Employment challenges to the knowledge economy in Europe:

the case of IT services

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ABSTRACT

This paper investigates the employment challenges facing the fast-expanding IT services sector in Europe and contributes to debates about what policy reforms are required to nurture the so-called knowledge economy. The IT services sector is highly internationalised and strongly concentrated in all the four countries examined - Austria, France, Germany, and the UK. Nevertheless, policy reform is unlikely to follow a universal route, since the development of IT services has been strongly shaped by its interaction with each country's specific national employment model. The article investigates three employment challenges, namely the country system of skill formation, forms of collective employee and employer representation, and patterns of worker mobility and use of non-standard employment contracts. While important, national employment models do not determine the character of the sector and the paper identifies several points of tension and contradiction that raise questions about the future sustainability of knowledge economy sectors.

Introduction

The successful experience of the USA in so-called 'knowledge economy' sectors has led scholars and policy bodies to argue that, due in part to overly strict employment protection legislation, the European social model developed for the industrial society may be inappropriate for the knowledge economy. According to this view, the nurturing across Europe of distinctive manufacturing models for competitive

advantage has been effective. But in a future scenario of international competition in the high value-added markets of service provision, and dynamism in knowledge economy sectors, what is now required, studies suggest, is a raft of more flexible labour market (and social security) policies that can establish the right mix of incentives for flexible career paths, investment in skills and risk taking by employers (see, for example, Saint Paul, 2002).

While policy reform and a strengthened commitment to investment in the types of skill and capital required for high-tech services sectors are undoubtedly needed in many European countries, it is open to question whether a one-best-way approach to labour market policy reform is appropriate. Inspection of the recent comparative, cross-national research on services sheds some light on the issue. The available evidence points to considerable cross-national difference in the organisation of services production models (Bosch & Lehndorff, 2005; Casper & Soskice, 2004; Grimshaw & Miozzo, 2006; Rubalcaba, 2007). Such studies emphasise the dangers of ignoring country-specific institutions and national economic conditions that shape the development of services production models and point to an important interaction with a country's employment model. The notion of an employment model that we utilise in this paper comprises several features: labour market regulation; employment protection; education and training; industrial relations; systems of social security; and active labour market policies. A comparative analysis of the successes of the US service model reveals its association with employment conditions characterised by long working hours and wide wage differentials, sustained by a combination of weak welfare services and a deregulated approach to the determination of pay and employment conditions. Such features fall outside the scope of what might be considered feasible policy options for most EU member states and call for further detailed investigation.

In the context of this ongoing debate about the relative vitality of European service production models, this paper investigates the character of the IT services sector in four European countries and its relationship with the respective national models of employment. Across Europe, the IT services sector is one of a bundle of knowledge economy sectors that are valuable sources of job growth and innovation, as well as providing beneficial intermediate inputs to other sectors (den Hertog, 2000; Miozzo & Grimshaw, 2006; Peneder et al., 2003). Despite much policy attention, especially within the European Commission, there is very little research on the degree to which the national employment models found across Europe can be considered an appropriate or inappropriate 'fit' with the development of successful knowledge economy industries. The central argument of this paper is that there is no single, or universal, development path for the IT services sector, since it is strongly influenced by its interaction the national employment model in its host country. While the sector shares certain common characteristics across countries, associated with strong growth, internationalisation, industry concentration and strategies of outsourcing and offshoring, within each country the associated employment challenges are refracted differently, owing to the specific roles and organisation of social actors (including trade unions, sector bodies, etc.) and features of the national employment model. As a result, the precise developmental path of the IT services sector is framed by its interaction with these country-specific institutions and conditions. At stake – an issue we take up in the paper's conclusion – is the degree to

which the prospective success and sustainability of knowledge economy sectors, such as IT services, is characterised by: a) a slowly adjusting 'fit' with its host national employment model; b) a clash between the rapidly changing conditions facing the sector and the characteristics of the national employment model; or c) a dislocation from employment institutions that over time contributes to the possible erosion or transformation of the national model.

The IT services sector is a highly internationalised knowledge economy sector, so our argument about the importance of the interaction with the host national employment model, if it holds good, is even more likely to apply to other, less internationalised, knowledge economy sectors. For other sectors, such as banking, insurance or transport, it is clear that their industrial and business history cannot be understood without analysing the role of the state and the influence of national systems of employment regulation. By contrast, in the international IT services sector, where large international firms compete in a global market for products, services and labour, we might expect to find fewer national discrepancies than in the older services sectors. However, the evidence (the comparative quantitative and qualitative data for four European countries on which this paper draws) suggests the contrary. In order to support our argument, we focus on three institutional variables – national training and qualification system, industrial relations and worker mobility – which provide an appropriate lens for investigating the influence of each of the four national employment models. Three particular employment challenges are investigated: first, how country systems of skill formation have adapted to changing demands in the IT services sector; second, how the traditional forms of collective representation by social actors (unions and employers) have been extended to the fast-growing IT services sector; and third, whether there is evidence of new patterns of worker mobility and/or use of nonstandard employment contracts in the sector.

In our research design, we followed the comparative methodological approach of the 'societal effect' school, associated with Eyraud et al. (1990), Maurice and Sorge (2000) and Marsden (1999). Each country team collected data through interviews with representatives of collective associations (such as trade bodies and professional associations), government and a small sample of IT firms. This 'meso level' approach has the benefits of shedding light on the sector-wide perspectives of the employment challenges arising from the development of the IT services sector in each country. Moreover, our selection of countries – Austria, France, Germany and the UK – covers a range of contrasting varieties of capitalism.

Our investigation makes three potential contributions to existing literature. First, much of the comparative systems literature has focused on manufacturing sectors, with little attempt to examine the socio-economic features that characterise diverse services sectors. Our analysis focuses on the interaction between features of a prominent knowledge economy sector and the character of each country's national employment model. Second, the literature on varieties of capitalism/business systems has integrated the employment-related issues of education, skill formation and training (Hall and Soskice, 2001; Whitley, 1999) to explain the way firms in key sectors develop competences in the context of particular national institutions. Nevertheless, there remains scope to explore other employment-related variables, especially recruitment, wage-setting and career paths. This paper investigates these issues using a methodological approach that privileges

the role of key social actors in the sector – those representing the collective interests of employees and employers, as well as others with responsibilities for shaping HRM practices. Third, we build on the arguments of other studies that critique the tendency of the varieties of capitalism literature to over-emphasise the static diversity of country systems at the expense of pressures for homogeneity arising from the growing presence of powerful multinational firms (Djelic & Quack, 2003). Since the IT sector is dominated by a small number of US multinationals in all four countries studied, our data collection included interviews with representatives from these organisations and we consider their responses and strategies in the context of a changing host country employment model.

The paper is organised as follows. The first section details the characteristics of the IT services sector in the four selected countries. The second summarises the method of research and includes details of interviewees. The third analyses the data and identifies three key tensions between employment organisation in the sector and institutions associated with the national employment model – the challenges for organising vocational training, the adaptation of industrial relations features and patterns of worker mobility. The final section concludes the paper by assessing the dynamic relationship between changing economic and organisational conditions at the sector and national levels.

Characteristics of the IT services sector and the significance of its internationalisation

Before examining the distinctive linkages between national employment models and sectoral development, it is necessary to set out the principal economic and business characteristics of the IT services sector that are to some degree shared across all four countries. The types of IT services activities provided by firms in each of the four countries are very similar and can be grouped into nine distinctive activities.

The first of these is systems consultancy, which covers a broad range of functions including drawing up specifications; carrying out technical, financial and strategic audits; designing information systems and project management. The second is software packaging, which includes the marketing of groups of programs developed to perform computerised functions that are more or less distributed. The third is systems engineering, which includes the design, production, installation and customisation of computer systems. The fourth activity type is system integration, which includes the design and installation of complete systems using heterogeneous elements derived from different suppliers. The fifth category is technical assistance, which involves qualified engineers, analyst programmers and specialists. The sixth involves services and networks with added value, including providing user access to server centres for the retrieval of software resources, data and information. The seventh is information systems outsourcing, which involves taking charge (fully or partially) of the customer's IT function and managing it as part of a long-term relationship; eighth, maintenance, an activity that is primarily concerned with providing third party software maintenance, including making modifications required by a customer as a result of

legislative, technical or organisational changes. The ninth and final activity is training. This includes needs analysis and the design of training projects as well as training and performance measurement.

Across all four countries the IT services sector has developed from a ‘new economy’ sector during the 1980s to a mature sector by the mid-2000s. The number of persons employed in ‘computer and related activities’ (SIC¹ 72) has also been growing; country trends for the period 1999-2005 include a rise from 27,684 to 47,898 workers in Austria, from 262,097 to 348,575 in France, from 349,000 to 395,901 in Germany, and from 507,216 to 584,815 in the UK (Eurostat LFS data).

It should also be noted that the organisation of the IT services industry is highly concentrated and internationalised in each country. While the IT services sector includes a very large number of small and medium-sized firms in all four countries, a few very large multinational firms play a dominant role. For example, according to an industry report (PAC, 2003), the leading firm, IBM, alone accounted for around 8% of the European market for software and IT services in 2001. The top five firms controlled more than one fifth of the market, and the top 20 accounted for close to half (PAC, 2003). National evidence confirms this high concentration and suggests it has increased considerably in recent years. In France, for instance, the market share of the top 10 firms grew from 31% in 1995 to 43% in 2006. In each country, the leading firms are typically subsidiaries of US-owned multinationals. In 2007, the top three firms in Europe were all US-owned (see Table 1).

Table 1: Leading IT firms in Europe and country coverage, ranked by size of worldwide workforce (2007)

IT firms	Employees worldwide	Countries covered	Country of origin
IBM Global Services	190 000		US
Accenture	180 000	49	US
EDS (HP/ EDS)	130 000	57	US
Cap Gemini	83 500	32	France
Infosys	72 200	43	India
Wipro	72 000	25	India
SAP	51 400	50	Germany
Sema (Atos Origin)	50 000	40	France
CGI	27 000	16	Canada
Steria	18 000	16	France

Source : analysis by the authors, based on the companies’ annual reports (2007)

Another characteristic of the sector is the strong role of intra-country outsourcing in market expansion and the establishment of inter-country linkages with overseas IT firms (captive, joint venture or independent foreign-owned firms) through the offshoring of IT functions. The IT outsourcing market developed rapidly in Europe

¹ Standard Industrial Classification category

during the 1990s and by 2002 accounted for 28% of the total market for software and IT services in Europe (Miozzo & Grimshaw, 2005; PAC, 2002). Similarly, the cross-country offshoring market has grown quickly, up to an estimated €15.5 billion by 2005. The development of these markets is significant because they shape, and are shaped by, features of both the business system and the employment system (Grimshaw & Miozzo, 2006). Large outsourcing contracts (typically over \$100 million in value) generate a strong competitive advantage for multinational firms, thus reinforcing industry concentration. Also, intra-country outsourcing typically involves the transfer of IT professionals from client organisation to IT firms, raising questions about inter- and intra-organisational career paths, union representation and job insecurity (Grimshaw & Miozzo, 2009). Cross-country offshoring of IT services is widely perceived as presenting a serious threat to both levels and quality of employment in the sector, raising concerns about the position of IT firms in developed countries in the global value chain and the adverse knock-on impact on demand for low and intermediate skills (for a recent study on Europe see Crinò, 2007).

Comprehensive data on offshoring that enables a comparison of offshoring of IT services across countries does not exist (UNCTAD, 2009:75). National sources nevertheless provide some clues². In the UK, 12-15% of the total value of the software and IT services market is estimated to have been offshored in 2004. Revenues for India, the leading location for UK offshoring³, grew from £3 billion in 2000 to £8 billion in 2003. In France, a report from McKinsey (2005) estimates that between 2% and 6% of IT jobs have been offshored. In Germany, industry representatives claimed that offshoring was still not a common strategy; nevertheless, this was expected to grow, from an estimated €10 billion of IT services offshored in 2003. Evidence for Austria, too, suggests that 'nearshoring' practices have increased since 2003. International harmonised data collected by UNCTAD show the UK, France and Germany among the leading economies with foreign direct investment related to IT services (customer contact centres and shared service centres), accounting for approximately one sixth of all such FDI projects in the world during the period 2003-08 (UNCTAD, 2009: Table III:11).

The formation of new forms of global production networks (Lane & Probert, 2008) is also a characteristic of internationalisation in the IT services sector. This can involve the use by large IT firms of strategies of 'hidden offshoring' (Berrebi-Hoffmann et al., 2009). One strategy is the acquisition of local firms in order to facilitate an integrated production chain from conception to sales, exemplified by Cap Gemini's acquisition of the Indian firm Kambay. A second strategy is the creation of subsidiaries and local offices with responsibility for local recruitment policy (as occurs in the case of SAP, for example). A third type of hidden offshoring involves creating alliances, as IBM and Steria, for example, have done in recent years (Berrebi-Hoffmann et al., 2009).

Together, these four characteristics suggest considerable pressures for common development of the IT services sector in Europe. We know, however, from previous comparative research on the service sector, that the national employment model can

2 As described in the research method, the data are sourced from national research reports: Donnelly et al. (2006), Gerlmaier (2006), Hermann and Flecker (2006) and Berrebi-Hoffmann et al. (2006).

3 80% of offshoring around the world is located in India. The other countries to which IT activities are offshored include the Philippines and China.

exert a strong influence on both the mix of service sector activities and the nature of development of a particular service activity (Bosch & Lehndorff, 2005; Casper & Soskice, 2004; Grimshaw & Miozzo, 2006; Rubalcaba, 2007). A 'sectoral systems of employment' approach is therefore potentially helpful for exploring the dual influences relating to the distinctiveness of a country's national employment system on the one hand and the business and employment challenges of a given sector on the other. For this reason, our research method was designed to pay attention both to the national employment model and to the sector, as we describe in the next section.

Research method

The data on which our analysis was based were collected as part of a systematic, cross-national comparative study that aimed to identify the challenges for national employment models posed by changing conditions in a selection of sectors of economic activity. This wider three-year project⁴, involving nine countries, selected a range of sectors for investigation based on a judgement that each sector could illuminate two or three key issues of concern for European employment policy and practice. The IT services sector was selected in order to explore employment challenges related to fast job growth, new skills for the knowledge economy and internationalisation of economic activity.

At the initial stage of the project, round-table discussions among country participants were organised in order to select smaller groups of countries for comparative research into each sector. Each country team was requested to select three or four particular sectors for investigation on the basis of an informed hypothesis, or empirical observation, of trends and policies in the given sector in their country. For the IT services sector, four country teams successfully defended a bid to be included in this research: Germany, on the basis of its well-received adaptation of the dual system for IT apprenticeships; Austria, following the introduction of a new sector-level collective bargaining agreement for the sector; France, because of the growing role and influence of its multinational IT firms, Cap Gemini and Sema; and the UK because of its new commitment to vocational training in IT and new joint employer-university degree programmes. The choice of countries also had to fit with the wider project objective of comparing distinctive national models of employment, as characterised in the varieties of capitalism literature and subsequent developments (Bosch et al., 2009; Hall & Soskice, 2001; Hall, 2007; Hancké et al., 2007; Schmidt, 2003; Whitley, 1999). This did not require a selection of countries to fit all possible types of models, largely because the debate about how many 'types' prevail is ongoing. Rather, the intention was to select countries that were sufficiently diverse to make it possible explore broader issues about how sector developments compare and contrast across two or more models of employment. The four countries selected for this research fitted well with this objective: Germany and Austria as 'coordinated market economies', France as a 'state-led' variant, and the UK as a 'liberal market economy'.

The focus of the research was defined and fine-tuned through preliminary discussions amongst the four country teams, building on expert knowledge of the sector and reviews of the literature, as well as linking with the broader objectives of

⁴ The DYNAMO (Dynamics of National Models of Employment) project is a concluded project funded under the EC's Sixth Framework Programme for research and coordinated by Gerhard Bosch and Steffen Lehndorff at the Institut Arbeit und Qualifikation (IAQ).

the DYNAMO research project. This resulted in a focus on three variables that both highlight the distinctiveness of the country sample and provide a lens through which developments in the IT services sector can be explored. Moreover, the three variables shed light on the possible evolution of each country model in response to three key employment challenges. An analysis of the first variable, the country system of skill formation, makes it possible to address the national policy challenge of how to adapt to a knowledge economy in terms to new technologies, skills and qualifications. Analysis of the second variable, the industrial relations model can shed light on the question of how to reform the traditional roles and strategies of national institutional actors in a highly internationalised sector. Finally, an analysis of patterns of worker mobility can lead to an improved understanding of the dynamics of labour markets, and contribute to the development of new career patterns and models of participation.

Each of the four country teams collected data during 2006 and produced a national report on IT services.⁵ Each report also included an analysis of available secondary data related to employment trends (including education and training), industrial relations (key social actors in the sector), market activity (especially industry concentration and character of multinational IT firms) and country-specific features of the IT services sector. Typically this involved the analysis of national Labour Force Survey data, reviews of press and trade reports (including reports from consultancies such as Pierre Audoin Conseil and Ovum), as well as academic research published in refereed journals.

This method of research was designed to facilitate a consistency of approach across each country yet also to be sensitive to country-specific peculiarities in the way the IT services sector operates. The principal organising rule for the research design was to focus on key actors with roles or positions of influence in shaping the sector whilst also taking a snap-shot view of the challenges facing small and large firms in the sector. In other words, the method targeted the meso level of the economy rather than conducting in-depth firm-level case studies. A limitation of this research method is that it does not capture the full range of challenges facing IT services firms and, in particular, does not account for possible conflicting points of view among managers and employees within a single firm. The benefits of a meso level approach, however, include the wide lens adopted in data collection, enabling the incorporation of a large variety of perspectives, as well as an understanding of the strategic importance of key actors interviewed.

In each country, a first round of interviews was undertaken with representatives of the main collective associations present in the IT services sector – employers' associations, trade bodies, professional associations and trade unions. A second round involved contact with government representatives responsible for overseeing the sector (typically for issues related to skills and innovation). A temporary work agency was included in the list because of issues relating to freelance work in the sector. And finally, each country team contacted HR managers in a selection of IT firms, both small and large, and both domestic and multinational, to take account of the company perspective.

5 These four reports are listed in the bibliography: Germany (Gerlmaier, 2006); Austria (Hermann & Flecker, 2006); France (Berrebi-Hoffmann et al., 2006); and the UK (Donnelly et al., 2006).

Analysis

In the context of the economic and business characteristics described above, this section assesses the employment challenges posed by the IT services sector in each country and explores the particular tensions between sector dynamics and country model, informed by the three research questions set out in the introduction in, namely: how have country systems of skill formation adapted to changing demands in the IT services sector? have the traditional forms of collective representation by social actors (unions and employers) been extended to the fast-growing IT services sector? and, is there evidence of new patterns of worker mobility and/or use of nonstandard employment contracts in the sector?

National skill formation systems and firms' recruitment strategies

All four countries have made efforts in recent years to adapt their systems of vocational education and higher education to anticipated changes in the demand for skills in knowledge economy sectors. In the two countries with the most strongly developed national systems of vocational training, Germany and Austria, we find highly reputable institutions for training apprentices in IT skills.

In Germany, following a successful adaptation of the dual system, achieved through cooperation between employers, government and unions, apprentices can now gain one of four IT-related qualifications that require training on-the-job supplemented by attendance at a vocational school one day a week. After successfully completing three years of this training, apprentices can qualify as a system electrician, an IT system integration specialist, an IT support officer or an IT system officer. The training allows for the acquisition of specialised skills relevant to the sponsoring firm, as well as general skills in project management and team-building, thus responding to employers' demands for greater freedom to determine the content of the work-based training element. In line with market conditions, the numbers of apprentices increased rapidly during the late 1990s (reaching an annual peak of 25,000) and have since levelled off at around 18,000.

Similarly, in Austria, where vocational training for IT skills is also well developed, we find a first level consisting of apprenticeships that combine on-the-job training with attendance at vocational colleges and a second level based on 5-year vocational college courses with a specific focus on IT.

The UK is quite different. It has relatively weak institutions for vocational training in the IT sector, mirroring the national picture of limited provision and poor reputation. Nevertheless, it has witnessed two significant attempts at renovation in the form of the modern apprenticeship (since 1995) and a new Sector Skills Council covering 'e-skills' (since 2003). Advised by a consortium of employers, e-skills has published a Sector Skills Agreement and set up new Skill Programmes. These include a new national IT Diploma for students aged 14 to 19, which integrates existing modules from secondary school qualifications, foundation degrees and modern apprenticeships.

Similar efforts are also under way in France where social actors in the IT sector have negotiated the establishment of a specialised vocational qualification (the so-called CQP, *Certificats de Compétence Professionnels*).

Thus, from different starting points, all four countries have strengthened vocational training in IT skills. However, our evidence suggests a striking dichotomy between these policy efforts and the increasingly marginal role of apprenticeships and other qualifications for intermediate level skills in the large IT firms. Increased internationalisation of the production chain, combined with growth in the business services market for IT, appears to have changed employers' attitudes in each country concerning the most appropriate skill-set for new recruits (Table 2); although further research is required to substantiate this claim.

Table 2: National skill formation systems and changing recruitment practices of large IT services firms

	Austria	France	Germany	UK
Intermediate skills	Well developed VET involves level 1 (apprenticeships) and level 2 (5-year college) Limited interest from employers	Weak, but new effort by social partners to establish a new vocational qualification Declining interest from employers	Well developed (and enhanced) 3-year training in 1 of 4 IT qualifications (dual system) Strong, but declining preference from employers	Weak, but new effort to enhance apprenticeship system through Sector Skills Council Limited interest from employers
Graduate level skills	Large investment in universities of applied sciences; introduction of university bachelor degrees Strong employer preference	Rise in number of IT graduates and introduction of many new certificates, especially at the BA level Very strong employer preference	Large rise in number of IT graduates Strong employer preference	Large number of IT graduates, but steady decline in recent years; several new degrees sponsored and co-designed by IT firm Very strong employer preference

Note: data for employer preferences derive from interviews with a small sample of IT services firms in each country as detailed above.

The preference for hiring individuals with two years of technical or vocational training, or investing in apprenticeship training, has declined significantly. For example, Austria registered only 316 apprenticeships in the software sector in 2001 and, among these, most focused on sales and administration skills rather than IT. Also, secondary data drawing on a survey of HR managers of large IT firms in Austria suggests limited interest in hiring workers with completed apprenticeships from other firms. France is another example of a country where the late 1990s saw extensive efforts by the government to develop specialist IT courses in technical colleges (at a Bac+2 level), only to witness a declining demand for such qualifications by the early 2000s. And, albeit to a lesser extent, shifts in recruitment practices were also evident from case

studies in Germany; employers were hiring from further up the qualification job queue, displaying an increasing preference for applicants with university or applied science college diplomas in computer science or information systems. These recruitment practices have transformed the pattern of the sector since the 1990s, when IT firms were forced to widen their selection criteria as demand outpaced the supply of applicants with IT skills, especially during 1998 and 1999.

Now, the already strong preference for hiring highly educated applicants has intensified, with IT firms increasingly aiming to recruit people with formal qualifications from higher education. In France, the few job opportunities that were available during the 2001-03 slump largely benefited only graduate applicants (Bac+4) or those with even higher qualifications. In Germany, interviews with sectoral representatives suggest that firms have become more careful in their selection criteria, especially regarding the level of formal qualifications. And in the UK, a survey conducted in 2005 by the Sector Skills Council for IT services found that 53% of hires to IT jobs were graduates, compared with just 9% who had A levels or equivalent.

While this trend does not fit with country efforts to fill gaps in the supply of intermediate skills, it does fit with efforts to expand higher education provision (see Table 2). Country trends and starting points differ. The UK has the highest number of IT graduates, reflecting the massive expansion of the higher education sector in the last decade, but numbers have declined in recent years. In Austria and Germany, numbers of IT graduates have been rising, albeit from a lower level compared to the UK; in both countries the incidence of higher education among IT workers is higher than for all workers. In France, numbers of IT graduates have also been rising. One reason is that, after 2000, initial training was strongly developed at all higher education levels at Bac+3 (*licences professionnelles*) and Bac+5 with engineering schools specialised in computer science or more general courses.

There are notable features of both firm strategy and country variety underpinning the rising prevalence of graduates in the sector. Data from interviews with multinational firms suggest that there has been a shift in the organisation of recruitment from national to regional centres. For example, SAP organises recruitment for its European branches from a single central recruitment unit based in Prague. This is said to enable the profiling of jobs into 'national' and 'international' types, reflecting the degree of required geographical mobility. It also facilitates market access to new graduates from Eastern and Central European countries, typically at lower labour cost (Berrebi-Hoffmann et al., 2009). National variation is evident in the type of graduates recruited. It is notable that firms in the UK are more likely to recruit graduates with a non-IT related degree than an IT degree; in 2003, 55% of the 8,300 graduates who entered the IT workforce held non-IT degrees. Interview data suggest that UK employers hire non-IT specialists as a means of acquiring employees with particular personal skills, aptitudes and intelligence.⁶ This trend is reflected in the development of new university courses (such as 'IT Management for Business') designed to reflect employers' demands for a mix of business knowledge and leadership skills, with a strong IT foundational expertise.

6 For example, the Director of Operations at the Sector Skills Council, e-skillsUK, stated: 'We're getting lots of graduates out of IT degrees, but a lot of them aren't going into IT jobs. ... But at the same time, employers are saying, "Well, actually we'll quite happily take graduates from Arts degrees because they have a lot of qualities we want".'

National industrial relations systems

The second issue we addressed in our research concerns the adaptation of industrial relations systems, especially the organisation of collective social actors – representing employers and employees – in the IT services sector. In three of the countries we investigated, the organisation of trade bodies and industrial relations mirrors that of the wider national model (see Table 3).

In France, the IT services sector is covered by the Syntec collective bargaining agreement. Reflecting its high national coverage, the IT services sectoral agreement is strongly inclusive. Estimates suggest that 550,000 employees are protected by it, including 80% of data processors and 60% of engineers and managers in the sector. A wage scale provides the principal reference for firms for defining qualifications, the wage rate and job ladder, despite the fact that internal pay is set at the firm level.

A strongly inclusive system of collective bargaining is also evident in Austria where a new sectoral agreement was set up in 2002 after years of dissatisfaction with the former arrangement. This had bundled IT workers into a broader category under craft and trades agreement, which did not provide the flexibility to set pay in line with the IT labour market. While unions and employers alike consider the new agreement to be 'modern', it led to conflicts within the union because it drastically diminished the principle of seniority, reducing the number of pay bands to just three, compared with the fourteen different bands that were distinguished in the broader agreement for craft and trades.

In the UK, collective bargaining is very limited – but this again reflects the national picture, which has seen a collapse of collective bargaining in the private sector – and there is extensive use of individual wage bargaining. HR managers in large IT firms typically collect market-rate data to set wages using surveys of IT firms. In the market for IT consultants, conditions were described by HR managers as 'aggressive' and payment of market rates caused considerable disturbance to internal pay structures – not only because new recruits might be paid more than comparable incumbents, but also because it was frequently necessary to increase the pay of incumbents to guard against the threat of poaching. Individual wage-setting also plays a relatively important role in the IT sector in Austria, although, unlike in the UK, they are generally underpinned by collectively agreed rates.

Germany is unique among the four countries studied in that the industrial relations arrangement in the IT services sector does not mirror the national scenario. While there has been adaptation in Austria, in Germany there is no specific collective bargaining agreement for IT firms. The primary reason is the absence of an encompassing employers' association that wishes to negotiate with trade unions, along with a very low trade union presence among IT workers. Nevertheless, like the pre-2002 situation in Austria, other sectoral agreements do provide protection for some IT workers. Thus, the IT services sector can be portrayed either as looking dissimilar to the broader German model or as marking a radical new trend in collective bargaining coverage in a fast-growing sector. This new model is characterised by pockets of strong coverage in some large firms with works councils and very limited protection in the many small and medium-sized firms.

Table 3: Trade bodies and industrial relations in the IT sector

		Austria	France	Germany	UK
Trade associations/ Chambers of commerce		Chamber of the Economy 100%; membership (compulsory); Negotiates collective agreement.	Syntec Informatique chamber; Very high membership; Functions include promoting interests and public image; providing market data.	Spitzenverband der Deutschen Software-Industrie; Bundesverband Informations-wirtschaft, Telekomm-unikation und Neue Medien; Arbeitgeberverband der Metall- und Elektro-industrie. High membership. Lobbies government and negotiates collective agreement.	Intellect Trade Association; Moderate membership; Functions include lobbying government; publishing best practice guides.
	unionisation	Low to average	Low	Low	Low
	works councils	Strong links with unions.		Strong links with unions.	None
	collective bargaining	Inclusive; Strong coverage of sectoral collective agreement; some use of individual market supplements.	Inclusive. Strong coverage of sectoral collective agreement	Exclusive. Patchy coverage under other sectoral agreements	Exclusive. Very limited coverage of collective agreements; strong use of market rates.

Adaptation between the sectoral and national models also generates new contradictory tensions. On the one hand, the strong presence of US-owned multinationals in the different national markets acts as a pressure against unionisation and the practice of collective bargaining (see Colling et al., 2006). On the other hand, however, these same global IT firms also depend on the IT outsourcing market for growth and this is accompanied by transfers of many hundreds of IT workers, often with union representation and protected rights to collective bargaining (under European TUPE

legislation⁷). In the UK, as well as Germany and France, where the outsourcing markets are relatively important, project management skills and business expertise in applying IT systems in client organisations in the manufacturing, banking, retail and government sectors are highly valuable for the IT firm. Transferring staff from the client saves the IT firm from having to invest in training, not to mention the costs of advertising new posts, recruitment and selection (Grimshaw & Miozzo, 2009). It also provides expertise in new client markets where future outsourcing contracts can be won. However, an unintended consequence of this practice has been to establish new opportunities for trade unions to mobilise in previously non-union workplaces. For example, while IBM is renowned for applying its US non-union ethos to UK operations wherever possible, success in the UK IT outsourcing market has required it to accommodate trade unions in some transfers of IT staff. This means, for example, that IBM must negotiate a collective bargaining agreement with groups of staff who transferred from the public sector, or a unionised bank, as part of outsourcing contracts.

Career paths and further training

Our third field of research enquiry concerns patterns of worker mobility in the IT services sector, and the associated uses of further training and non-standard employment contracts. Again, our focus was on the extent to which broad country models (Marsden, 1999) are useful characterisations of forms of skill development and job mobility among workers in the IT services sector. It is possible that the 'knowledge economy' features of the IT services sector might erode country differences, as IT workers seek to develop 'professional team careers' where commitment to particular employers is valued less than accumulation of technical expertise and contribution to project success, leading to inter-firm mobility and the development of publicly certified skills (Whitley, 2003:675). So-called 'boundaryless careers' may also herald a decline in the use of standard employment contracts and the rise of self-employment or freelance status among IT workers (Arthur & Rousseau, 1996).

The data, summarised in Table 4, suggest resilience of country variety in career patterns, rather than the emergence of a distinctive knowledge economy type model where all countries might witness individual firms and workers assuming greater control over skill development and career moves. Regarding provision of further training, Germany is especially notable for the recent reforms that have considerably strengthened its sectoral framework for organising further training, in line with the country model, and maintained its relevance and reputation among IT employers. Social partners initiated reforms of the further training system in 1999 and developed a new institutional framework – the APO-ICT skill matrix, developed by the Federal Institute for Vocational Training (*BiBB, Bundesinstitut für Berufsbildung*). Operationalised in 2002, qualified apprentices could enter one of 29 defined specialist profiles and progress further in programmes for operational professionals, equivalent to university degree level (eg a

⁷ The Transfer of Undertakings (Protection of Employment) Regulations (TUPE) preserve employees' terms and conditions when a business or undertaking, or part of one, is transferred to a new employer. These regulations resulted from a series of EC directives on transfers of undertakings, including the Acquired Rights Directive (77/187/EC), the Acquired Rights Directive (98/50/EC) and the Acquired Rights Amendment Directive (2001/23/EC).

certified IT business consultant) and, in strategic professions, equivalent to Masters level (eg a certified IT business engineer).

Table 4: Further training, employment contracts and worker mobility in IT services

	Austria	France	Germany	UK
Firm provision of further training	Weak sector framework (social partners audit firm practices); strong commitment by firms.	Firm-led system; high firm spending (2-5% of wage bill), but does not deliver new qualifications.	Strong sector-wide framework; reforms simplified and formalised further training; high employer commitment, but financial constraints.	Firm-led system; investment in initial training for new graduate recruits.
non-standard employment contracts	Above-average (approx. 25% self employed/freelance)	Limited (approx. 10% self employed/freelance)	Average (approx. 20% self employed; limited use of freelancers)	Average (11-15% self employed)
Inter-firm job mobility	Limited	Extensive		Extensive

Unlike Germany, IT employers in Austria play a relatively autonomous role in delivering further training. Nevertheless, individual firms are strongly committed; the subsidiary of one large multinational firm, for example, delivered 2-3 weeks of further training to its workforce annually. Moreover, to counter against a too fluid labour market, Austrian IT employers often require employees to commit to remain with the firm for three years after completing the training, or pay penalties. Also, the Austrian case is not entirely firm-led, since there is some coordination of firm practices; all further training is monitored - as part of a new agreement by social partners (the Chamber of the Economy and the Private Employees' Union) - by a committee that audits training programmes and issues certificates. This can be interpreted as an effort to reinforce social partner influence in an otherwise unregulated and firm-led system of further training.

IT employers in the UK and France operate relatively independently. In both countries, IT firms have a strong commitment to further training. In the UK, IT firms invest considerable funds in training graduates, especially those recruited with a non-IT university degree (see above). In France, IT firms spend an estimated 2-5% of their wage

bill on training. However, unlike the German and Austrian approach, French firms tend to target training on the already qualified and do not generally seek to build new skills or qualifications; there is very limited use of such funds for upgrading new recruits who wish to further develop their skills (Bac+2 level).

The resilience of country differences in further training within firms is to some extent associated with differences in use of standard or contingent employment contracts and patterns of job mobility. In France, for example, the disinclination among IT employers to invest in formal programmes of further education may in part reflect the surprisingly high level of turnover among new recruits, despite the limited use of contingent employment contracts. During the period 2000-02, nearly three out of four employees (73%) in the IT sector had less than five years seniority within their company, up from 59% in 1994-96. Case study interviews suggest the large firms are increasingly perceived as 'rights of passage' for young graduates.

Neither Germany nor Austria display an emerging shift to inter-firm career networking and extensive use of freelance contract labour. In Germany, 80% of workers in the IT sector are employees and approximately 20% have self-employed status, compared to a rate of 18% for the economy. In both countries, while freelancers might have been utilised more during the 2000-01 boom, they were the first victims of job cuts post-2001, especially those without specialist skills. Moreover, where they are still used they tend to be no longer integrated into project teams, but instead hired for highly specialist tasks or to meet occasional peaks in workload. The UK also does not fit with stylised accounts of a networked, mobile IT workforce. The proportion of self-employed workers is very close to the average for the economy – Labour Force Survey data for 2009 reveal shares of 15.5% and 11.1% in the computer programming industry and the information services industry, respectively, compared to a national average of 15.2%⁸. Moreover, the position of freelance, self-employed workers is supported by a range of organisational and institutional networks that provide a degree of income stability. Temporary work agencies, such as Hays IT, manage IT firms' demand for temporary placements. Also, the UK has witnessed the proliferation of hundreds of specially established 'umbrella' companies (typically small accountancy firms) that manage the contract details for the freelancer with the IT firm.

Discussion and conclusion

The rapid expansion of the knowledge economy sector of IT services in Europe is, on the one hand, characterised by several common trends constitutive of a sectoral model. On the other hand, however, our analysis of four countries also demonstrates significant inter-country variety in the organisation of employment, largely resulting from diversity in the role of social actors and initiatives deriving from a given set of national institutions. Given these findings, this section addresses the issue of compatibility and adaptability of the country employment systems with conditions and new challenges associated with the IT services sector.

Three characteristics of the IT services sector are shared to a large extent across countries. First, there is a common trend in employment growth and a similar workforce

8 The data refer to the third quarter of 2009. The industry codes are 62 (computer programming, consultancy and related activities) and 63 (information service activities) as defined in the LFS classifications for 2009.

profile. Also, in each country the typical IT worker is a highly qualified young man with an apparently weak interest in joining a collective association such as a trade union or professional association. Secondly, there is a notable similarity in pressures for work flexibility. Common features of the employment relationship in the IT services sector include long working hours, limited holidays, blurred frontiers between private life and work, a requirement for geographical mobility and constant demands to update and renew technical skills, as well as possibilities of switching from one sector to another. These features do not necessarily imply flexibility of employment contract since, against expectations of the so-called knowledge economy model, in three of the four countries the dominant form involves a full-time, open-ended contract. A third common characteristic is the strong internationalisation of the sector. In each country, the same international firms – mostly US-owned, but also Japanese, German and French – are dominant, and, since the 1990s, mergers and acquisitions have reinforced the market shares of the ten leading firms. Related to this, as Berrebi-Hoffmann et al. (2009) show, the growing domination of the US norm of quality (Capacity Maturity Model Integration) at the expense of the French (ISO) and British (BS) norms is very likely to increase the pressure for convergence in work and business organisation in the sector in coming years.

Despite the strength of common sector pressures, our research suggests that there are important areas of inter-country diversity that reflect a strong influence from the national employment model (see Table 5). The evidence indicates, for instance, that the German IT labour market has inherited several features of the national model, especially in the field of vocational training, following successful reforms of both the IT apprenticeship programme and the coordination of further training. In the UK, weak and patchy collective bargaining coverage, strong use of market wage rates and flexible use of graduate recruits are to be found, in accordance with expectations. In France, the impact of the national model is visible in the weakness and division of the trade unions, along with the distinctive sectoral role played by the social partners as well as the role of the law in governing training expenditures. In Austria, IT firms are effectively integrated within the national industrial relations model, including the provision of a sector collective bargaining agreement and works councils.

While it is certainly the case that the IT services sector reflects particular features of the host country's employment model, it is nevertheless inappropriate to consider the sector simply as a lower level projection of the national model. As Table 5 illustrates, there are many areas where the influence is notably weak. In Austria and Germany, unionisation is lower than in other sectors; in Germany, works councils are less likely to be implemented; in the UK, freelance workers are over-represented; and in France, career paths are distinctively different from the traditional internal labour markets that prevail in large firms in other sectors. It seems, therefore, that the very different national employment models (especially with regard to employment law, industrial relations and systems of skill formation) are not the only, nor necessarily the most decisive, variable required to explain the character of employment and organisation of production in the IT services sector in any given country.

Table 5. The influence of diverse national models on employment in the IT services sector

	Influence of national model		
	Weak	Strong	Notable tensions
Austria	Above-average use of self-employed	New sectoral agreement for collective bargaining; Strongly developed VET ¹	A weakening of firms' preference for hiring intermediate qualified workers despite VET reforms
Germany	No specific sectoral agreement for collective bargaining; patchy coverage by other sector agreements	Strongly developed VET, which also extends to further training	Increasing use of graduates potentially conflicts with national investment in VET; Very weak enforcement of works council provisions
France	--	Full-time, permanent contracts are the norm; Divided, weak trade unions	High mobility of IT workers conflicts with traditional stability of internal labour markets
UK	Exceptionally high use of freelancers; Risk to job security posed by outsourcing and offshoring	Limited joint regulation of wages, with high use of 'market rates' and individualised bonuses; Flexible recruitment of expanding pool of graduate job applicants	Outsourcing and staff transfer brings unionisation to non-union US-owned IT firms; Firms' disinterest in vocational training conflicts with national policy efforts to extend and deepen vocational programmes

This gap between the explanatory power of country model variables and systemic features of the IT services sector (especially internationalisation and industry concentration) establishes a basis for tension and creates a dynamic of adaptation and change (Pontusson, 2005). In Germany, the main tension concerns the absence of any extension of the national industrial relations model to the IT sector. Only a third of firms – compared to an average of two thirds in other economic sectors – have a works council. Also, unlike other sectors, IT workers are not covered by a specific sectoral collective bargaining agreement, relying instead on patchy provision from other sector agreements. In Austria, the tension revolves firstly around the above-average use of self employed workers, which may reflect employers' desire to reduce the costs associated with the standard employment relationship, and secondly around the dichotomy between IT firms' preferences for recruiting graduate labour and the reform of national institutions of vocational training. In the UK, there is a tension between renewed policy efforts to extend and deepen

vocational training, with input from the main employers in the sector and new government investment on the one hand, and, on the other, the apparent disinterest among IT firms in recruiting people with vocational training and developing a pool of intermediate skills. The dominance of foreign-owned firms, which is especially notable in the UK, raises the question whether a stronger economic position of UK-owned firms in the sector would stimulate greater employer interest in contributing to a sector-wide initiative to improve workforce intermediate skills. Finally, in France, questions remain about how to manage the high inter-firm mobility of IT workers that is so distinctive to the sector, in contrast with the stability provided by traditional internal labour market structures.

These evident tensions fuel the dynamic relationship between changing economic and organisational conditions at the sector level and the adaptation and development of institutions at the national level. In all four countries, national actors (employers, the state and trade unions) have sought to reconfigure a set of socio-economic conditions, partly in response to key employment challenges posed by the rapid expansion of the IT services sector. In this paper we have analysed the challenges concerning vocational training, the role of collective representative bodies and patterns of worker mobility and identified evidence of pressures to align the sector with the national employment model. But in the context of a strong internationalisation of the sector – the presence of US-owned firms, trends towards offshoring and nearshoring, as well as an increasing reliance on the more footloose pool of graduate labour – the evidence in this paper also points towards a distinctive sector dynamic that generates several points of tension and contradiction with national institutions. Given the exploratory nature of our results, the issues raised merit further detailed investigation into this, and other, knowledge economy sectors, in order to understand more fully the challenges of changing skill needs, the roles of collective representative bodies and patterns of worker mobility.

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