

F1: Website creation company

F1 is a small company concerned primarily with website development, but also involved in website hosting, internet marketing and games. The company was established in 1997 by two founders, and has grown steadily in both employee numbers and turnover since then. The downturn in the new economy in 2002 affected the company and led to redundancies. There are now 17 employees. Work is organised through project managers, and been somewhat formalised in recent years. A hierarchy has been newly-introduced. Nevertheless, the daily work of developers is done relatively autonomously and there is a strong cultural emphasis in the company on autonomy and responsibility among employees. In fact, the work is very intensive, and long hours are worked. The employees complain that the company culture is not participative, and that there is little by way of information and consultation. There is a strong cultural emphasis on gender balance and lack of discrimination in the firm, and gender relations appear to be positive.

F2: Small software company

F2 is a small company of eight people, established by two partners in 2000 in order to develop open source software (OSS). Its clients are other companies and service organisations. The company compares itself to an architecture firm, searching for and developing appropriate technical solutions and then often outsourcing the implementation of those solutions. It does not define itself as a ‘dot-com start-up’ because it is committed to the long-term requirements of its clients. The company now employs eight people; four are permanent staff and the other four are work placement students. All staff are under 30 years of age, and there is one female working there (one of the placement students). The work is high-level knowledge work. It is organised by project: the manager negotiates with clients and then discusses the technical specifications with the web designers. The latter is then placed in charge of carrying out the project. Each person in the technical team is assigned to a different project, so people rarely work together. Most of the work is done on a solitary basis,

and people work the hours they choose. The place of the one woman in the firm seems somewhat paradoxical: she is technically naïve and was employed to introduce a 'feminine touch' to the company.

Ireland

IR1: Medium-size software company

IR1 reflects the story of the Irish economic miracle. It is a software company which was established as a spin-off from a university computer science department during the period when the Irish government was investing heavily in technical education to drive economic development through the IT sector. After its formation in 1991, it expanded rapidly in parallel with the general expansion in the Irish software industry, and was floated on the NASDAQ stock market. It established headquarters in both Ireland and the United States. Revenues began to decline in 2000, and the company made a large financial loss following the IT downturn in 2002. As a result, it cut costs and has implemented two redundancy programmes in the past two years. There are currently 250 staff in Ireland, 900 in total. The company has developed a series of competitive products which have made it very technologically advanced. Its business is as a middleware integrator, making software that enables distributed computers and software systems to work together. The company demands commitment from its employees and promotes staff on that basis. It has a limited understanding of the needs of its female workforce and does not support them in their employment, and this looks unlikely to change given the negative market conditions within which it is currently operating.

IR2: Medium-size courseware and e-learning company

IR2 was until 2001 an Irish company which has now been acquired by a US company and is now part of the world's largest e-learning enterprise. It offers a combination of courseware, simulations and reference-ware solutions for information technology and businesses, employing 270 staff in Dublin. Since the American acquisition, there has been a clash of organisational cultures. The new "do it or leave it philosophy" is said not to belong to the Irish management culture. Informal, well-rooted practices such as informal rewards and social events, are also being affected. The acquisition from the American company led to a process of restructuring that has impacted on all the non-standardised contracts that were in place in the company and, therefore, penalised the few women who were accessing them. Another distinctive feature of E-LearnCo is its internal dis-homogeneity. The company has a number of subgroups of employees that are differentiated according to their role, technical skills, gender composition, training received, etc. These diverse groups hold a different status at organisational level and in the eyes of the management. Technical writers are generally female, with non-technical backgrounds. Software developers are prevalently men, with technical backgrounds. Employment relations are based on the 'exploitation' of a young and dynamic workforce. The management accepts short-term employment relationships in exchange of relatively low levels of wage and the absence of effective career opportunities.

Italy

IT1: Large software house in North-Central Italy

IT1 was founded in 1972 by two entrepreneurs who imported American software programs and sold them on the Italian market. It tapped into a period of industrial restructuring in which

technical innovations were developed in order to automate human work activities. They subsequently began producing their own software solutions. The company has grown into a large enterprise since then, and now consists of several companies within a group, all involved in IT services ranging from software solutions to internet portals and website production. It is listed on the European NASDAQ stock exchange. It has strong business relationships with some of the major IT service providers, and its clients are all large enterprises in different sectors, including the public sector. Like almost every other IT company, however, IT1 has been affected by the crisis in the sector and has had to undertake a restructuring programme, primarily involving wage cuts. The culture of work is strongly centred on clients' needs, and working hours are long and intense.

IT2: Medium-size software house in S. Italy

IT2 is a group of three firms specialising in software solutions. Originally established in order to develop banking software in 1981, the firm grew through the acquisition of other firms. It moved into the Romanian market in 1992 and tried without success to establish itself also in the USA. The activities of IT2 are: 1) creation of software solutions and applications to enhance the business administration of its clients; 2) implementation and assistance of the software solutions; 3) research activity with the scope of new solutions; 4) marketing and sales of the software solutions. The organisational model and culture of the firm involves a mixture of modern and traditional elements which don't always coexist in harmony. On the one hand, there is a traditional South Italian patriarchal culture based on hierarchy and gender discrimination. On the other, it displays elements of post-Fordist work organisation with a flat structure, teamworking, and work externalised to Romania where labour costs are lower than in South Italy. Only in the second half of the 1990s, however, was the first woman hired to the company. Cultural barriers remain the main obstacle to women's progression within it.

Portugal

P1: Large multinational computer service company

P1 is the largest IT company in Portugal, part of an American multinational corporation involved in computing systems, applications, networks and solutions. The company employs 316,303 workers worldwide, and 737 in Portugal. It is organised into divisions relating to product lines. Human resource management is highly structured and programmatic; the company operates extensive training and employee development programmes for technical workers. It is very concerned to improve women's participation and there are concrete measures for increasing the number of women in management and executive positions. The company uses a discourse of having a global presence but local culture, in which management is close to workers. It also places great emphasis on team spirit and on interpersonal co-operation, along with individual responsibility for work and personal development. On the other hand, it is experienced as bureaucratic and rule-bound by employees.

P2: Knowledge management and solutions company

P2 is involved in knowledge management, e-business, applications, outsourcing and consulting services. Part of a larger corporate group with operations in several Latin American countries, P2 is the result of a merger of three companies, and was only established in Portugal in 2002. Since its establishment, it has faced the challenge of a highly volatile and unstable market affected by the IT downturn, making the competitive environment both

uncertain and dynamic. It employs 31 people, with an average age of under 35, some of whom are immigrants to Portugal employed for their technical skills. The company culture is informal and there are sports and team activities for staff to encourage team-building and commitment to the enterprise. Although nearly half its technical staff are female, the company appears reluctant to hire and develop women.

UK

UK1: Large multinational IT service provider

UK1 is a provider of business and technology services, in particular software, networking systems, professional and business solutions. It is part of a multinational provider of IT products and services, with group headquarters in the United States and facilities throughout the world. It employs a total of 320,000 people worldwide, of whom 50,000 are employed in the UK across 6 sites throughout the country. The fortunes of UK1 have changed considerably over the past two decades. In the 1960s and 1970s, it was a major supplier of computer hardware, mainly to large companies. It had a captive market, and as a result was poor at innovating or developing new competences. With the rise of personal computing and a changing market saturated with hardware, the company seemed to be in terminal decline. To survive, it pursued an internal restructuring during the 1980s and reoriented its services to the services and solutions market. This case study illustrates the conditions of work for women in a very large IT organisation, in which there is strong support for equality and diversity in general, and in particular, a strategic programme to encourage more women into the profession and into this firm.

UK2: Small software company

UK2 is a very small software house specialising in the development and sales of EDI and e-commerce software. It was started up as a computing consultancy in 1973 by the current Managing Director, and subsequently moved into e-commerce as this technology developed. UK2 is now a public limited company, which has had offices in Germany, the US and Australia. It currently operates from a single small office in the South of England. The case study shows the nature of employment and of programming work in a small company where HR and employment relations are informal, and where the work process is principally driven by a timetable of software releases. It also demonstrates the prospects for women to advance in a setting where there are very few women and where equal opportunities is not part of management or organisational thinking.

Table 1 provides summary information on the IT services organisations which served as case studies.

- Financial data on turnover varies slightly according to the time period for which this data was made available to the national research teams. In some cases, we were unable to obtain this information.

- Employment figures are broken down by gender where possible, and we have indicated the gender breakdown of technical jobs where this information is available.

- Company structure and the organisation of work refers, first, to the existence of hierarchies, flat organisations, or other organisational forms; and second, to the arrangements implemented for the daily conduct of work, such as project teams.

- Where provided by our case studies, we have included information on the employment status of their workforces at the time when the case studies were undertaken. Data was not comprehensively provided by all case studies.

Table 1: Summary of IT Services Case Studies

Country	**Company**	**Turnover in €**	**Total workforce (% female; % female in technical jobs)**	**Company structure & organisation of work**	**Employment Status of Workforce**
Austria	A1: Large multinational software company	477m in 2001-2002	3500 in Austria (16%; 10%)	Hierarchical structure. Project working	3228 full-timers (92% of workforce). 97% of men and 69% of women work full-time. 272 part-timers (8% of workforce). 3% of men and 31% of women work part-time.
	A2: Small IT service provider	3.38m in 2002	40 including freelancers (25-30%; data not available)	Flat structure, permanent teams	30-35 permanent employees; 5 freelancers.
Belgium	B1: Large computer services company	No information	670 in Belgium (23%; data not available)	Flat hierarchy; flexible work organisation including job rotation	18 women out of staff of 670 work long part-time (4 days). Other employees are full-time and work long hours (evenings, weekends).
	B2: Small internet services enterprise		30 (no data available)	Condensed hierarchy (few levels); project teams of 3	Some part-time employees – all women with children. Freelancers also used.
France	F1: Website creation company	116m in 2002	17 (40%; no data).	Short hierarchies through project managers	100% full-time.

	F2: Small software company	No information	8 employees (of these 1 is female, a placement student in a technical role)	Flat structure. One of two partners manages company. Work organised by project assigned to each employee.	50% of staff are permanent; 50% are students on placements. All are employed full-time and work long hours. Freelancers are used where work cannot be handled in-house.
Ireland	IR1: Medium-size software company	No information on turnover, but company made $28m loss in 2002	250 in Dublin (20%; no information).	No information.	Most staff on full-time contracts.
	IR2: Medium-size courseware and e-learning company	$43m in 4th quarter of 2003, but net loss of $270m	270 (35%; no information)	Project teams of writers, editors and consultants.	All staff on full-time contracts; part-time working and job sharing abolished.
Italy	IT1: Large software house in North-Central Italy.	48.5m in 2002	610 (38.7%; no information)	Project teams of 4-6 people.	Mainly permanent full-time employees.
	IT2: Medium-size software house in S. Italy	4.5m in 2002	73 (8%; 5.5%)	Hierarchical decision-taking but autonomous project-based work.	All employees full-time.
Portugal	P1: Large multinational computer service company	265m in 2002	737 (31%; 24% of 'technicians' which excludes 'people managers' who may be IT professionals)	Hierarchical with global decision-taking implemented locally. Day-to-day work organisation varies according to area of the company and product.	No information.
	P2: Knowledge management and solutions company	153m in 2001 for wider group of which P2 is part.	31 (55%; 43%)	Work organised into functional departments, some working exclusively for single client company.	Most employees permanent and full-time.

UK	UK1: Large multinational IT service provider	$86bn in 2001 for global company	50,000 (28%; no information)	Global and regional structure, with departments in UK company organised by client base	Different types of flexible working arrangements are available, but no information on numbers of employees taking them up.
	UK2: Small software company	No data.	25 (3 women = 12%; 1 in technical role = 4%)	Flat hierarchy of directors and departmental managers. Work organised by software release.	All staff full-time except one part-time administrative employee.

Table 2: Informants in IT Services Case Studies

Organisation	**Informant**	**Sex**	**Age**	**Position in organisation**	**Family circumstances**
A1 – Large multinational software company	S	F		Works in the HR department, is in charge of the company's equal opportunities programme.	
	Boss of S	M			
	K	F	30	Project manager	Married, one child 1 year old
	R	F	40	Technical project consultant and development project manager	Divorced, living with partner, two children 14 and 18
	C	F	< 30	Project manager	Living with a partner, no children
A2 – Small IT Service Provider	K	F	< 30	Human Development manager	No children
	L	F	31	Project manager	Living with partner
	N	F	26	Consultant and Senior Technical Engineer	Living with partner
B1: Large computer services company	Jacques	M	55	Developer	Married, three children.
	Jean-Charles	M	39	Senior consultant	Married, one child
	Annick	F	42	Developer	Married, 5 children
	Chantal	F	42	Analyst developer	Married, 3 children
	Ann	F	37	Human Resource manager	Single, no children
	Freddy	M	42	Project manager	Divorced, one child
	Jessica	F	25	Request co-ordinator	Single, no children

	Catherine	F	21	Temporary help desk	Single, no children
B2: Small internet services enterprise	Frédéric	M	36	Manager	Single, no children
	France	F	33	Computer Graphic Artist	Married, 2 children
	Emmanuel	M	27	Developer	Single, no children
	Anne-sophie	F	28	Project leader	Single, no children
	Kristel	F	38	Design manager	Married, 2 children

F1: Website creation company		M		CEO and Company Partner	
		M		Technical Director & Company Partner	
		F		Project Manager	
		F		Account Manager	
		F		Computer Graphic Artist	
		F		Personal Assistant	
F2: Small software company		M	29	General Manager and main partner	Married, one child of 7 months
		M	28	General Manager and secondary partner	Married, one child of 2 months
		M	22	Web developer and network designer	Single
		M	23	Web developer and network design apprentice	Single
		M	24	Support technician	Single
		M	22	Web developer, student	Single
		F	23	Work placement student	Single
		M	20	Work placement student	Single
IR1: Medium-size sofware company	PH	M		Human Resource Manager	Married, two children
	LS	F	39	Programme Manager	Married, one child
	MOD	F	35	Senior Software Engineer	Married, one child
	AC	F		Senior Engineer	Married, two children
	MM	F	41	Engineering Manager	Living with partner, two children
IR2: Medium-size courseware and e-learning company	FD	F	40	Human Resource Manager	Living with partner, two children
	IOD	F	33	Technical writer	Living with partner
	TB	F	32	Technical writer (no longer employee of IR2)	Living with partner

IT1: Large software house in North-Central Italy.		M	45	Human Resource Manager	
		F	38	Project Manager	
	Marta	F	29	Software Developer	Married, one child 16 months
	Paola	F	28	Software Developer	Single
	Riccardo	M	33	Software Developer	Married, one child 3 years.
				Worker representative	
IT2: Medium-size software house in S. Italy		M	43	Manager of R&D Centre	Married
	Paolo	M		Software Analyst	Married, two children 5 and 6
	Maria	F		Controller of software solutions	Married, one child
	Olga	F	28	Software developer	Single
	Giulia	F	22	Software developer	Single
	Guido	M	33	Analyst developer	Single
P1: Large multinational computer service company	8		27	SAP consultant	Single
	11		40	Account manager	Married, one child
	12		46	Business Consulting Services Manager	Married, two children
	13		43	Integrated Technology Services Director	Married, two children
	16		42	Financial Account Manager	Married, four children
P2: Knowledge management and solutions company	A	F	31	Translation Co-ordinator	Married, one child
	B	M	32	Technical Director	Married, one child
	C	F	29	Commercial Consultant	Single
	D	F	43	IT Consultant	Married, two children
	E	F	27	Customer Support Services Co-ordinator	Single

UK1: Large multinational IT service provider	AC	F	31	Technology and e-solutions manager	Married
	BH	F	53	Web Services Architect	Married
	JT	F	39	Technical sales leader	Divorced
	MH	F	29	Software Engineer	Living with partner.
	MP	M		HR Manager	Married, children
	RG	F	42	Director, UK Government Business	Married, two children 8 and 10
UK2: Small software company	JM	F	27	Development Manager	Single
	AO	F	38	Technical Consultant	Married
	CH	F	47	Administration Manager	Married, two children 19 and 15

Summary Descriptions of e-publishing Case Studies

Austria

A3: Online journal

A3 is an online journal created in 1995 with a paper counterpart. In 1999, it became independent from the print journal. Today it has 13 channels, including a woman's channel, and also offers other services including tailored application service provider (ASP) solutions to external clients, a technical infrastructure with a content management system, a presentation system, tools and technical support. A3 also sells content. Current market conditions have forced A3 to cut the working hours and salaries of its editorial staff and programmers. Editorial staff suffer from low pay and poor job security, with poor career prospects, and now face a paradox of being under-employed and underpaid, resentful but strongly committed to the product and the project.

A4: Two companies - Database Company and Architecture Archive

A4 is composed of two small companies: a content provider with a special focus on architecture working in the fields of multimedia and architecture; and an architecture centre and exhibition space. The content provider was founded in 1995 and provides information on architecture on its websites. It has from the first day co-operated intensively with the architecture centre. Its clients and target groups are architects, authors and photographers, and people generally interested in architecture. Its main product is a large online database on architecture, containing several thousands of objects, plans and photographs. The work involves updating the database and newsletters that are updated monthly, and creating new websites for clients. A4 employs four people in the content provision area and 22 in the architecture centre. Both part of the case study have flat hierarchies, and interviewees appreciate the informality of the organisation. Autonomy is strong, but career prospects are few and instead they are offered the opportunity to move sideways in other types of work.

Belgium

B3: Multimedia Section of Press Group

This case study analyses the young multimedia cell of a press group, created on an informal way as an internal project for interested journalists, without any special recruitments; training takes place on the job but shows its limits. Web editors (5 men and 1 woman) are journalists before all; their work consists of posting the daily newspaper on the web. Therefore knowledge of editing software is enough; all developing jobs are left to the informatics department of this press group. They work under the direction of a web master who is rather the information chief. The work organisation of the journalism world has been imported in the cell: freelance status; work in shift and low wage. All are young and are happy with the diversity, the possibility to learn and the fun provided by their job, which compensate low wage and lack of perspectives. There is not any hierarchical level; it is up to each member of the team to create his trajectory. Yet, this general satisfaction is fading away (especially for the woman) under claims of training, of a richer job content, of a wage earner status and of higher wage.

B4: Business Communication and Web Publishing Firm

This case illustrates the diversification of communication means that led a firm specialised in theatre based communication to evolve to e-communication and even to create a new firm that offers diverse services from CD-ROM and web site creation to web-TV and e-learning. This firm only works with a project leader and a hard core of around 7 workers, all freelances. They can chose to work on the premise or at home (one woman always work from home for work-life balance reasons), and all have many projects in hand, also on their own. Collaborators are mostly self-taught persons who completed their self-training by punctual training and come from very diverse horizons. The emphasis is put on quality of work and respect of each other's freedom and nobody claims a salaried status. In this quickly evolving field, the only drawback of their status is the cost of training. Careers are considered as personal affairs.

France

F3: Digital Content Distributor

This case study concerns a large digital content distributor established following the French 'Plan câble' to diffuse digital technologies throughout the country. Founded in 1986, it was a pioneer in the diffusion of digital television. The bursting of the dot.com bubble in 2002 led to projects being abandoned and staff being made redundant. It now employs 540 people, with an average age of 33. There is a sharp sexual division of labour in F3, with men dominating technical jobs and women predominating in sales and communications roles. The daily work is organised into project and teams of 4-5 people, though recruitment to teams has some gender bias. Hours worked are longer than those declared on timesheets. Managers work very long hours, and evening meetings are routine. Relational skills are now appearing as more important than experience of the sector, and the company has turned to recruiting mature candidates, especially for management jobs. But there are limited career prospects and a very divided work culture following the restructuring of the company. The emphasis on individualism in which 'everyone has a chance' conflicts with stressful working conditions in which the mental health of employees is under threat.

F4: Online newspaper group

This case study is of the electronic publishing department of an online newspaper group, comprising five websites. It employs 26 staff in five web editorial teams, each responsible for one site. Although there are 12 women working in the organisation, none are in technical functions but several are in editorial work. Some are in senior positions, though these do not enjoy high status in the organisation. The production cycle is a weekly one, with the papers being placed online mid-week and all work efforts focussed around this deadline. Despite this, there is great working time flexibility and autonomy, providing the work is done. Employee development is available for technical staff, not for editorial staff. As the organisation is small, career prospects are poor, and recruitment has been difficult since the bursting of the internet bubble.

Ireland

IR3: Online part of Irish broadcaster

This case study concerns the online department of a major Irish broadcast organisation, employing 35 staff. The environment is dynamic and young, composed of journalists, many of them women. The flux of information governs their work rhythms, which are steadier than in IT services. Work is organised into shifts so that news is covered almost continuously. The department favours hiring young journalists, and uses freelancers as the pool from which to hire. The technical content of the work is not high but journalists do need to have an awareness of technological options. Because of the difficult financial situation of the organisation, it cannot offer long-term career prospects, which employees find very unsatisfactory.

IR4: Online newspaper

IR4 is the online edition of a leading Irish newspaper, first published on the web in 1994. It employs 30 staff, in editorial, commercial and technical sections. The workplace is young and dynamic but also gender-imbalanced. Women are the majority only in the commercial section of the company. Men dominate the technical section whilst, among journalists, women are only two out of 18. The work is organised according to shifts and the flexibility of working time is a major feature of the work organisation, which has to face the unpredictability of the flux of news. Journalists are not requested any specific technical expertise and this is due to the presence of a technical team that is in charge of dealing with all the technical aspects of their work. The imbalanced presence of women at the workplace is not therefore attributable to any obstacle concerning the technical aspects of the work involved but rather to the particular organisation of work based on shifts and on the theoretical availability of employees to the exigencies of news production. These aspects tend to reduce the space for manoeuvre for men and especially women with family commitments.

Italy

IT3: News and information internet company

This is a medium-sized company which operates as a portal for news and information provision, currently employing 34 people. It is a ‘border company’ – being at once rooted in the past in terms of its functional structure and management, and yet forward-looking to ‘new economy’ ways of working. It survived the dot.com crash but had to restructure and reduce

staff. 45% of its workforce are 'quasi self-employed', effectively working freelance for a single client. Men predominate at all levels and in technical roles, while women are concentrated in content development functions. However, these require strong ICT skills, so women in this company are technically competent. Moreover, 50% of applicants for technical jobs are female. But the company does not believe that its young workforce needs to work part-time. Flexibility is the key quality it looks for in its staff – adaptability and an aptitude for learning.

IT4: Multimedia publisher and editing service

IT4 is a multimedia publisher and editing service, established originally to publish on paper but since 1992 working in electronic media. It is medium-sized company employing 59 staff, a quarter of whom are long-term employees with more than 15 years' service. 63% of staff are 'quasi self-employed'. Most work is full-time and the working rhythm depends on customer needs. Internet publishing involves more work at the start of a project in setting up codes and content, and this shapes the time pressures on the staff. The work rhythm is predictable and not stressful. The company recruits people from diverse backgrounds but particularly from the humanities for this work. People learn their skills on the job.

Portugal

P3: Online newspaper

This case study is of an online newspaper which unusually does not have a paper counterpart. As a result, it is constantly updated and there are no publishing deadlines. As with other e-publishing organisations, it was affected by the internet crash and both restructured its sites and made staff redundant as a result. It now employs 19 staff with an average age of less than 30. Working hours are jointly agreed between workers and the company director and are designed to meet the needs of both. They are structured into 8-hour shifts. There is a climate of openness and support in P3, with informal family-friendly policies developed in response to need. This case illustrates the differences between the rhythm of working in print and that of working solely online. There are no time constraints with online publishing, but employees report higher workloads and more stress more constantly applied. On the other hand, they find the directness of reporting events very rewarding.

P4: Online edition of weekly newspaper

P4 is a weekly newspaper, the online version of which was first launched in 1998. It employs only 3 journalists and a few trainees, most staff having returned to jobs on the main newspaper following declining revenues and downsizing in 2001. Journalists on the online version have the same skills and those working on the conventional paper, though the latter believe that their online counterparts just perform simple 'cut-and-paste' operations. Technicians put the online version on to the web once a week. For these journalists the working rhythm is steadier and more continuously reactive to events than for the paper journalists, where the weekly print run is their deadline. In P4, learning is done from other colleagues, and technical skills are needed at applications rather than at programming level. There is no formal training in P4 and little by way of career prospects.

UK

UK3: Network of online newspaper sites

UK3 is a large network of news websites. It is part of a national newspaper group which publishes a daily broadsheet newspaper and a Sunday broadsheet. The newspaper group of which it is a part was established in the 1930s. The group was and continues to be owned by a trust and is consequently independent of shareholder pressures. It employs 1400 people. UK3 itself was established in 1999. UK3 currently covers over 100 million page impressions, and the network offers a range of sites covering news, politics, films, books, travel, shopping, jobs, money, football and sport. It has three specialist sites for professionals in the media, the education sector and the public sector in general. It reaches around 9 million readers. The case study illustrates the nature of new media employment and skills in the context of a large organisation with a formal commitment to equality and diversity. It shows the problems encountered by employers in recruiting and promoting qualified women to work in technical positions, even where their internal processes are strongly oriented to do so. It also shows how informal gender cultures can serve to undermine formal equality practices and to prevent women from gaining the visibility needed for advancement.

UK4: Online professional journal and business information publisher

UK4 is a subsidiary of a global information provider and publishing company. It specialises in legal and business news and information services delivered through professional journals and online. UK4 is the product of mergers between two specialist legal and taxation publishers, which originally published traditional professional journals in these fields. UK4 is a large international company in its own right, and is continuing to expand through mergers and acquisitions. It has 85 offices worldwide, with operations in the US and Canada, Latin America, South East Asia, and throughout the countries of the EU including the UK. Many of the challenges the company now faces are those connected with globalising and restructuring its operations. UK4 has undergone a major programme of rationalisation and restructuring following the merger in 2001. This has involved both reorganising the location and conduct of some of its operations, and the company now has offices in central and outer London. EP2 has made nearly one hundred redundancies amongst its staff. Staff morale and motivation in vulnerable parts of the organisation is consequently quite low.

Table 3 summarises basic company information for the e-publishing case studies, under three main headings: workforce numbers, company structure and the organisation of work, and the employment status of the workforce. Financial information (for example, on turnover or profits) was not easily accessible or available in the case of the e-publishing organisations, and we have therefore not included it in this table.

It should be noted that:

- 'Workforce numbers' refers to the total numbers of employees and freelancers in the case study organsiations, where the combined figures have been provided to us. In e-publishing there is significant use of freelancers in almost all organisations, so we consider it important to include them in the numbers employed. Under this heading, we have also, where possible, included a gender breakdown to show the proportion of women and men in the company and if the data is available, the proportion in different areas of work.

- 'Company structure' refers to the presence or otherwise of hierarchical structures, while the 'organisation of work' refers to the way in which daily work groups are constituted and conduct their tasks.

- 'Employment status of workforce' refers to the type of employment contracts held and by what proportion of the workforce. In particular, it shows the extent of temporary or freelance working in the case studies. As we have noted, this is significant in e-publishing. Where relevant, other indicators of contract type, such as part-time working, are also given.

Table 3: Summary of e-publishing Case Studies

Country	Company	Workforce numbers	Company structure & organisation of work	Employment Status of Workforce
Austria	A3: Online journal	Total of 70.	Flat structure; externalised editorial work	23 employees; 47 freelancers.
	A4: Two companies - Database Company and Architecture Archive	4 in Database: 1 woman, 3 men. 22 in Archive.	Flat structure in both. Work self-directed.	1 employee; 3 freelancers in Database company. 17 employees; 5 freelancers in Archive.
Belgium	B3: Multimedia Section of Press Group	9: 1 woman, 8 men.	Flat hierarchy. Continuous process working.	5 employees of whom 2 are part-time; 4 freelancers.
	B4: Business Communication and Web Publishing Firm	7: 3 women, 4 men.	Flat hierarchy. Mixture of freelance and salaried culture. Autonomous working.	In addition to 7 core staff, 7 freelancers collaborate regularly with company.
France	F3: Digital Content Distributor	540: 39% female, predominantly in sales and communications.	Flattened hierarchy and new 'network structure'. Work organised into temporary project teams.	
	F4: Online newspaper group	26 of whom 12 are female.	Matrix organisation operating across publishing titles. Work organised around a weekly production cycle	
Ireland	IR3: Online part of Irish broadcaster	35: 16 female, of whom 1 is a technician and others are editorial and sales staff.	Work organised around rhythm of news production	Workforce of 35 are core staff but freelancers are also used.
	IR4: Online newspaper	Total of 30. Women are predominantly in commercial function and absent from technical and editorial functions.	Work is organised around continuous process of news production.	Freelancers are used for editorial functions.

Italy	IT3: News and information internet company	34, of whom 10 female. In web section, 6 staff (50%) female. Product managers 100% female. In technical area, 2 staff (20%) female.	Formal and traditional organisational structure but daily work is organised into teams and projects. Staff rotate between tasks when they move between projects.	45% of workforce 'quasi self-employed'.
	IT4: Multimedia publisher and editing service	59, of whom 39 are female. 35 of these work in editorial functions, only 1 in a technical function.	Work organised along six product lines, within which projects are carried out.	63% of staff are 'quasi self-employed'. 2 part-time staff.
Portugal	P3: Online newspaper	19 employees, of whom 9 are female and in editorial positions.	Informal organisation.	
	P4: Online edition of weekly newspaper	3 journalists and some trainees.	Informal and flat organisation. Work organised minimal due to small size of organisation.	
UK	UK3: Network of online newspaper sites.	100 core staff.	Each site has own editorial team. Work managed very autonomously and informally, according to rhythm of daily online publishing and more frequent site updating.	Large pool of freelancers employed in editorial and production roles as required.
	UK4: Online professional journal and business information publisher	13,000 employees worldwide; 1300 in UK.	Hierarchical organisation. Project teams are organised within product lines. In IT, there are permanent teams as well as project teams for particular tasks.	In addition to employees, company employs freelance staff to fill particular editorial requirements.

Table 4: Summary of informants in e-publishing case studies

Organisation	Informant	Sex	Age	Position in organisation	Family circumstances
A3**:** Online journal	G	F		CEO, chief editor and responsible for selling content	
	CEO1	M		CEO, responsible for advertisements, marketing and the website	
	CM	F	29	Channel manager of fem.at	
	IF	F	24	Editor	
	D		F	Editor	Divorced, 1 son of 16
	IL		F	Editor	
A4: Two companies - Database Company and Architecture Archive	R	F	30	HTML programmer	Lives with partner
	J	M		Company owner	
	K	F	38	Financial control	
	G	F	35	Web editor	Married
B3: Multimedia Section of Press Group	Renaud	M	30	Webmaster	Single
	Laurent	M	28	Web editor	Single
	Laurence	F	34	Web editor	Married, 3 children
	Michel	M	28	Computer graphic artist	Single
	Paul	M	40	Computer project manager	Married, 1 child
	Patrick	M	48	Multimedia manager	Married, 2 children
B4: Business Communication and Web Publishing Firm	Aurore	F	25	Web architect	Single
	Véronique	F	35	Web designer	Married, 1 child
	Julien	M	23	Rich media specialist	Single
	Sylvain	M	24	Network engineer	Single
	Xavier	M	35	E-learning specialist	Married, 1 child
	David	M	36	Project manager	Married, 1 child
	Xavier	M	35	Administrator	Single

F3: Digital Content Distributor		F	30+	Deputy Human Relations Director	Married, 3 children
		F	< 30	Internet Project Manager	Single
		M	28	Webmaster	Married, 1 child
		M	27	Customer forum moderator	Single
		F	27	Forum moderator	Single
F4: Online newspaper group					
IR3: Online part of Irish broadcaster	BT	F	38	News editor for web edition	Lives with partner
	C	F	25	Journalist	Single
IR4: Online newspaper	DV	F	35	Editor	Single
IT3: News and information internet company	GC	F	50+	Chief editor and web manager	Married
	Z	M	45	General director	Married
	MT	F	45	HR Manager	Single
	RL	F		Product and Operations Manager	Married
	LB	F	30	Product Manager	Single
	PD	F	32	Product Manager	Single
IT4: Multimedia publisher and editing service	W. 1	F	38	Web secretary assistant	Married
	W. 2	F	29	Junior editor	Married
	W. 3	F	32	Editor	Single
	W. 4	F	28	Content reviser	Single
	M.M.	M	45	GDO	Married
	G.D.	M	40	IT manager	Married
	D.B.	F	45	Human resources manager	Married
P3: Online newspaper	HS	M		Director	
	V	F	26	Editor	Single
	X	F	27	Sub-Editor	Married, 1 child
	Y	M	30	Sub-Editor	Single
	Z	F	40	Reporter	Married, 3 children

P4: Online edition of weekly newspaper	RPL	F	38	Journalist	
	MC	M	45	Editor	
	MP	F	45	Journalist	
	CB	F	28	Journalist	
UK3: Network of online newspaper sites.	VS	F	38	HR Manager	Married, no children
	JM	F	40	Staff Development Manager	Single
	HI	F	29	Senior Developer	Single, no children
	SM	F	41	IT Support Specialist	Single, no children
	VM	F	42	IT Support	Single, no children
	AH	F	32	PC Support specialist	Cohabiting, no children
	KF	F	29	Technical Consultant	Cohabiting, no children
	LM	F	59	Development Manager	Married, adult children
UK4: Online professional journal and business information publisher	PH	F	38	Head of HR Development	Divorced, one child, 3.
	KS	F	42	Quality Manager, Publishing Systems	Married, no children
	JV	F	26	Maintenance team leader, Electronic Product Fabrication	Single, no children
	JC	F	36	Builds Team Leader, Electronic Product Fabrication	Single, no children
	CW	F	30	Senior Information Systems Analyst, IT Services	Cohabiting, no children
	PI	F	27	Software Development Team leader, Business Systems	Single, no children
	SC	M	45	Senior Editor and European Works Council representative	-