Teleworking and Globalisation

Ursula Huws
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TELEWORKING AND GLOBALISATION

towards a methodology for mapping and measuring
the emerging global division of labour
in the information economy

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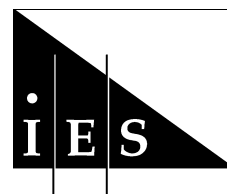Jagger N, Perryman S
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The Institute for Employment Studies

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Contents

Executive Summary

Cheap telecommunications, the spread of computing, and globalisation are creating major change in the location of work, within and between countries. No tools have yet been developed to investigate the new spatial employment patterns. This pioneering study is the first to bring a systematic comparative approach to measuring and mapping this emerging global division of labour in telemediated work, explaining national differences in the uptake of teleworking and developing a methodology for identifying the world's most favoured sites for particular activities.

Globalisation

There is a growing recognition that the globalisation process plays an increasingly important role in shaping work patterns. However, most literature on the subject is highly anecdotal, based on a few well-publicised examples. This study introduces a note of realism into the hype. Although in theory (when it comes to work involving the processing of information which can be delivered down a telephone line) it is possible for anything to be done by anyone anywhere, in practice choices are constrained by factors which vary according to the specific activity involved.

Using an innovative analysis of over 50 variables for 206 countries, this study uses cluster analysis techniques to group countries and identify their position in the emerging global division of labour in information-processing work. An exploratory study, it offers a conceptual framework for more detailed research in the future, and points to the indicators which might enable such an analysis to be carried out in a manner which is both systematic and rigorous and takes account of the qualitative, as well as quantitative changes taking place in the organisation and distribution of work.

Call centres

One of the most rapidly developing forms of delocalisation is the call centre. Concentrating a group of functionally specialised workers on a remote location with a telecommunications link to customers does not just bring about a relocation of employment within countries but also between them, with international call

centres constituting a growing proportion of the total. The growth in outsourcing and virtual call centres further complicates the geographical picture.

The large-scale relocation of telemediated work within countries, in order to serve the domestic market, mainly occurs in the developed world, but is expanding dramatically into a global phenomenon. The study concludes that its development in any given country is likely to run in parallel with general economic development, corresponding closely with the growth of domestic consumer markets and financial services, and also with the development of its telecommunications infrastructure.

Competition to attract international call centres (serving a customer base beyond national boundaries) is fierce. In addition to such factors as telecommunications infrastructure and labour costs, time zone and the language skills of the workforce play an important role. The report includes tables listing countries according to these factors.

Off-shore data processing

Companies based in developing countries have been outsourcing routine back-office work, such as data entry, to lower-waged countries since the late 1970s. However, this follows a different geographical distribution from call centre work, with language and communication skills playing a much smaller part, whilst other factors (such as low wage costs) become more critical. The study summarises the literature and examines the indicators most likely to be associated with this type of employment.

Software development

The rise of the export software industry in such countries as India, the Philippines, Russia and Bulgaria has drawn attention to the delocalisation of more highly-skilled information processing work. The new global distribution of work in this sector follows yet another pattern. Here, a good supply of highly skilled work, especially computer scientists, constitutes an important attraction, but by no means the only one.

The study includes a discussion of the complex difficulties of measuring trade in information products like software which may be delivered over the internet and are therefore not registered in the statistics in the same way as commodities which are physically transported across national frontiers.

National differences

This study isolates the factors associated with high and low rates of teleworking. Differences in national take-up rates of home-

based and mobile teleworking cannot be explained simply in terms of variations in the cost and availability of information and telecommunications technology; nor can differing sectoral and occupational structures provide a complete explanation, although this too may play some part. The study explores other variables including urbanisation, household size and structure, the national regulatory context and type of welfare regime and organisational culture, and assesses their impacts on the development of teleworking and the specific forms that this might take in any given national context. In combination, these factors appear to offer a convincing explanation of why, for instance, despite similar levels of economic development, home-based teleworking is more prevalent in Anglo-Saxon countries (*eg* Australia, Canada, the USA and the UK and in Scandinavia) than in other EU countries.

It also points towards indicators which will enable the growth of teleworking to be tracked in developing countries where it is beginning to appear, without yet reaching critical mass.

The teleworking workforce

The report includes an analysis of the results of the UK Labour Force Survey, currently the only such survey to include questions that keep accurate track of the numbers of home-based teleworkers and their characteristics at a national level. For the purpose of this analysis, teleworkers are defined as people who work at home or use their home as a base at least one day a week using both a telephone and computer.

- Five per cent of the British workforce can be defined as teleworkers.

- Of these, 68 per cent are male and 32 per cent female. Men make up only 56 per cent of the total UK workforce, so men are over-represented in the teleworking workforce.

- There are major gender differences in the place of work (*ie* between those who work at home and those who use their homes as a base). Forty-one per cent of female teleworkers work at home, compared with only 15 per cent of men, whilst over 59 per cent of male teleworkers (compared with only 33 per cent of women) use their homes as a base but work in a variety of locations.

- Teleworking is most likely in mid-career. Only two per cent of teleworkers are in the 16 to 24 age bracket (compared with 14 per cent in the whole workforce), and only 12 per cent aged 55 to 64 (with a further three per cent aged 65 or over). 32 per cent are aged 35 to 44 (compared with 25 per cent of all workers) and a further 29 per cent aged 45 to 54 (compared with 22 per cent of the total workforce). Twenty-two per cent of teleworkers and 26 per cent of all workers are aged 25 to 34.

- Nearly three-quarters of teleworkers (73 per cent) are married or living with a partner, compared with only 58 per cent in the workforce at large.

- Seventy-seven per cent of teleworkers work full time. As expected, female teleworkers are more likely to work part time than men (47 per cent, compared with 12 per cent of men).

- Fifty-two per cent of all teleworkers are employees, with 47 per cent classified as self-employed and the remaining one per cent as paid family workers.

- Nine per cent of teleworkers have disabilities, roughly the same proportion as in the workforce as a whole, with no significant differences relating to type of disability.

- The banking, finance, insurance and business services sector accounts for 34 per cent of teleworkers, compared with only 15 per cent of the total workforce.

- Teleworkers are more than twice as likely as other workers (23 per cent compared with ten per cent) to be in professional occupations, and considerably more likely (26 per cent compared with 16 per cent) to be managers, or associate professional or technical staff (18 per cent compared with ten per cent).

Economic development

In assessing whether economic development has occurred, it is necessary to consider qualitative indicators as well as quantitative ones. Even if large numbers of jobs are created, the value they add to the local economy will be limited if, for instance, they are very low paid, are temporary in nature, if they create health hazards, or if they bring no new skills or knowledge to the local community capable of being transferred to locally-owned enterprises.

Technologies enabling the new international division of labour bring an unprecedented 'shrinking' of distance in terms of immediacy of communication. This often produces a situation where workers may be in closer and more frequent 'virtual' contact with customers, managers, subordinates and co-workers located on other continents, than they are with their immediate neighbours in 'real' space, but with whom they have no telematic links.

A side-effect of this new situation is an unprecedented convergence in labour processes and working conditions between workers in different countries. If they work for the same transnational corporations, they may also find that these near-standardised working practices are also embedded in corporate cultures which are increasingly applied universally, no matter where they are based geographically.

Whether this represents an improvement or a deterioration in working conditions for the workers concerned will depend on what it has replaced, and what the available alternatives may be. The challenge to policy-makers is to identify the new opportunities opened up in any given national or regional context by these developments.

1. Introduction

1.1 The challenge

This study is a first attempt to do something which, to our knowledge, has never been attempted before: to measure and chart the new global division of labour which is emerging in what, for lack of a better term, we tentatively refer to as a 'telemediated information processing work'. Or, put more fashionably, to determine the extent to which the combined technologies of computing and telecommunications have actually brought about 'the death of distance',[1] a 'weightless world',[2] a 'connected economy',[3] or, quite simply, 'globalisation' in terms of the distribution of employment.

This is a formidably difficult task. Almost all the statistics and tools available to the economists and geographers and others whose business it is to plot trends in employment are rooted in the assumption that 'work' is something which takes place on a fixed geographical spot (normally the employer's premises) for a specified number of hours by a person with a contract which conforms to a recognisable and stable standard within the terms of national jurisdiction, and that 'trade' involves the exchange of goods and services in discrete and measurable transactions.

The 'informatisation' of economies, as Castells has called it,[4] has thrown all these assumptions into question. The convergence between the industrial sectors and occupations used in standard classification schemes and the emergence of new ones; the breakdown of the unity of time and space of the traditional

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[1] Frances Cairncross, *The Death of Distance: How the Communications Revolution will Change our Lives*, Harvard Business School Press, Boston, 1997.

[2] Diane Coyle, *Weightless World: Strategies for Managing the Digital Economy,* Capstone Publishing, Oxford, 1997.

[3] Christopher Meyer and Stan Davis, *Blur: the Speed of Change in the Connected Economy*, Addison-Wesley, 1998.

[4] Castells M, *End of Millennium: The Information Age: Economy, Society and Culture, Volume II*, Blackwell, Oxford and Malden, Massachusetts, 1998.

workplace; the multiplication of contractual arrangements with a blurring of the boundaries between 'employment' and 'trade' relationships; the increasing knowledge-intensiveness of traded commodities and the growing use of electronic media to transmit information products and services tracelessly across borders have rendered many of the old research methods redundant.

In the face of these changes, labour market researchers who rely on traditional methods find themselves suddenly helpless. It is as though we are entomologists who have been trained to study caterpillars. An armoury of methods has been devised for tracking their exact characteristics, rates of growth and movements. We might know, for instance, precisely which species tend to congregate on which types of plant, how long it takes them to get there, how high they can climb, how much they eat in an average day and so on. But suddenly (after a period of liquefaction and reformation inside a chrysalis) they become butterflies. No longer obliged to proceed, a footstep at a time, in linear fashion over physical surfaces, they can take off into a third dimension and fly in any direction, landing we know not where. The rules which enabled one to predict their movements no longer apply. How can we begin to map their progress and foretell their future distribution? Must we throw out all our old instruments? Or can they be adapted for these new purposes?

Before embarking on this ambitious project it is worth first asking why one should bother. As long as we know that change is happening, does it really matter to know the answers to such questions as how much? where? how often? how quickly? and how?

We would suggest that there are at least three immediate reasons why it is important to seek some accurate information about the new employment patterns:

Firstly, there is a need to inject a note of realism into the hype which surrounds such concepts as the 'cyber-economy', the 'information society' or globalisation. Whilst it is clear that some activities (such as designing software, or dealing by telephone with customer enquiries) are delocalisable, it is equally clear that others (such as building roads or preparing food) are not. Even when activities have been shown to be delocalisable, it is also clear that only some employers take advantage of this characteristic and actually relocate the jobs. In the midst of a rhetoric which sometimes appears to suggest that *all* work is now capable of being shuffled into cyberspace[1] it is necessary to ask such hard-nosed questions as: How much delocalisation is actually taking place? and where is it occurring?; What factors

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[1] We have discussed this elsewhere, in Huws U, 'Material World: the Myth of the Weightless Economy', in Panitch L and Leys C (eds), *Socialist Register*, Merlin Press, UK and Monthly Review Press, USA, 1999.

determine whether it takes place or not?; What form does it take?; and Which locations are chosen, and why?

Secondly, there are good reasons why policy-makers in any given country might wish to measure the extent to which traditional patterns of office-based employment are breaking down and work is being carried out remotely, either in the form of home-based or mobile teleworking or when whole functions are relocated to a different region. This information is important, *inter alia* to inform regional development policy, transport policy, environmental policy and urban planning policy, as well being necessary to predict future employment patterns and skill requirements.

Thirdly, without a means of tracking the movement of jobs across national borders it is extremely difficult to identify the opportunities and threats posed by globalisation or the specific competitive strengths and weaknesses of any given national economy. Such information is an essential prerequisite for the development of strategies to boost economic development, safeguard jobs and minimise social exclusion.

1.2 Towards an analytical framework

The 'end of geography', the 'borderless economy', the 'virtual enterprise'; these are just a few of the extravagant claims which have been made about the impact of information and communications technologies (ICTs) on work and organisational structure in the future.

The suggestion is a twofold one: first, that these technologies will dematerialise many human activities, so that an increasing proportion of added value will come from knowledge, rather than physical production; and second, that a high proportion of economic activities will become delocalisable which will lead, by the inexorable logic of the market, to their being relocated in the places where conditions are most favourable. Little hard empirical evidence has yet been put forward, however, to substantiate the case that either of these is taking place on any great scale. With a few exceptions, what evidence there is appears to be patchy and anecdotal; either derived deductively from the potentialities of the technology, or extrapolated from essentially qualitative case-study information.[1]

The word 'teleworking' is one of several which can be used to describe this process of delocalisation and it has been used in

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[1]   Huws U (1999), 'Beyond Anecdotes: On Quantifying the Globalisation of Information Processing Work', in Mitter S, Bastos M I (eds), *Europe and Developing Countries in the Globalised Information Economy: Employment and Distance Education*, Routledge, London and New York.

that sense in this report. In order to distinguish the types of work which can be relocated because of the introduction of ICTs from those which may be relocated because of other factors, we also make use of the term 'telemediated' work. When we speak of telemediated work, we mean work which involves the processing of digitised information (or, put another way, the manipulation of electronically recordable abstract symbols) and its transmission by means of a telecommunications link. Both terms are inevitably imprecise and neither corresponds exactly to any standard category already used in the collection of statistics. The word 'teleworking', in particular, is used in a number of different senses in the literature and requires some clarification if it is to be used as a descriptive or analytical tool.

In order to establish the extent to which the delocalisation of telemediated work is actually taking place it is necessary to have a working definition which is precise enough to be used in surveys or tested against the existing statistical indicators.[1] It must also be sufficiently universal to enable comparisons to be made between countries.

Because of the rapid introduction of ICTs throughout the world, accelerated in recent years by the deregulation of telecommuni-cations, sharp reductions in the cost of hardware and software, exponential increases in the memory and processing capacity of computers and the speeds at which data can be transmitted, and the development of wireless and portable technologies, the range of sectors and occupations affected by these developments is multiplying constantly. Any definition which relies on a fixed list of activities and occupations is bound to become out-of-date almost as quickly as it can be developed. Similarly, any definition which relies on the identification of particular forms of work arrangement is likely to be obsolescent because it is in the nature of telemediated work that new options in the organisation of work in time and space are constantly being opened up. It is, perhaps, the main effect of the introduction of ICTs not that any particular form of work organisation is brought into being, but that a range of new choices is opened up in terms of who does what work, where, when and how. Any attempt to codify these new forms of work by pinning them down once-and-for-all in time and space seems likely to miss the point: rather, it would seem useful to devise means to capture their diversity and gain enough insight into the dynamics of change to predict likely future patterns. In particular, it would appear to be a useful exercise to identify the factors influencing locational choice, in order to assess the contribution (negative or positive) which these changes are likely to make to local economies, including

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[1] Huws U, 'Remote Possibilities: Some Difficulties in the Analysis and Quantification of Telework in the UK', in *Telework: Development of a New Form of Work Organisation*, eds. Korte W, Steinle W, and Robinson S (eds), North Holland, 1988.

the numbers, characteristics and quality of the jobs likely to be created, or placed at risk in the delocalisation process.

In this report, we have attempted to provide a global overview of the available information on the extent and nature of teleworking throughout the world. In doing so, we have entered what is largely uncharted territory. There is now a very large literature on teleworking, but extraordinarily little of it has proved useful for our purposes. Not only are there enormous variations in the definitions used, but most of the research has been concentrated in a relatively small number of developed countries. Where research has been carried out in developing countries this has tended to be anecdotal, and to give little indication of the prevalence of the phenomena described. While it may be instructive, for instance, to know that a particular company has relocated a particular activity, and how and why this has taken place, this information does not tell us how typical that company is. If it is not typical, then it would be useful to know why the majority of similarly-situated companies have chosen *not* to relocate their activities in this way.

This almost complete lack of information for most countries has made it necessary to start from the beginning: assembling whatever data is available at all in a form which makes international comparison possible and then, in the light of the evidence from the technical and other literature, analysing it to see what meaningful information can be derived from it. This has inevitably involved a somewhat rough-and-ready use of whatever proxy indicators are available and must be regarded as laying the groundwork for more focused studies in the future, rather than as providing definitive answers. It is our hope that this pioneering groundwork may provide a starting point for more detailed studies in the future at international, national and sectoral levels.

Because of the very broad range of activities involved in teleworking and the very different methodological issues which arise in attempts to quantify and analyse them, in this report we have differentiated between three main categories of delocalised telemediated work:

1. Individualised teleworking, involving homeworking, mobile working or other forms of telemediated work carried out by individuals in isolation away from the traditional office environment: in other words, the dissolving of the boundaries of the traditional office. It is under this heading that these forms are discussed, in Part 2 of this report.

2. Teleworking involving the relocation of entire functions, or groups of workers to a remote site within national boundaries (including satellite offices, telecentres, national call centres *etc.*). These forms are grouped together under the heading 'the regional dimension' in Part 3 of this report

3. Cross-border teleworking, involving the relocation of work outside national boundaries, whether outsourced or carried

out internally by a transnational corporation. In this report, these forms of teleworking are discussed in Part 4, under the heading 'the global dimension'.

We recognise that this typology is somewhat simplistic and does not cover the entire range of possibilities. There is also some overlap between the categories. For instance, it is possible for individualised forms of teleworking to take place across national borders, whilst large-scale outsourcing might take place either within or between countries. It is perhaps in the very nature of the range of flexible options opened up by the new technologies that such multiple choices should be available to employers. Nevertheless, we believe that these categories cover the types of teleworking likely to be both the most important numerically and the most dramatic in their impact on working conditions, and consider this organisation of the material to be the one most likely to be useful to policy-makers (since it follows most closely the usual demarcations between departmental responsibilities).

The methodological issues raised in each case are discussed separately under these headings in the context of our research findings.

Our primary focus in this study is on the geographical distribution of telemediated employment, the factors determining this distribution, the numbers of jobs involved and their general demographic, sectoral, and occupational characteristics. There is a substantial body of literature, which we have summarised elsewhere,[1] on working conditions, social impacts, attitudes and other qualitative aspects of teleworking, nearly all drawing on experiences in developed countries, but, for reasons of space and clarity of focus, we have excluded such questions from this study.

We have, however, briefly summarised what little evidence appears to exist on the working conditions of teleworkers in developing countries. The reason for doing so is that in the context of economic development, qualitative issues are closely entangled with quantitative ones. In determining whether economic development can really be said to have taken place it is necessary to ask not only how many jobs have been created but also whether they have a long-term future; whether they produce technology transfer; whether they entail social or environmental costs; whether they transfer enough wealth to the local community through the wage packet to improve the overall standard of living and other such essentially qualitative questions.

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[1] See, for instance, Huws U, *The Best of Both Worlds,* ACAS, London, forthcoming; Huws U, *Teleworking in Local Government: Assessing the Costs and Benefits,* Local Government Management Board, London, 1999, and Huws U, *Teleworking: an Overview of the Research,* Joint publication of the Department of Transport, Department of Trade and Industry, Department of the Environment, Department for Education and Employment and Employment Service, London, July, 1996.

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We cannot pretend to have produced definitive answers to them in this study but we hope that we may at least have produced a starting point for further study.

2. Dissolving the Boundaries of the Traditional Office

The form of teleworking which has received the most attention (perhaps in part because it is the most socially visible) is the form, sometimes termed 'telecommuting', which involves the use of information and communications technologies (ICTs) to shift work out of the office into the home, or any other location external to the traditional office. It involves a dissolution both of the spatial boundaries of the traditional office and the temporal boundaries of the traditional working day in a process whereby individual workers are, so to speak, peeled off from the collectivities and rigidities of the traditional communal work environment and released to work in isolation elsewhere. We have referred to such working arrangements in other publications as 'individualised forms of teleworking'.[1]

2.1 Problems of definition

Estimates of the prevalence of this form of teleworking vary enormously, depending in part on the definition employed. Some of the variables involved include:

Amount and proportion of time spent off the employer's premises

This variable covers a spectrum ranging from 100 per cent, in the case of teleworkers working exclusively from their homes, to less than one per cent, in the case of workers who occasionally take work home in exceptional circumstances, or who put in a few hours of home-based work in addition to working a full-time week in the office. In the case of part-time workers, a small number of hours spent working remotely may, nevertheless, translate into a high proportion of total working time spent in this way.

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[1] See, for instance, Huws U, Podro S, Gunnarsson E, Weijers T, Arvanitaki K and Trova V, *Teleworking: Guidelines for Good Practice,* Institute for Employment Studies, 1997, and Huws U, *Follow-up to the White Paper: Teleworking,* European Commission Directorate General V, Brussels, September, 1994, also published as *Social Europe, Supplement 3,* European Commission DGV, Luxembourg, 1995.

Location of the work

Some studies have defined this form of teleworking in terms which restrict it to work carried out in the worker's own home; others have included work carried out 'from' home, *ie* using the home as a base, whilst others include work done in premises adjoining the home (*eg* where workers live 'over the shop' or on a farm with attached offices), or in other domestic premises (*eg* where a worker acts as a secretary or assistant to another home-based worker). In other cases, the definition is looser still, including mobile workers who work on clients' premises, those who use their home as an administrative base for a small business based elsewhere, or those who work from telecottages, telecentres or neighbourhood work centres located near their homes.

Contractual relationship with the employer

A home-based worker may be self-employed, an employee, the director of an independent business, a member of a co-operative or partnership, an agent working on commission, or a multiple job holder who carries out home-based work in a second occupation which is not their main employment. It is also possible that home-based working may not be related to paid employment at all, for instance in the case of voluntary work for charitable organisations, some forms of work experience, training or private study, or work carried out for artistic or religious purposes. In each case, the researcher will have to make a decision about whether this category should be included in the general designation 'teleworker' and in each case this decision will affect the overall research results.

Nature of the technology used

A narrow definition will include only those workers who work with computers and a direct on-line link to the employer or client. Even here, however, there are difficult demarcations to be drawn. Once again, we find a spectrum ranging from full remote integration into a company's intranet, activated throughout the working day, at one extreme, to the sending of an occasional email message at the other. Some definitions would include any kind of work which is potentially telemediated, even if this is not the current practice (for instance data entry where the work is delivered on diskette, instead of over a telephone line, or a design process where visual information is sent by fax). In others, some time threshold may be established (*eg* a small home-based business which used ICTs only once a year for communication with the accountant, might be excluded on the grounds of infrequency of ICT use) or some requirement stipulated that the work should be incapable of being carried out remotely without the use of ICTs. Whatever the definition used, it will not only affect the results, but is also likely to be variable

over time, given the speed at which ICTs are disseminated and new activities brought within their scope.

Each of these variables, clearly, covers a complex range of possibilities, with decidedly fuzzy boundaries. Any researcher is therefore obliged to establish what are essentially arbitrary cut-off points across all four of these dimensions in order to arrive at a workable definition. That different researchers have decided on different thresholds must be borne in mind in any comparative analysis.

Of course the ideal method of obtaining this data is to collect it in a disaggregated form, so that each variable can be analysed separately and cross-tabulated independently with each of the others. To date, the only country in which this takes place to our knowledge is the UK, which twice a year includes questions in its Labour Force Survey making it possible not only to carry out such comparative analysis but also to track the changes longitudinally. If a similar approach were adopted in other countries then this would provide a robust basis for international comparison. Some results from this survey are summarised below.

2.2 Prevalence

Many different methods have been used to try to establish the extent of home-based and other forms of off-site teleworking; these have been discussed in detail elsewhere.[1] They divide roughly into two categories: those which attempt to estimate the number of employers adopting teleworking and those which attempt to estimate the number of workers involved. The latter may be subdivided into those attempting to establish the number of teleworkers working *at* home, who may be termed tele-homeworkers, and those attempting to quantify the number of teleworkers working *from* their homes, including mobile or nomadic teleworkers.

2.2.1 Prevalence among employers

The most usual method of attempting to establish the numbers and characteristics of employers using teleworking has been the use of targeted employer surveys specifically designed for this purpose, or the inclusion of questions about teleworking in general employer surveys. In order for the results to be statistically valid, it is necessary for a fairly large sample to be drawn, using random sampling methods, and achieving a reasonably high response rate. Some of the survey results which

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[1] Huws U, *Teleworking: an Overview of the Research,* Joint publication of the Department of Transport, Department of Trade and Industry, Department of the Environment, Department for Education and Employment and Employment Service, London, July, 1996.

Table 2.1: Incidence of use of home-based teleworking, per cent of employers

Country	Definitional threshold– minimum time at home	Year	%	Notes
Japan	50% of working hours and dependent on using ICT	1993	1.4	rises to 3.2% if non-IT homeworkers included
UK	50% of working hours and dependent on using ICT	1992	5.8	rises to 11.8% if non-IT homeworkers included
UK	minimum 1 day per week and using ICT	1993	7.4	includes workers in neighbourhood telecentres
Germany	minimum 1 day per week and using ICT	1993	4.8	includes workers in neighbourhood telecentres
France	minimum 1 day per week and using ICT	1993	7	includes workers in neighbourhood telecentres
Italy	minimum 1 day per week and using ICT	1993	2.2	includes workers in neighbourhood telecentres
Spain	minimum 1 day per week and using ICT	1993	3.6	includes workers in neighbourhood telecentres
Singapore	work 'away from the office' using ICT for contact	1993	6.3	sample skewed towards employers with high likelihood of teleworking
USA	none specified	1994	8	only medium and large organisations sampled
USA	none specified	1994	19	large employers only
Canada	none specified	1994	27	large employers only
Sydney, Australia	'substantially away from the office'	1995	23	

Sources: Unpublished data from Japan Ministry of Labour; Huws; TELDET; National Computer Board; Smith; Cowans; and BOMA.[1]

have achieved wide media attention have been flawed by failing on one of these three criteria. In particular, many have suffered from being based on purposive sampling of groups, such as members of particular employers' associations, which are not necessarily representative of the general body of employers. In other cases, postal sampling methods have been used, achieving unacceptably low response rates. Table 2.1 summarises the results of the most robust surveys of which we are aware. However, the results should be treated with some caution since they are not all directly comparable.

The first two surveys in the list (those in the UK and Japan) used identical definitions, but varied somewhat in their sampling

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[1] Huws U, *Teleworking in Britain*, Employment Department, 1993; TELDET, *Pan-European Telework Surveys, 1994*, TELDET, November, 1994; National Computer Board, *Report on Status of Teleworking in Singapore*, 1994; Smith B, '1995 Forecast' in *HR Focus*, Vol. 71 No. 9; Cowans D S, 'Work/Family Benefits' in *Business Insurance*, Vol. 28 No. 30; BOMA, *Tenant Demand*, Building Owners and Managers Association, 1995.

methods, the Japanese survey being carried out using a postal questionnaire, whilst the UK one used computer-aided telephone interviewing. In each case, however, a thousand responses were analysed and the sample was stratified by both sector and size of firm. The only significant difference is, therefore, a somewhat lower response rate in the Japanese survey. There is no reason to believe that the non-respondents in the Japanese survey were more likely to be using teleworking than the respondents, suggesting that the lower incidence of home-based teleworking in Japan is a real one, deserving of some investigation.

The second UK survey in the table was carried out in parallel with similar surveys in Germany, France, Italy and Spain, the results of which are also presented in the table. There is thus direct comparability between these results, although a somewhat looser definition of teleworking was used, which included workers in neighbourhood telecentres. The other surveys summarised in this table were carried out independently of each other, using different definitions and sampling methods.

Despite these reservations, it seems likely that these results reflect actual differences between countries in the proportions of employers practising individualised forms of teleworking.

The low prevalence of home-based teleworking in Japan is attributed by the Japanese Ministry of Labour (which commissioned the survey) mainly to the characteristic Japanese organisational structure and culture with its emphasis on continuous learning, job rotation and lack of specialism. This contrasts with a situation in the UK where there is a high degree of job specialism and a relatively deregulated labour market.[1]

The high proportions of employers using home-based teleworking which have been recorded in some North American and Australian surveys almost certainly arise in part from the exclusion of smaller companies from these surveys and from the adoption of very loose and inclusive definitions. Nevertheless, there does appear to be evidence that teleworking is considerably more prevalent in these countries than in Southern Europe or Japan.

The Singapore study also used a broad definitional threshold, classifying as telework all 'work performed away from the office'.

There would appear to be a number of possible explanations for these differences, both on the supply side and the demand side. These will be discussed at the end of this chapter, when we have considered the evidence on the prevalence of these forms of teleworking in the general population.

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[1] Information presented at Anglo-Japanese Teleworking Conference, joint conference of UK Employment Department and Japanese Ministry of Labour, London, 18-19 October, 1995.

2.2.2 Prevalence in the general population

When it comes to measuring the incidence of home-based teleworking in the general population, there is a greater variety of methods to choose from. These include population censuses, general labour force surveys, household surveys, special teleworking surveys, and market research by the suppliers of equipment, software or services to the general public. In the absence of relevant data from such surveys, various attempts have been made to extrapolate estimates of the extent of teleworking from other data sources, such as statistics on the distribution and use of ICTs. In some cases, attempts have been made to extrapolate the numbers of home-based teleworkers from the incidence reported in employer surveys. Needless to say, this is not a very reliable method, since it inevitably omits entirely all self-employed teleworkers who are working directly for final consumers, as opposed to working for firms. It also tends to underestimate the number of freelances who work for the corporate market. Furthermore, because respondents in employer surveys tend to be senior managers, it is also associated with an underestimation of the sorts of informal teleworking practices which tend to be negotiated individually with line managers at a lower level in the organisation. Nevertheless, in the absence of other data, even these results offer a pointer to general trends which is better than nothing.

As with the employer surveys, the great majority of the evidence is from North America, Northern Europe and other OECD countries.

Table 2.2 summarises the results of the more reliable surveys of which we are aware. Of these, the UK Labour Force Survey is the largest and most robust, followed by the Swedish and Canadian studies. However, it is the TELDET surveys which provide the greatest international comparability, albeit based on comparatively small sample sizes. The Singapore figures were produced by extrapolation from an employer survey, itself based on a sample which was somewhat biased towards IT and business services companies with an above-average likelihood of practising teleworking.

Until standard questions are added to population censuses and labour force surveys enabling the development of home-based teleworking to be tracked reliably (as is now the case in the UK) precise comparisons between countries will remain unachievable. However, even allowing for differences in methodologies and definitions, these results appear to confirm the findings of employer surveys in suggesting that home-based teleworking is most prevalent in the Anglo-Saxon and Nordic countries and probably also in high-tech Singapore; and relatively low in Japan and in the rest of Europe.

Table 2.2: Prevalence of home-based teleworking, per cent of workforce

Country	Year	%	Notes
UK	1998	4	Labour Force Survey, results
UK	1993	2	TELDET Survey
Germany	1993	0.6	TELDET Survey
France	1993	1	TELDET Survey
Italy	1993	0.5	TELDET Survey
Spain	1993	0.8	TELDET Survey
Sweden	1997	10	increased from 4.2% in 1994-5
USA	1998	6/7.6	increased from 5.2% in 1996; different estimates from two relatively small surveys by market research companies
Canada	1997	6.9	increased from 4.3% in 1993
Singapore	1993	6.3	extrapolated from employer survey (biased towards high-telework industries); an additional 9.5% estimated to be mobile teleworkers
Japan	1995	1	Kobe region only; defined as 'home office'; an additional 27% engaged in mobile work
Japan	1996	4	% of non-manual workforce only

Sources: Labour Force Survey; TELDET; Statistics Sweden/NTO; Nordplan; Kensington Technology Group, Link resources; Statistics Canada; National Computer Board; Satellite Office Association of Japan; Spinks[1]

The UK Case: results of the Labour Force Survey

Because it is the most comprehensive source of data on the distribution of teleworking of which we are aware, we summarise here the results from the March to May Quarter of the 1998 UK Labour Force Survey.

Following our recommendations, the definition of a teleworker was constructed as follows. Respondents who had indicated, *either:*

(a) that they were regular homeworkers — *ie* they mainly work at home or they work in different places but use home as a base, *or*

(b) that they were occasional homeworkers — *ie* they had spent at least one full day in the reference week working at home or using their home as a base.

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[1] UK Labour Force Survey; calculations based on TELDET, *Pan-European Telework Surveys, 1994*, TELDET; Statistics Sweden/NTO; Nordplan; Kensington Technology Group; Link resources; Statistics Canada; National Computer Board; *Report on Status of Teleworking in Singapore*, 1994, Satellite Office Association of Japan; Spinks W, *Preliminary Results from Survey on Changes in Commute and Work Environments following the Great Hanshin Earthquake*, Gakushin University, Tokyo, 1996.

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were asked:

'Do you use a telephone and computer for work at home?'

Those answering positively to this question constituted five per cent of the workforce of whom 68 per cent were male and 32 per cent were female.

It is possible, however, that some of these were people for whom the combination of a computer and a telephone link were not essential prerequisites for their work but optional extras, perhaps only used occasionally. Accordingly, a further filter was applied in the form of the additional question,

'Would it be possible to work at home (or use home as a base) without using both a telephone and a computer?'

The addition of this question also makes it possible to triangulate the results with those of the *Teleworking in Britain* survey, in which we used the same definition.

The exclusion of those answering 'no' to this question reduces the overall proportion of teleworkers in the working population to four per cent, of whom 70 per cent are male and 30 per cent female.

The over-representation of men (who make up only 56 per cent of the total UK workforce) in the teleworking workforce is interesting, especially in the light of stereotyped views that teleworking is especially suitable for women because of their domestic responsibilities. However a more detailed analysis of the location in which the work takes place reveals a more traditional pattern, as can be seen from Table 2.3.

From this analysis it can be seen that while the proportion of men and women working from separate premises adjacent to the home is about the same (at 25 per cent and 24 per cent respectively) there are major gender differences between those who work *at* home and those who work *from* their homes. Forty one per cent of female teleworkers work at home, compared with only 15 per cent of their male counterparts, whilst nearly six out of ten male teleworkers (59 per cent, compared with only 33 per

Table 2.3: Work location of UK teleworkers, per cent of teleworkers

Place of Work	All	%	Male	%	Female	%
All	1,115,740	100	776,113	100	339,626	100
Own home	258,314	23	119,094	15	139,220	41
Same grounds or building	16,019	1	10,528	1	5,491	2
Different places with home as a base	567,257	51	454,072	59	113,185	33
Separate from home	274,150	25	192,420	25	81,730	24

Source: UK Labour Force Survey, 1998, analysis by Siobhan O'Regan and Ursula Huws

cent of women) use their homes as a base but work in a variety of locations. Only a small proportion (one per cent of male and two per cent of female teleworkers) have a separate work-space on the same grounds or in another part of the same building as their home.

Turning to the demographic characteristics of teleworkers, we find an age distribution somewhat skewed to the mid-career period. Only two per cent of teleworkers are in the 16 to 24 age-bracket (compared with 14 per cent in the whole workforce), and only 12 per cent aged 55 to 64 (with a further three per cent aged 65 or over). Nearly one-third (32 per cent) are aged 35 to 44 (compared with 25 per cent of all workers) with a further 29 per cent aged 45 to 54 (here, the comparable figure for the total workforce is 22 per cent). The 25 to 34 age-band accounts for 22 per cent of teleworkers and 26 per cent of all workers.

Nearly three-quarters of teleworkers (73 per cent) are married or living with a partner, compared with only 58 per cent in the workforce at large, with 18 per cent who have always been single (compared with 31 per cent of all workers) and a further nine per cent who are separated, divorced or widowed. Nine per cent of these teleworkers have children under the age of two, 12 per cent have children aged between two and four, 19 per cent have children aged between five and nine and 21 per cent have children aged between ten and fifteen. In each case these proportions are very slightly higher than in the general population, but never more than a single percentage point higher. Given the fact that teleworkers are much more likely to be married than non-teleworkers and are also more likely to be in their thirties and forties, this difference is very slight, and it would be difficult to use these statistics to support an argument that teleworking results from a life-style choice to put family before work.

We also examined the hours worked by these teleworkers and discovered that over three-quarters (77 per cent) are working full time, with the remaining 23 per cent classified as part-time workers. As expected, female teleworkers are more likely to work part time than their male counterparts, with nearly half (47 per cent) working part time, compared with only 12 per cent of male teleworkers.

Turning to employment status, we find a more even balance. Just over half of all teleworkers (52 per cent) are employees, with 47 per cent classified as self-employed and the remaining one per cent as paid family workers. The proportion of male teleworkers who are self-employed is, at 49 per cent, somewhat higher than the 42 per cent of women who are classified in this way, but not enormously so. There are clearly substantial numbers of men and of women working as teleworkers both as employees and on their own account. It is possible that some of the self-employed teleworkers might fall into the category of 'pseudo-self-employed' workers, that is people who might be deemed to be employed if

Table 2.4: Sectoral distribution of UK teleworkers compared with total workforce, per cent

Sector	% of total workforce	% of teleworkers
Agriculture and fishing	2	2
Energy and water	1	1
Manufacturing	19	14
Construction	7	11
Distribution, hotels & restaurants	20	10
Transport & communication	7	4
Banking, finance & insurance *etc.*	15	34
Public administration, education & health	24	14
Other services	6	9
Total services	*71*	*72*

Source: UK Labour Force Survey, 1998, analysis by Siobhan O'Regan and Ursula Huws

their case were tested in law (for instance if they are dependent for work on a single employer under whose direction they carry out). Whether this is the case could only be ascertained in the light of qualitative research.

Nine per cent of teleworkers are disabled, roughly the same proportion as in the workforce as a whole. A breakdown of the sample by type of disability reveals no significant differences between teleworkers and the rest of the working population.

The sectoral and occupational distribution of UK teleworkers are presented in Tables 2.4 and 2.5.

A comparison of the sectoral breakdown of the teleworking workforce with that of the total workforce is not, perhaps, as striking as it could be. The proportion working in service industries taken as a whole, at 72 per cent is almost identical to

Table 2.5: Occupational distribution of UK teleworkers, and total workforce, per cent

Occupational category	% of total workforce	% of teleworkers
1 Managers and administrators	16	26
2 Professional occupations	10	23
3 Associate prof. & technical occupations	10	18
4 Clerical, secretarial occupations	15	9
5 Craft and related occupations	12	12
6 Personal, protective occupations	11	1
7 Sales occupations	8	8
8 Plant and machine operatives	9	1
9 Other occupations	8	1

Sources: UK Labour Force Survey, 1998, analysis by Siobhan O'Regan and Ursula Huws

the 71 per cent of the whole UK workforce in this sector. Similarly, the same proportions are to be found in the primary and energy sectors.

The proportions in manufacturing, transport and distribution, hotels and catering are somewhat lower, not surprisingly in view of the undelocalisable nature of much of the work in these sectors. However, the main contrast is in the much higher proportion of teleworkers working in the banking, finance, insurance and business services sector. This sector alone accounts for over one-third (34 per cent) of teleworkers, compared with only 15 per cent of the total workforce. By contrast, the public sector (which accounts for nearly a quarter of all workers) accounts for only 14 per cent of teleworkers, despite including a high proportion of workers whose jobs involve processing information (as well as many, admittedly, such as those in health care and education, whose jobs require a face-to-face presence). Apart from the finance and business services sector, the only sectors in which teleworkers are over-represented compared with the general population are 'other services' and 'construction'. We must presume that this latter category includes a number of people (including architects and engineers as well as self-employed building contractors) who are multi-locational workers using their homes as a base.

We must turn to the occupational breakdown to get a better sense of what kind of work these teleworkers are actually doing. Table 2.5 shows us that here there are substantial differences. Teleworkers are more than twice as likely (at 23 per cent compared with ten per cent) as other workers to be in professional occupations, and considerably more likely (at 26 per cent compared with 16 per cent) to be managers and associate professional or technical staff (at 18 per cent compared with ten per cent). Surprisingly, in view of the intensive use of IT in much of this kind of work, secretarial and clerical occupations are under-represented among teleworkers (at nine per cent, compared with 15 per cent in the total workforce), whilst the proportions of teleworkers in craft and sales occupations are the same as amongst other workers. It is likely, however, that this broad category conceals major differences in the kinds of task involved. Teleworking sales staff are likely to be either travelling sales representatives or tele-sales personnel, whilst their non-teleworking counterparts are more likely to be shop assistants, although some staff in outgoing call centres would also be categorised as non-teleworkers under the definition used in this analysis. Finally, and unsurprisingly, there are extremely low proportions of teleworkers amongst people in personal and protective occupations and among plant and machinery operatives: occupations which generally speaking do not depend on the use of computers and telephones and which, in many cases, require face-to-face interaction with customers, or the operation of machines which are located in factories or other outside workplaces.

Taken together, these results suggest that the propensity to be a teleworker is not associated strongly with any unusual demographic features or types of work. On the contrary, teleworkers seem to share most of the characteristics of the rest of the workforce. Apart from a somewhat greater propensity to be married, with children and in mid-career than other workers, their remote location seems to be the only feature which distinguishes them strongly from those who work on-site. The occupations in which teleworkers are over-represented appear on the whole to correlate quite logically with those with the greatest propensity to make extensive use of ICTs, in combination with a certain minimal level of autonomy.

This suggests that the most useful indicators for identifying their equivalents in other countries will not be demographic variables, but sectoral and occupational data, in combination with information about other factors (such as infrastructure, employer attitudes, skills or organisational culture) which evidence from qualitative studies suggests are prerequisites for, or facilitators of, teleworking.

2.2.3 Prevalence of mobile teleworking

There is some confusion in most surveys of teleworking about where, if at all, to draw the line between home-based teleworking (which may include a substantial amount of work carried out away from the home) and mobile teleworking. In some definitions the latter is implicitly included in the former, whilst in others it is distinguished separately. As can be seen from Table 2.2, in the study carried out in Kobe in Japan, mobile workers were categorised separately and made up a substantial part of the workforce (27 per cent); whereas home-based workers, who were strictly defined as those working only from their homes, represented only one per cent.

There is a general agreement in the literature that mobile working is as important as, if not more important than homeworking, with forecasts that in the future hot-desking will become widespread, with large corporations planning their offices on the basis of one workstation for every four staff members,[1] suggesting that such workers will typically spend three-quarters of their working time away from base, much of it working while on the move. Despite this, very little work has been done to establish the prevalence of mobile teleworking.

One survey we carried out in the UK in 1990 found that mobile teleworkers covered a surprisingly broad occupational range. Over 50 different occupations were mentioned by the mobile teleworkers who responded to a survey of *Practical Computing*

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[1] Makimoto T and Manners D, *Digital Nomad,* John Wiley, Chichester and New York, 1997.

readers, although 32 per cent of these respondents were programmers, systems analysts and other IT professionals. Only 19 per cent spent more than half their working time away from their office base, but 96 per cent expected the use of mobile technology to increase in their workplace. Over half said that, given the choice, they would like to spend more time away from the office (with 12 per cent who would prefer to spend less time away from base).

Compared with home-based teleworkers, there was, in addition to mobile phone use, a very high use of other telecommunications, with half regularly using electronic mail, 70 per cent using faxes, a quarter using a paging service, ten per cent using some other form of radio communication and five per cent voice mail. Forty five per cent carried their laptops with them when travelling to other sites and over one-third worked while travelling. Other major differences from surveys of home-based teleworkers were that the respondents were overwhelmingly male and worked on average very long hours, with nearly 60 per cent working over 40 hours a week.[1] Whilst giving some useful information about their characteristics, this study could not provide information about the prevalence of this form of working.

A potential source of evidence about mobile teleworkers is travel surveys. In the UK, for example, the *Continuous National Travel Survey* provides information about the proportion of the population engaged in work-related travel. This does not, however, make it possible to distinguish between those who make the occasional journey for business purposes and those for whom travelling takes up a significant proportion of their working time. Still less does it provide information on the extent to which working while on the move using ICT is a reality. Nevertheless, this information does provide some sort of a starting point which is useful for planning future research. An analysis of the data from 1991 to 1993 suggests that in any one travel week, nearly 21 million people in the UK make commuting trips and nearly six million make at least one journey for business purposes.[2]

Another approach is to use labour force survey data to make an estimate of the number of workers in occupations which involve travelling and also include a sufficiently high component of information processing work to make them likely candidates for the use of telematics. Unfortunately, many countries only present employment statistics broken down by industrial sector and not by occupation, which renders international comparisons impossible. However, the UK Labour Force Survey (LFS) does

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[1] Huws U, 'Pinning down the mobile worker' in *Practical Computing*, March 1990.

[2] Department of Transport Statistics from the *National Travel Survey*, supplied by DOT, July, 1995.

Table 2.6: Occupational groups likely to include mobile teleworkers in Great Britain, Spring 1998

SOC occupation code	Occupation (main job)	No.
	Base (total workforce)	26,947,400
121	Marketing & sales managers	527,200
170	Property & estate managers	66,900
190	Trade union *etc.* officials	29,200
232	Education officers, school inspectors	16,500
293	Social workers, probation officers	112,100
311-2	Building inspectors/quantity surveyors	47,4500
262+313	General practice & other surveyors	72,300
348	Environmental health officers	14,400
380	Authors, writers, journalists	107,300
393	Driving instructors (excluding HGV)	22,900
394-5	Factory & other statutory inspectors	19,900
412	Debt, rent & other cash collectors	11,100
523	Telephone fitters	29,900
526	Computer engineers *etc.*	43,900
710	Technical & wholesale sales reps	54,500
719	Other sales representatives NES	221,300
	Total:	*1,518,800*
	as % of total workforce:	*5.64*

Source: Labour Force Survey, Spring 1998

give an occupational breakdown, and an analysis of these results is presented here as an indicative illustration. For this purpose a special analysis was carried out of the UK LFS data from the Spring of 1998, the results of which are shown in Table 2.6.

It should be noted that the category 'mobile worker' is not coterminous with that of teleworker working from a home base, described above (whose numbers, according to the 1998 UK LFS, totalled 567,257 in 1998, some two per cent of the workforce). Although there is some overlap between the categories, there are many mobile teleworkers whose base is the employer's premises, not the home.

In general, the decision to include any given occupational category was made on the basis of the occupations reported as involving teleworking in past surveys (*eg,* the *Teleworking in Britain* survey, Huws, 1993). This methodology is, however, of necessity somewhat rough-and-ready. The occupational categorisation used in the collection of these statistics does not always match well with those given by employers in surveys of teleworking. For example, some groups known to be involved in

mobile teleworking (such as financial services advisers) are subsumed within larger occupational categories and rendered invisible in these results, while other groups, although visibly mobile (*eg* bus inspectors), may contain relatively small proportions of workers who are actively using telematics to carry out their work and in this case generate numbers too small to report. Survey and case-study evidence reveals that the decision to adopt new technology is often as much a product of corporate culture and managerial style as it is an effect of the objective requirements of the job, so it is likely that some of these occupational groups may be involved in teleworking in some organisations, but not in others, even when they are carrying out identical tasks.

The 1.5 million workers (representing between five and six per cent of the workforce) who make up the total presented in Table 2.6 thus include a large number of workers who would probably *not* be defined as mobile teleworkers under most definitions. However, they also exclude a (probably greater) number who most likely would be regarded as teleworking. To 'guesstimate' the numbers of mobile teleworkers from these figures is tricky enough. It is, however, even more difficult to extrapolate from the UK data to the rest of Europe, and still more so for the rest of the world. If done properly, this latter exercise would involve not only taking account of the very different industrial structure of the economy (and hence occupational structure of the workforce) in each country, but also taking account of different national patterns of technology usage. Despite all these reservations, since there is no alternative course of action (given the inadequacy of the existing data) we could venture to suggest that across the EU (E15) as a whole, with its total workforce of approximately 366.2 million, perhaps 2.3 per cent of those in the workforce (some 8.4 million) might currently be defined as mobile teleworkers. It should be emphasised, however, that this estimate excludes a very large number of manual workers who are mobile (ranging from plumbers to taxi-drivers; from meter-readers to tree surgeons) some of whom might well make some use of telematics in the course of their work. It also excludes a large number of technical, professional and executive staff who might make occasional use of telematics whilst involved in business travel, although this does not necessarily take up a large proportion of their working life. A broader definition would therefore produce a significantly larger estimate. Because of lack of comparability of Labour Force Surveys, we do not think it feasible to attempt to extrapolate beyond Europe on the basis of these calculations.

Some attempts have been made to estimate the numbers of mobile workers from sales of portable technology (such as mobile phones and laptop computers). In 1994, for instance, New York-based consultants Link Resources drew on such information (along with other sources) to produce their estimate that there

were at that time seven million mobile teleworkers in the USA, with numbers predicted to grow to 25 million by the year 2000.[1]

There is obviously no justification for extrapolating directly from the number of mobile phone users in the population to the number of teleworkers, not least because (at least in developed countries) mobile telephones are used a great deal for social, as opposed to business purposes, and a large number of mobile telephones are owned by people who are not in employment, such as teenage children, the elderly and full-time carers. Nevertheless, it is reasonable to assume that societies with a low usage of mobile telephones are the least likely to have a high prevalence of mobile teleworking, since the mobile telephone can be regarded as a near-essential prerequisite for this type of working.

We may, therefore, venture to suggest that there is some correlation between a high number of mobile phone users and mobile teleworking in any given country. Globally, mobile teledensity is extremely uneven, with three people out of ten in the population of Denmark, at one extreme, having a mobile phone, whilst at the other, in Tajikistan, only one person in a hundred thousand is a mobile phone user. Table 2.7 (overleaf) displays the countries with over ten per cent mobile teledensity in rank order, contrasting them with those countries with mobile teledensity of less than one per cent.

As can be seen, the list is headed by the Nordic countries, Denmark, Finland, Norway and Sweden, which, together with Australia, have over 280 mobile phones per thousand inhabitants. Next come Hong Kong, Japan, Israel and Iceland with teledensities between 180 and 220. They are followed by the USA, Singapore and New Zealand; then by the UK and Canada. The only European countries, apart from Britain, with teledensities of over ten per cent are Luxembourg and Italy. Finally, Macao has just over 100 telephones per thousand inhabitants.

In general, the pattern is close to that for home-based teleworking, with the highest concentrations in the Nordic and Anglo-Saxon countries and a further cluster of high teledensity in the developed urban Asian economies of Japan, Singapore, Hong Kong and Macao. It may well be that, for cultural reasons which will be discussed below, the latter are countries where mobile teleworking may be more prevalent than home-based teleworking. Israel may also share some of the characteristics of this group. The absence of most of the core European countries from this list, despite their high levels of development, is significant, suggesting that mobile teleworking, like home-based working, may be much less prevalent in these countries than in Scandinavia, the UK or North America.

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[1] Illingsworth M M, 'Virtual Managers' in *Information Week,* June 13, 1994.

Table 2.7: Countries with high and low mobile teledensity

Mobile phones per 1,000 inhabitants

High teledensity countries				Low teledensity countries			
Denmark	304.06	Belize	9.84	Russian Fed.	1.51	Zambia	0.33
Finland	291.94	St Lucia	9.72	Guyana	1.43	Angola	0.29
Australia	311.27	Bahamas, The	8.97	French Polynesia	1.35	Tanzania	0.29
Norway	287.15	Peru	8.39	Tonga	1.16	Kazakhstan	0.28
Sweden	281.81	Dominican Rep.	7.97	Nicaragua	1.07	Congo, DR	0.23
Hong Kong	215.80	St Kitts &Nevis	7.32	Iran, Islamic Rep.	0.98	Cuba	0.22
Japan	213.95	Paraguay	6.63	Cote d'Ivoire	0.92	Moldova	0.22
Israel	184.34	Dominica	6.49	Vietnam	0.92	Uganda	0.20
Iceland	180.74	Gabon	6.15	Vanuatu	0.89	Djibouti	0.18
USA	165.23	Grenada	5.76	Solomon Islands	0.84	Senegal	0.16
Singapore	141.25	Oman	5.62	Lao PDR	0.80	Uzbekistan	0.16
New Zealand	138.10	Poland	5.61	St Vincent & Gren.	0.75	Cameroon	0.16
UK	122.27	Suriname	5.59	Romania	0.75	Myanmar	0.16
Canada	114.15	China	5.57	Ghana	0.72	Senegal	0.16
Italy	111.88	Marshall Islands	5.35	Papua New Guinea	0.69	Equat. Guinea	0.15
Luxembourg	109.22	Slovak Republic	5.33	Albania	0.68	C. African Rep.	0.14
Macao	101.52	Ecuador	5.17	Belarus	0.64	Guinea	0.13
		Fiji	4.64	Tunisia	0.61	Egypt, Arab Rep.	0.12
		Namibia	4.29	Lesotho	0.61	Nigeria	0.12
		Guatemala	3.97	Ukraine	0.59	Mali	0.11
		Sri Lanka	3.88	Yemen, Rep.	0.55	Kenya	0.09
		Bolivia	3.79	Macedonia, FYR	0.49	Burundi	0.09
		Bulgaria	3.14	Benin	0.49	Sudan	0.08
		Indonesia	2.86	Pakistan	0.48	Armenia	0.08
		Gambia, The	2.71	Georgia	0.43	Maldives	0.08
		El Salvador	2.71	Bosnia & Herz.	0.41	Bangladesh	0.02
		Jordan	2.64	Algeria	0.41	Tajikistan	0.02
		Azerbaijan	2.25	Mongolia	0.38	Burkina Faso	0.02
		Martinique	2.23	Honduras	0.38	Madagascar	0.001
		Cambodia	1.95	Malawi	0.37		
		Morocco	1.55	India	0.35		

Source: World Bank data, 1997

The second part of the table shows the countries with the lowest mobile teledensities for which data exist. As can be seen, they include several from eastern Europe and the former Soviet Union (Russia, Slovakia, Poland, Bulgaria, Romania, Belarus and Albania, Tajikistan and Uzbekistan) as well as a number of countries in the Caribbean, the Pacific, Latin America and Africa.

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These can be regarded as the countries with the lowest likelihood of mobile teleworking.

Another important tool of mobile teleworking is the laptop or notebook computer. There has recently been a rapid growth in laptop sales. The *Financial Times* attributes much of this growth, in Europe in particular, to the spread of GSM (Global System for Mobiles) cellular digital networks over the past five years, which have made it much easier to keep in touch with the office while on the move, quoting a study of the European market for portable PCs, prepared by International Data Corporation for Dell Computer (1997), one of the notebook market leaders.[1]

In 1997 about one in every four PCs sold was a portable device and the portable PC market, which includes hand-held devices ('palmtops'), as well as standard 'A4' notebook machines, remains one of the most dynamic sectors. The value of portable PC sales was expected to more than double from US$ 30 billion in 1996 to nearly US$ 80 billion by the end of the decade, an 18 per cent compound annual growth rate, according to a study, *Pen, Palmtop and Notebook Computers*, 1997, prepared by Frost Sullivan, the market research firm.[2] These figures should be compared with an estimated 4.35 million portable PCs shipped worldwide (an estimated one in five of all personal computers) in 1993[3] and 2.3 million units in 1992.[4]

It should be emphasised, however, that not all these portable computers are necessarily being used while actually travelling,[5] or by workers who can be regarded as 'mobile' in the strict sense of the word. Some machines may be moved only occasionally from one office to another, while others may form part of a pool, to be shared amongst several co-workers.

Other potential sources of information are the market figures for modems, mobile fax machines, pagers and digital data networks. However, these are so widely used for non-business purposes that a considerable amount of secondary analysis of the data would be required to produce realistic estimates. Similarly, the size of the company car market is too crude an indicator to be used without refinement.

A widely-quoted estimate of the current numbers of mobile teleworkers in the UK comes from Gray, Hodson and Gordon

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1   'Survey- IT: Portable PCs', *Financial Times,* March 5, 1997.

2   'Survey- IT: Portable PCs', *Financial Times,* March 5, 1997.

3   'Small is beautiful', *Financial Times,* 26 October, 1993.

4   Frost and Sullivan, Consultants, quoted in: 'Challenge of the Notebooks', *Financial Times,* 19 February, 1993.

5   'Small is Beautiful', *Financial Times,* 26 October, 1993.

(1993),[1] who drew on a variety of different sources, many of them American, to produce 'guesstimates' of the extent of teleworking in Britain and concluded that there were 500,000 in all. Another British publication, by the Key Note consultancy estimated that there were 600,000 mobile teleworkers in the UK in 1992 to 1994, representing approximately two per cent of the workforce.[2] Such estimates, approximate as they are, cannot be used with any certainty even to extrapolate to other developed countries, let alone to developing ones.

2.3 National differences

Although the circumstantial evidence is considerable, we do not have enough information to be absolutely sure that there are significant national differences, even amongst developed countries, in the prevalence of mobile teleworking. However, it seems clear that, despite differences in definition and sampling which make comparison difficult, there are real differences in the prevalence of home-based teleworking. These differences can be attributed to a range of different variables, economic, social, cultural, regulatory and technological. We summarise some of the most important of these below, not only because they shed explanatory light on the factors which facilitate, or constrain the development of teleworking, but also because they can offer information which assists us in identifying the potential for teleworking in countries where no data is currently available.

2.3.1 Availability and cost of telecommunications infrastructure

A prerequisite for teleworking either in the home, or dispersed across a wide geographical area, as in mobile teleworking, is a telecommunications network capable of supporting voice and data transmission. At the most basic level this involves a simple copper voice-line. Home-based teleworking is therefore only practicable where such a line is available in the home, at an affordable price. Table 2.8 shows the teledensity (the number of telephone lines per 1,000 of the population) in the countries for which reliable data is available on the prevalence of home-based teleworking (see Tables 2.1 and 2.2 above), drawing on the most recent figures available from the ITU.

Perhaps the most striking feature of this table is the fact that all these developed countries have much higher teledensity than the global mean (which stands at 170.05 lines per thousand) with a range from 392.48 in Spain to 682.12 in Sweden. This global average conceals densities which are considerably lower in some

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[1] Gray M, Hodson N and Gordon G, *Teleworking Explained*, John Wiley & Sons, 1993.

[2] Smith P (ed.), *The Key Note Guide to Teleworking,* Key Note, 1995.

Table 2.8: Teledensity and telecommunications costs in countries with estimates of teleworking prevalence

Country	Telephone lines per 1,000 inhabitants, 1997	Telephone subscription as % of GDP per capita, 1993	Cost of local call in US$, 1994
International mean	*170.54*	*7.65*	*0.09*
USA	639.89	0.6	0.01
Canada	602.42	0.5	0.00
Australia	518.79	0.6	0.18
Japan	489.23	0.5	0.10
Singapore	513.31	0.3	0.03
Sweden	682.12	0.6	0.05
UK	527.62	0.9	0.18
Germany	538.38	0.8	0.14
France	563.60	0.4	0.13
Italy	440.06	0.4	0.17
Spain	392.48	1.1	0.09

Source: ITU data, various years

developing countries. For instance, Liberia, Mali, Niger and Somalia all have less than two telephones per 1,000 inhabitants.

As can be seen, there is a fairly strong correlation between teledensity and the likelihood of home-based teleworking, with the United States, Canada and Sweden, all with teledensities of over 60 per cent, also being countries with a high proportion of the population working from home. Similarly, Japan, Italy and Spain, with teledensities below 500, are also countries with a relatively low incidence of home-based teleworking among developed countries. Looking at the cost of local calls produces a similar, if less dramatic picture. Canada and the United States, where local calls are free or nearly so, clearly have telecommunications environments which present few cost barriers to teleworking, while Singapore and Sweden also have low-cost local telephony correlated with a high incidence of home-based teleworking. However, in the other European countries and Australia the cost of a local call is actually somewhat higher than the international mean of nine US cents.

This indicator does not give the whole picture, however. The cost of a local call represents only part of the cost of being on-line, even for voice only. To it must be added the cost of a subscription, as well as the cost of any non-local calls. In order to measure affordability, the cost must also be related to income, rather than compared in absolute terms.

We therefore looked also at the cost of an annual subscription as a percentage of per capita income. Here, once again, it becomes

abundantly clear that the developed countries for which teleworking data is available represent a privileged minority in terms of telecommunications access. Internationally, the average cost of renting a telephone line is 7.65 per cent of average annual income. However in these developed countries, there is only one instance where it rises above one per cent. This exception is Spain, which is also amongst the developed countries with the lowest incidence of teleworking.

It appears to be the case, therefore, that high teledensity is strongly correlated with a high prevalence of home-based teleworking, whilst low telecommunications costs also play a significant part. These factors alone, however, do not provide a complete explanation.

2.3.2 Urbanisation

Linked with teledensity is the geographical spread of the population. Another characteristic of developed countries is that they tend to have a higher proportion of the population concentrated in cities than less developed countries. As can be seen from Table 2.9, all the countries with a recorded level of teleworking are also countries in which over three-quarters of the population live in cities, although the international mean is only 53.28 per cent. It is not possible, however, to detect a close correlation between rurality and low prevalence of teleworking, although the higher proportion of urban population in the UK and in Sweden than in other EU countries may offer a partial explanation for the higher incidence of home-based teleworking there than in France, Italy or Spain. This would not, however, explain the relatively low prevalence of home-based teleworking

Table 2.9: Percentage of population in urban areas

Country	Urban population, % of total
International mean	*53.28*
USA	76.32
Canada	76.78
Australia	84.70
Japan	78.26
Singapore	100.00
Sweden	83.14
UK	89.26
Germany	86.70
France	74.88
Italy	66.68
Spain	76.24

Source: World Bank data, 1998

1999 © Institute for Employment Studies

in Germany which, at 86.7 per cent, also has a very high proportion of its inhabitants in urban areas.

2.3.3 Regulatory environment

We must turn to other factors to begin to construct a more complete, and less deterministic, explanation.

One factor which would appear to be of some relevance is the regulatory climate which exists in the country in question and the type of welfare state in which it is embedded. It must be said that no two countries are identical in these respects, each having evolved its own unique system over the generations, while the number of variables is so great that any comparison is fraught with difficulties. Nevertheless, some attempts have been made to categorise the welfare systems of the more developed industrial countries. One of the most influential of these attempts in recent years has been made by Gøsta Esping-Andersen (1990) who proposes a three-fold typology.[1] Central to the theoretical justification of this differentiation are the twin notions of equality and of de-commodification, the latter defined by Esping-Andersen as 'the degree to which individuals or families can uphold a socially acceptable standard of living independently of market participation'.

In this analysis, the first type is the 'liberal' or 'residualist' state, of which the UK is the prime example in Europe, but which also prevails in most of the English-speaking former British colonies, including the United States, Canada, Australia and Ireland. In this model, market forces are believed to be the best method for maximising the social welfare of citizens, with state benefits (typically means-tested and stigmatising to their recipients) only being brought into play as a safety net when other systems have failed. The liberal model is regarded by Esping-Andersen as producing both a high degree of commodification of labour and considerable inequality. The household, rather than the individual, is the basic economic unit in this model, with means-tested benefits being dependent, typically, on the income of the whole household falling below an agreed threshold.

The second type may be variously categorised as 'conservative' or 'corporatist' or even 'catholic' or 'Bismarckian'. Germany, France, Belgium, Italy and Austria, according to Esping-Andersen, are examples of this category, which is characterised by status differentiation, with church and family playing an important role in the provision of welfare. Compulsory labour market insurance, usually differentiated by occupation, is typical of this model, with receipt of most benefits being dependent on an unbroken period of labour market participation. In this model

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[1] Esping-Andersen G, *The Three Worlds of Welfare Capitalism*, Polity Press, 1990.

too the family breadwinner is normally the welfare recipient, with married women frequently excluded from eligibility to claim unemployment benefit or pensions in their own right. This type of regime allows for a considerable degree of decommodification for some members of society but the benefits are not distributed equally.

Esping-Andersen's third category is the 'social democratic' welfare state. This model is typified by universal benefits, financed by taxes, for which eligibility is not conditional on labour market participation or head-of-household status but granted as a right of citizenship. The basic economic unit is the individual citizen, rather than the household. Such regimes, which are primarily found in the Nordic countries, offer a high degree of de-commodification combined with equality.

This typology is open to criticism on several counts, even within Europe. Firstly, it fails to take account of the types of regime to be found in Greece, Spain, Portugal and other poorer Mediterranean countries, which could be seen as sharing some features of the 'liberal' type with some of the 'corporatist' but are characterised by low levels of welfare spending and a high dependence on the extended family and religious organisations to relieve social hardship. These systems should not, of course, be regarded as a homogenous type; they differ markedly from each other, reflecting the very different cultural, economic and political forces which have shaped them.

Secondly, Esping-Andersen's categorisation makes it difficult to account for many of the hybrid systems which have developed in Europe. The Netherlands, for instance, has, under political regimes which would normally be regarded as 'conservative', consistently exhibited the high level of de-commodification associated with 'social-democratic' regimes while nevertheless sustaining a strong 'breadwinner' model of the household.

The British system, too, has historically exhibited some features of a 'social democratic' model (for instance in its National Health Service, and in its separate taxation of women) while retaining a strongly 'liberal' approach to most benefits. Ireland represents an even more puzzling case, in which a 'liberal' system, largely modelled on that of the UK, nevertheless contains many features more usually associated with a 'conservative' regime, notably in the more prominent role accorded to church and family in the provision of welfare.

A third difficulty arises when we attempt to integrate the former communist regimes into this framework. While sharing many features of the 'social democratic' model, they also exhibit significant differences.

Despite these, and other differences, we used an adapted version of this typology as a framework for examining the relationship

between flexible labour markets and benefit systems in Europe.[1] Our study concluded that these types of welfare system are associated with different models of labour market regulation and industrial relations regimes and that these have, in turn, strongly influenced the patterns of flexible working which are adopted in each country. Insofar as it represents a form of flexible working, then this can be seen to have an impact on the prevalence and characteristics of teleworking in each nation.

Thus the 'liberal' regimes are associated with a laissez-faire attitude to labour markets, with weak regulation, informal agreements and low levels of collective negotiation which, when it does take place, is more likely to be at a local than a national level. In such countries, the most common forms of flexible working fall into the category of 'external flexibility', involving the use of temporary or casual working or loosely-regulated part-time working. The mutual commitment of workers and employers to each other can therefore be said to be relatively weak, with the average worker spending a comparatively short time in any given employment. Because permanent full-time employees are relatively poorly protected, the penalties for leaving this kind of employment for self-employment or part-time or temporary working are also relatively low, producing a concomitantly low level of resistance to external flexibilisation in the workforce. In such a climate, it is relatively easy for employers and workers to experiment with new forms of working, such as teleworking, often on an *ad hoc* basis.

In the 'corporatist' regimes there is a strongly contrasting situation, despite recent tendencies towards a European convergence. Here, labour contracts are tightly regulated, with juridical controls on the forms which they take, and on conditions of employment and social protection. Typically these countries have a strong social dialogue, with near-universal collective bargaining at both the national and the works council level. Hiring and firing are activities which are embarked on much more reluctantly in such contexts, resulting in a longer-term mutual commitment by workers and employers.

Flexibilisation of employment is more likely in such countries to take 'internal' forms, involving such practices as multi-skilling and multi-tasking and the introduction of flexible hours, including such devices as annual hours contracts to redistribute work to match demand.

In such societies, because so many social benefits for the worker and his or her dependants hinge on the social insurance contributions of the main breadwinner, the cost of leaving secure, permanent full-time employment is a high one for the individual concerned, and there is therefore considerable

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[1] Huws U, *Flexibility and Security: towards a new European Balance*, Citizens Income Trust, London, 1997.

resistance to entering more precarious forms of employment. Any new form of working, such as teleworking, is therefore not only more likely to be regarded with suspicion by the workforce; it is also more difficult to introduce in an informal and *ad hoc* manner. In order for it to be introduced in accordance with existing regulations, it is necessary for special contracts to be negotiated, a process which can be slow and cumbersome, even though it may eventually result in better protection for the workers in question than the unregulated make-it-up-as-you-go-along Anglo-Saxon approach.

This combination of factors has undoubtedly contributed to the lower levels of home-based teleworking to be found in Germany, France and Italy than in North America, Australia or the UK.

The social democratic model, found in various forms in Sweden, Norway, Denmark and Finland, has some features in common with the corporatist model. There is a strong social dialogue, with trade unions playing an important role in the codetermination of wages and conditions of employment, creating a regulated labour market with strong protection for those in employment. In contrast with the corporatist model, however, the system is egalitarian, with many benefits available universally, regardless of the occupation of the recipient. An individualised benefit system is associated with a general commitment to equality between the sexes, which may provide part of the explanation for the extent to which, in contrast with many other European countries, part-time workers are treated not as a peripheral and precarious source of flexibility, but as core workers, protected by the same rights as full-time workers.

In this context, 'flexible working' is more likely, as in the corporatist model, to involve internal rather than external forms of flexibility. However, the nature of the benefit system makes it easier for workers to move from occupation to occupation, or from full-time to part-time work, without loss of pension entitlement or other forms of social protection. The egalitarian and meritocratic nature of the work culture, with a strong focus on improving the quality of working life, has also, we would speculate, made it easier to develop relationships of mutual trust between workers and employers, which, along with other factors, may provide a partial explanation for the high prevalence of teleworking recorded in Sweden, which could, perhaps, best be characterised as 'regulated flexibility by mutual consent', as opposed to 'unregulated flexibility' found under liberal regimes.

A fourth model of regime to be found among developed countries is what we might call the 'Mediterranean' model. This is found in the EU in Spain, Portugal and Greece, but may well share some characteristics with other more recently developed countries in other continents. Typically, these countries have a relatively high proportion of the population still employed in agriculture or in other forms of self-employment, a large

informal sector and a comparatively undeveloped welfare system. Here, as in 'conservative' regimes, the family and church play an important role in the provision of welfare, but other features of such regimes are lacking. Collective bargaining is relatively strong in the formal sector, but largely absent in the informal sector. In the formal sector, the development of teleworking is likely to be constrained by some of the same factors as under corporatist regimes, with a resistance by workers to abandoning the relative security of their full-time, permanent jobs in the sectors where occupation-specific social protection has been negotiated. In the informal sector, teleworking may well exist, but is unlikely to be documented or insured.

We have limited ourselves in this section to discussing some of the regimes which have been comparatively well-studied in relation to flexible working. We would like to emphasise that these four types have been presented here in order to illustrate the general point that regulatory climate is an important variable in determining the extent of teleworking and the forms which it takes in any given national context. These types do not in any way exhaust the spectrum of possibilities. The regimes which have developed in Eastern Europe, in Japan and in the newly-developed countries of South East Asia, for instance, present sharp contrasts in many of their characteristics both to each other and to those which have been summarised here, a diversity which has been pointed out, *inter alia* by John Gray (1998).[1] In developing countries, some aspects of the regulatory structure may have been shaped by their political history. For instance, former British and French colonies will tend to follow the legal structure of their former colonisers, whilst many CIS countries retain regulatory systems based on those of the former Soviet Union. The type of system in place in any given country is likely to play a role in shaping the forms of teleworking which are most likely to be favoured within it, and the speed with which they are likely to spread. Unfortunately, however, statistical indicators for these variables are not available, and they are thus difficult to use in comparative analysis or to incorporate into predictive models.

2.3.4   Organisational structure and corporate culture

We do not propose to summarise here the very large literature on organisational structure and the various typologies of corporate culture which have been developed within the disciplines of organisational theory and the sociology of work.[2] There does, however, appear to be a consensus in the literature

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[1]   Gray J, *False Dawn; the Delusions of Global Capitalism,* Granta Books, Cambridge, 1998.

[2]   We are, together with colleagues in six other EU countries, in the EC-funded SOWING project, currently developing a research instrument for comparing corporate cultures in different national contexts.

on teleworking that it is most likely to develop under certain conditions.

The evidence suggests that teleworking works best where hierarchies are flat, bureaucratic rules are minimised, job descriptions are flexible and workers are encouraged to work to targets which they have negotiated with their managers or team-mates.[1] Because management by results is a crucial component of effective telework management, it is also most likely to be adopted within cultures which are open and meritocratic. Work cultures in which advancement depends on 'schmoozing', 'informal networking', or developing a strong personal relationship with the boss are likely to be those where teleworking is contra-indicated. At least where more senior, knowledge-intensive jobs are concerned, teleworking tends to flourish best with a managerial style which is nurturing and enabling, rather than autocratic or dictatorial; a 'maternal' rather than a 'paternal' model, in which trust plays a crucial role.

These factors may provide a partial explanation for the prevalence of home-based teleworking in the 'liberal' regulatory environments of the Anglo-Saxon countries. Because of the comparatively loose mutual bonds between workers and managers which prevail here, and the corresponding absence of formal regulation of their relationship, a context has been created in which both management by results and payment by results are relatively common, producing a concomitantly high degree of self-management by workers.

For rather different reasons (notably an egalitarian and merito-cratic work culture, stress on team-working and a general public culture of trust and honesty) the Nordic countries appear also to have generated a type of democratic work culture and horizontal pattern of inter-communication in which teleworking can thrive.

By contrast, the corporatist model appears to be more closely associated with hierarchical structures and formal, rule-driven work procedures which act as barriers to successful teleworking (although there are, of course, many exceptions in these countries, as is the case with the other types of regime).

There is also evidence that teleworking is easier to introduce into organisations which already have a well-developed electronic communications culture, in which staff are used to using voice-mail, e-mail and other forms of communication which make location irrelevant and which facilitate asynchronicity (in other words, which make it easier to shift messages in time as well as space).[2] This would suggest that there is some synergy between

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[1] See for instance, Huws U, *Teleworking: an Overview of the Research*, Department of Trade and Industry, London, 1996.

[2] See, for instance, Huws U, *Teleworking in Britain*, Employment Department, Sheffield, 1993.

cultural and technological factors in generating the preconditions for widespread teleworking.

We can deduce that teleworking is most likely to develop in countries where the organisational culture is shifting away from hierarchical, command-driven or rule-driven systems, and where advancement systems are based on merit, or the achievement of specified targets, rather than on the development of a close personal relationship with the manager which requires co-presence for its development. Countries with overly bureaucratic or paternalistic work cultures are therefore likely to offer environments which will discourage the development of teleworking.

2.3.5 Housing and household structure

A final variable which undoubtedly plays a part in determining the prevalence of home-based teleworking in any given national context is housing and household structure. Homeworking is likely to be difficult where workers are living in cramped conditions in housing which is shared by a large number of other occupants. Thus high housing costs (and therefore high housing density) are likely to be contra-indicators of home-based teleworking (as has been demonstrated by CATRAL in their research on teleworking in the Ile de France region of France, 1995[1]). Similarly, a high proportion of households with extended families is also likely to indicate a low likelihood of this form of work, since a precondition for many forms of home-based teleworking is a space in which it is possible to work undis-turbed, without interruption from other household members.

These assumptions are borne out by the evidence: the United States, Canada, Australia, Sweden and the United Kingdom all have relatively high proportions of their inhabitants living alone or in small nuclear-family-type households, combined with relatively generous allocations of space per person. By contrast the inhabitants of Japan, Spain and Italy are likely to live in more crowded conditions, with a larger average household size. This may offer part of the explanation for the relatively high incidence of mobile teleworking, in preference to home-based teleworking, in Japan.

Unfortunately the United Nations HABITAT database on housing is not complete, so we were unable to draw strict comparisons between all the countries in question in relation to this variable. Table 2.10 shows the average number of rooms per household in selected developed countries, and broadly supports this assumption, demonstrating that houses in the United States and New Zealand (with an average of 5.43 and 6.35 rooms per

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[1] Research by the Teleurba Project, supplied Christine Gauthier and Phillipe Dorin of CATRAL, Paris, 1995.

Table 2.10: Average number of rooms per household, selected developed countries

Country	Average no. of rooms
United States	5.43
Germany	4.41
France	3.80
Sweden	4.30
Austria	2.90
New Zealand	6.35

Source: United Nations HABITAT data

household respectively) are likely to be more spacious than those in Europe, which range between 2.91 and 4.41 rooms per household. It should be noted, however, that Sweden, with a high prevalence of teleworking, has slightly fewer rooms per household on average (4.3), than Germany (4.41), which nevertheless has a low prevalence of teleworking. Without further investigation it is unwise to draw firm conclusions from this evidence (it could be, for instance, that Swedish homes are more likely to be open-plan than those in Germany), but it may be concluded that household space is a necessary, but not a sufficient precondition for home-based teleworking.

It goes, perhaps without saying, that another prerequisite is that the home in question should be secure, and have an uninterrupted supply of electricity. In many developing countries these prerequisites are still not present for a substantial proportion of the population, especially in rural areas.

We can conclude that, both in terms of household structure and in terms of the domestic space available, home-based teleworking is not a viable option for the majority of the population in many developing countries.

2.3.6 Skills

A final essential prerequisite for teleworking relates to skills. At the most basic level, literacy is of course necessary. There is also a need for ICT-specific skills which may be called 'computer literacy' or 'tele-literacy'. These include keyboard skills, a knowledge of whatever software is required for the assigned task, and competence in linking the computer to whatever means of telecommunications is used for the delivery of the work. In addition, a range of tacit skills is usually necessary to function effectively from a distance. These include such things as time-management, the ability to be self-motivated, and sufficient diagnostic ability to work out who to contact, or what procedure to adopt if problems are encountered. In the case of more highly-skilled teleworking there is also, of course, a need for occupation-specific skills and qualifications, such as computer

programming skills, accountancy skills or editorial skills. Moreover, fluency in certain languages is necessary for many kinds of work, and where telephone contact with clients is involved, there may be a more specific requirement for an accent which is acceptable or comprehensible to certain national or regional customer groups.

Unfortunately there are no reliable statistics which enable us to compare countries on the IT and self-management skills of their populations, which are largely undefined. There are, however, statistics collected by UNESCO which make it possible to compare countries on the basis of the proportions of the population which have completed particular stages of education. These have been used to inform the cluster analyses which appear in subsequent sections of this report, which also makes use of data on the main world languages spoken in each country.

2.4 Conclusion

We can conclude that home-based teleworking is a form of working which is likely to be found on a significant scale only when a number of preconditions are met. These preconditions include broad access to affordable telecommunications, relatively deregulated labour markets OR the existence of collective agreements supportive of this form of working, household size and structure which permit space for private working, and the existence of appropriate skills in the population. These preconditions are at present most commonly found in the Anglo-Saxon and Nordic countries, and in highly developed urban centres, such as Singapore. They are also found, to a lesser extent, along with other forms of individualised teleworking such as mobile working, in other developed countries.

In most developing countries, however, we find a concentration of the factors likely to constrain the development of this form of working on any scale, including:

- a high proportion of the population living in rural areas

- poor quality fixed telecommunications infrastructure and low teledensity

- low mobile teledensity

- high telecommunications cost relative to per capita income

- cramped housing conditions

- lack of continuous supply of electricity to many homes.

In some developing countries these conditions are exacerbated by other contra-indications of home-based or mobile teleworking:

- low literacy levels

- lack of IT specialists and IT training leading to low tele-literacy

- small proportion of population speaking world languages

- hierarchical and/or paternalistic organisational culture.

It seems to be the case, therefore, that this form of working is highly unlikely to take place on any significant scale in developing countries in the short to medium term. Where it does exist, it is likely to be confined to a privileged, IT-literate minority living in spacious and secure accommodation, with access to home telephones and an uninterrupted electricity supply. This minority may include foreign employees of multinational corporations living in or travelling through the country in question, as well as local residents. And there may be situations where transient forms of individualised teleworking are closely linked with the tourist industry.

In order to understand the impact of ICTs on employment in the developing countries, it will be necessary to look at other forms of remote telemediated work. These are investigated in the remaining chapters of this report.

3. The Regional Dimension

An important development in recent years has been the relocation of certain functions out of central or branch offices to remote regions. This process, which often follows on from a general functional reorganisation involving the use of telematics, frequently involves concentrating a large number of workers on a single site. The growth of call centres and remote back offices dealing with routine functions such as data entry has recently attracted considerable attention. This development is believed to have been dramatic and in some developed countries to be resulting in a new industrial geography.

3.1 Prevalence

Call centre work has been estimated to be growing at 30 per cent per annum in the EU as a whole and as much as 50 per cent per annum in the UK which, along with Ireland, the Netherlands, Belgium and Denmark, is one of the most favoured locations for call centres in the EU. It was estimated in 1997 that there were already 1.1 million call centre workers in the UK (half the estimated European total) and that one worker in 250 across the EU was working in a call centre, of whom 15 per cent were in pan-European call centres.[1] As one report from the London School of Economics commented, 'there are at least thirty times as many computer telephonists as coal miners in Britain today; more people work in this sector than in coal, steel and vehicle production put together'.[2]

In other parts of the world and other time-zones, a similar phenomenon has been noted, with certain regions, such as New Brunswick in Canada and Tasmania in Australasia, emerging as favoured locations for this type of work. In some cases this is

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[1] Fernie S and Metcalf D (1998), *(Not) Hanging on the Telephone: Payment Systems in the New Sweatshops*, Centre for Economic Performance Discussion Paper 390; and Datamonitor, *Call Centres in Europe,* 1997.

[2] Fernie S, *Call centres — the Workplace of the Future or the Sweatshops of the Past in a New Disguise?,* Centrepiece, Centre for Economic Performance, London School of Economics, 1998.

encouraged by the availability of development grants, tax breaks and other incentives.[1]

In the United States, the market consulting firm Frost and Sullivan[2] reported that the 1996 domestic market for call centre services generated revenues of US$15.4 billion. They forecast the compound annual growth rate in the US call centre services market from 1996 to 2003 to be 15.8 per cent. They further reported that more than half of the largest companies in the United States use toll-free numbers for customer services and a majority of US advertisers use or plan to start using call centres in their businesses. Another study, by Input[2], an IT marketing company, estimates that the US call centre operations market will grow even more rapidly, at 21 per cent annually, from US$7 billion in 1998 to US$18 billion in 2002. Datamonitor[2] calculated that in 1998 three per cent of the US working population was already employed in call centres, with a total of 1.55 million agent positions in the US call centre market. At a 6.5 per cent annual growth rate, the number of agent positions was forecast to grow to 1.979 million by 2002. In another estimate, Davox, citing F.A.C./Equities, expressed the view that in 1998 there were approximately 7,000,000 agents working in 70,000 call centres in the US, with an annual growth rate of up to 20 per cent in agent positions.[2] Yet another study, by Dataquest (1997) forecast that the US call centre market would double between 1997 and 2001, with a particularly rapid growth in 1998 and 1999 stimulated by Year 2000 compliance programmes.[3]

It must be emphasised that the quoted figures for the spread of call centres are mainly based on informed guesswork and vary widely depending on the source. For instance, in the UK the London School of Economics' total of 1.1. million call centre workers is disputed by Incomes Data Services, who estimated in 1998 that the total stood at only 150,000, after carrying out a survey of 120 call centres in 75 companies, which they calculated represented one-fifth of the UK total.[4] By contrast, call centre consultant Simon Roncoroni, of the L & R Group, estimated at around the same time that the call centre workforce stood at a total of 650,000 to 800,000, using a rough-and-ready methodology which consisted of: *a group of consultants got together and listed all*

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[1] Balka E, *Long Numbers and Wrong Numbers: New Technology and the Restructuring of Women's Work in Telecommunications in Atlantic Canada,* paper presented at the International Media and Communication Researchers Conference, University of Strathclyde, Glasgow, July 26-30, 1998.

[2] Dawson K, *Call Center News Service,* December, 1998.

[3] Dataquest, *US Inbound Call Center Market Share and Forecast,* Dataquest Market Statistics Report, April, 1997.

[4] Incomes Data Services, *Pay and Conditions in Call Centres 1998,* IDS Report No. 771, October, 1998.

the call centres we knew of and added up the total number of workstations'.[1] An article in a specialist call centre journal in January 1998 quoted estimates of the number of call centres ranging from a combined total of 1,700 in the UK, Ireland, Belgium and the Netherlands (by the Mitial Group) to 5,000 in the UK alone (by Schema).[2] In subsequent correspondence, a Schema representative pointed out that the smaller figure was based on 'organised call centres of 20+ seats', while in the latter case,

> *'Schema's research suggests that the number of call centres in the UK had increased from 5,000 in early 1996 to around 7,000 in early 1997. However, fewer than 15 per cent of these (about 900 call centres in total) have 25 or more agent positions. The vast majority of UK call centres (more than two-thirds) have between 10 and 24 agent positions, whilst the remainder are very small installations with fewer than 10 seats.'*[3]

Part of the explanation for these variations may lie in a difference of definition. Should the term 'call centre' be applied to any office where a group of workers has the specialised function of communicating information with remote callers using a computerised database for reference? Or should it be confined to cases where this function is geographically separate from the rest of the organisation? And should inclusion be confined to routine functions, or should it be extended to the more highly-skilled types of information provision which are increasingly delivered telematically?

There is now, for instance, considerable evidence that the call centre approach is being extended to central[4] and local government functions.[5] If this becomes widespread, it could lead to occupational groups as diverse as social workers, nurses, librarians, public health inspectors and council tax collectors spending increasing amounts of their time working under call centre conditions. Call centres, known in this context as 'public

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[1] Roncoroni S, *Call Centres–a New Way of Working*, presentation and verbal communication at Institute of Personnel and Development Annual Conference, Harrogate, October, 1998.

[2] 'How Many Call Centres in Europe?', *Inbound Outbound,* December/January, 1998.

[3] Letter to *Inbound Outbound* from Jo Piggot, Partner, Schema, 1998.

[4] Deloitte and Touche Consulting Group, *Government Direct: A Prospectus for the Electronic Delivery of Government Services,* unpublished document, Deloitte and Touche, London, 1997 and Parliamentary Office of Science and Technology *Electronic Government: Information Technologies and the Citizen*, UK Parliament, London, 1998.

[5] Huws U, *Teleworking in Local Government: Assessing the Costs and Benefits,* Local Government Publications, Improvement and Development Agency, 1999 and SOCITM, *IT Trends in Local Government, 1997/98*, 1997.

enquiry points' have already been introduced to deal with information requests from the general public about a wide range of central government information. To take another example (from the private sector) it is now becoming common for large corporations to introduce call centre conditions into their human resources departments, where it has been found that members of staff feel that it is more 'private' to discuss personal matters over the telephone than in person in an open-plan office.[1] A definition which was extended to cover all these groups would, of course, produce much higher estimates than one which was more narrowly focused.

Even if a universally applicable definition could be agreed, it would still be extremely difficult to draw international comparisons: in no country is there yet an occupational category 'computer telephonist' which would enable such workers to be tracked in the official statistics.

An alternative method of collecting information would involve surveys of employers designed to identify the extent to which information-processing activities have been functionally separated and are located on remote sites or outsourced to subcontractors. We have developed a methodology for carrying out such surveys, based in part on surveys already carried out in the UK and elsewhere. This has been put into operation in two surveys carried out under the auspices of the United Nations University Institute of Technology. One, funded by the International Development Council of Canada, in India; and one, funded by the United Nations Development Programme, in Malaysia. However at the time of going to press, the results of these surveys had yet to be published.

The breakdown between in-house and outsourced activities is an important one. Some researchers have already attempted to produce forecasts which take account of this distinction. According to the Meta Group (1998), by 2001 more than 75 per cent of Global 2000 companies will outsource some function of their help desk, a growth rate of more than 35 per cent annually.[2] Datamonitor estimated in 1997[3] that of the 270,000 agent positions in call centres in Europe (predicted to rise to 445,000 in 1998 and 670,000 in 2000) some 62,000 (or 23 per cent) were outsourced, and produced a forecast that by the year 2001 the number of outsourced agent seats in the major EU countries would be as Table 3.1

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[1] Unpublished research, Institute for Employment Studies, Brighton, 1998

[2] Meta Group, November, 1998.

[3] Datamonitor, *Call Centres in Europe*, 1997.

Table 3.1: Estimated EU call centre agent positions

Country	Total positions, 1996	Est. no. of outsourced positions, 2001
UK	121,500	21,000
Germany	45,900	15,000
France	45,900	10,000
Benelux	40,500	7,000
Spain	10,800	6,000
Italy	5,400	5,000

Source: Datamonitor, Call Centres in Europe, 1997

According to Datamonitor, and to the Henley Centre,[1] the development of call centres has been held back in Germany by the existence of prohibitions on unsolicited calling and strict regulation of working hours. The low incidence in Italy has resulted from a general unwillingness to use the telephone as a business tool.

3.2 Factors affecting location

In the present state of information any attempt at precisely quantified international comparison is out of the question. It is however possible, on the basis of extrapolation from a few local studies, interviews with employers, focus groups and case-study information, to draw some tentative conclusions about the factors likely to influence the spread of this type of work and the characteristics of the locations in which it is most likely to develop.

A study carried out by IES in the UK for the Rural Development Commission[2] used a literature review and interviews with employers, relocation consultants, telecommunications suppliers and local development agencies to establish the criteria which were used for selecting locations for call centres and remote data entry functions. Statistical indicators were then found for the most critical of these criteria. These were collected at a disaggregated local level and used as the basis for a cluster analysis to identify, at a county and district level, those areas most likely to attract these types of activity.

The evidence suggests that when selecting a site for a large back office function, employers take a number of factors into account:

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[1] Henley Centre, *Teleculture Futures,* London, 1997.

[2] Huws U, Honey S and Morris S, *Teleworking and Rural Development,* Rural Development Commission, Swindon, 1996.

- low labour costs

- availability of a plentiful supply of labour, especially part-time clerical labour, and (at least when incoming call-centre work or data entry work is involved) especially female labour

- appropriate skills, especially, language/communication skills and keyboard skills

- availability of suitable premises

- availability of development grants

- availability of high-capacity communications links

- good transport infrastructure.

The results of the cluster analysis, when tested empirically against the evidence for the existing distribution of call centres in the major banks and airlines, appeared to match the reality of back office relocation very accurately. They demonstrated that in the UK the areas in which this type of teleworking are most likely to be found are in the main not rural but urban, and are concentrated in regions of declining heavy industry. To quote from the report,

> 'This cluster included all the former metropolitan counties with the exception of London and with the addition of Lancashire, Cleveland, Durham, Nottinghamshire and East Sussex. These counties share a number of features which make them potentially attractive sites for relocated back office functions. Firstly, they are readily accessible; with a very small proportion of the population out of easy reach of a main station. Secondly, they have high rates of unemployment combined with low wage levels. Thirdly, they have high population density. This indicates the presence of a substantial pool of labour prepared to work for relatively modest pay. On the negative side, qualification levels are low on average, but in a densely-populated area with high unemployment this creates a smaller problem than it might in a rural area, because employers have a wide choice. It must also be acknowledged that most of the functions carried out in these centres require only a modest level of skill.

> We must conclude that rural areas will only be able to attract this type of employment in exceptional circumstances: if, for instance the employer has some special reason for wishing to cultivate a rustic image; if the area is centrally located; if the operation is fairly small-scale, if sophisticated infrastructure is in place; or if generous grants are available.'[1]

In North America, the Call Center University has developed a model for optimising the choice of location for a call centre, using the following local data:

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[1] Huws, U, Honey, S. and Morris, S, *Teleworking and Rural Development,* Rural Development Commission, Swindon, 1996.

Population statistics

- growth trends

- age composition

- education level of available workforce

- average or median income and local wage scale

- historical and current unemployment statistics and trends

- availability of part-time workers

Community considerations

- local competition from other call centres

- crime statistics

- industrial market employment

- cost of utilities

- housing availability and cost of housing

- availability of existing suitable building space

- overall perceived quality of life index

- co-operative arrangement potential with local education facilities

- proximity to primary customer base

Telecommunications issue

- local and long distance carrier support and availability of current technologies

- possible use of existing equipment

- potential for redundancy in network (local and long distance)

- current telecommunications infrastructures

- distance from corporate computing systems

Building specifications

- structural appropriateness for call centre purposes

- space requirements

- safety requirements

- distance from public transportation and restaurants

- ADA compliance, parking availability and safety

- expansion space availability

- electrical feeds and reliability

Other concerns

- availability of local and state incentives

- legal environment (such as telemarketing restrictions or silent monitoring limitations)

- other internal company issues.[1]

The authors recommend the weighting of each of these criteria on a scale totalling 100 points, and the use of a decision matrix to ensure an objective choice.

Whilst it is unlikely that all companies are this systematic in their choice of site, these criteria nevertheless shed useful light on the factors which contribute to the attractiveness of any given location for this kind of activity.

In attempting to explain why call centres should have developed more rapidly in the UK than in the rest of Europe, Simon Roncoroni[2] gives the following reasons:

- a liberated telecoms environment

- more flexible labour laws

- available labour

- available part-time labour force

- more developed service orientation

- closer links with the United States.

This example demonstrates the difficulty of distinguishing between the growth of call centres within a country, to serve the national market, and the selection of a location for a call centre to serve an international market. Roncoroni is undoubtedly referring to both when enumerating these advantages. Factors relating to the location of international call centres will be discussed in the next chapter of this report.

Despite this ambiguity, the evidence suggests that at a national level the factors leading to a high prevalence of home-based and mobile teleworking, discussed in the last chapter, may also be associated with a high prevalence of call centres, and possibly also with other forms of relocated back office functions.

Given the predominance of customer service in call centre activities, it seems likely that other factors which are likely to be

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[1] Idan C, TCS Management Group, *Call Center Site Selection*, Call Centre University, 1998.

[2] Roncoroni S, *Call Centres — a New Way of Working*, presentation at Institute of Personnel and Development Annual Conference, Harrogate, October, 1998.

positively associated with call centres at a national level will include:

- high teledensity

- relatively high per capita incomes

- large service industries, especially financial services, retail and travel/tourism

- a deregulated and competitive service sector

- minimal legal restriction on unsolicited or 'cold' calling (which is banned altogether in some countries, such as Denmark and Germany, and subject to restriction in many others)

- availability of advanced telecom services such as telecommunications caller identification (TCI)

- high usage of credit and or debit or charge cards.

3.3 Countries where call-centres and relocated back offices are to be found

There is no reliable source of data enabling valid international comparisons to be made of the development of relocated back office work. Academic studies are few and far between and the main sources of information are market research surveys and case studies which are necessarily variable in their definitions and methodologies and patchy in their coverage. In some cases, additional information can be gleaned from trade sources.

One indicator of a substantial number of call centres in any given area is the existence of a sufficiently large critical mass of call centre managers to support a local conference. We investigated two of the largest companies organising conferences for call centre managers and discovered that one, Advanstar, was planning conferences in late 1998 or early 1999 in the following locations:

- USA (four conferences, in California, Texas, Washington DC and Illinois)

- Canada (one conference, in Toronto)

- Brazil (two conferences)

- South Africa (one conference, in Johannesburg)

- UK (three conferences, all in London)

- Netherlands (two conferences, both in Amsterdam)

- Germany (one conference, in Cologne)

- France (one conference, in Paris)

- Australia (two conferences, in Sydney and Melbourne)

- Singapore (one conference, designed to serve neighbouring Asian countries as well as Singapore itself. An indication of the scale of the event can be deduced from the fact that the

previous year's conference attracted about 100 registered delegates and the attendant exhibition, featuring 70 exhibitors from 11 different countries, attracted 3,279 attendees).[1]

The second company, the Incoming Calls Management Institute[2], offers seminars for call centre managers, and was planning, in late 1998 and 1999, to hold them in the following locations:

- United States (thirteen seminars, in Massachusetts, Nevada, Arizona, Florida, Texas, Washington, New York, California, Nebraska, Illinois and North Carolina)

- Canada (two seminars, both in Toronto)

- Australia (two seminars, in Brisbane and Sydney)

- New Zealand (one seminar, in Auckland)

- France (one seminar, in Paris)

- Germany (one seminar, in Frankfurt)

- Ireland (one seminar, in Dublin)

- The Netherlands (details not specified)

- Denmark (one seminar, in Copenhagen)

- South Africa (one seminar, in Sandton)

- UK (two seminars and one conference, all in London).

With the exception of Brazil and South Africa, these are developed countries where there is recorded evidence of other forms of teleworking. This evidence supports our earlier conjecture that there is probably a close correspondence between the two forms. Despite their global reach, the North American location of both of these conference companies probably indicates a bias towards English-speaking countries in their coverage, and it seems likely that some other regions of the world not represented here may nevertheless have significant numbers of call centres.

Searches of the internet and the trade press indicate the presence of call centres in Japan, Hong Kong, Malaysia and other Asian countries, and also in Israel and elsewhere in the Middle East. There is evidence too of call centres in Namibia, and in Barbados and other parts of the Caribbean.[3] Latin America also appears to be regarded as a growth area. In order to give a flavour of the growth of call centres in developing countries and the issues affecting this growth, we quote from a press release from a company which has established a call centre in Mexico:

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[1]   Information from Advanstar, December, 1998.

[2]   Incoming Calls Management Institute,
      http://www.incoming.com/seminars/confdates.html, 1998.

[3]   Dawson K, *Call Center News Service,* various dates.

'Atención Telefónica, a Mexico City-based call centre company, has launched a "one stop shop" service for US high tech companies entering the growing Mexican market. The company is offering a complete line-up of services from traditional telesales and after sales customer service to assistance with regulatory issues and public relations, warehousing, invoicing, collections and delivery.

The company started operations in October 1995 with 16 seats and a few clients in industries as diverse as cement and banking. It now boasts a state-of-the-art 350 seat facility located 5 minutes from Mexico City's main arterial roads and only 10 minutes from the high-tech development "Santa Fe". In the last two years, Atención has seen a preponderance of high-profile clients in the telecommunications and computer industries, including companies such as Telcel (the cellular phone subsidiary of Telefónos de Mexico (Telmex)), Skytel (the world's largest paging company) and Microsoft.

Indeed, huge flows of telecom and computer-related imports and investments are entering Mexico as a result of the trade opportunities created by the North American Free Trade Agreement (NAFTA) and the ongoing privatisation of lucrative sectors of the Mexican economy such as telecommunications, satellites and power generation. In the telecoms sector, long-distance telephone service was opened to competition in January 1998 and both AT&T and MCI have partnered with Mexican entities to establish local challengers to Telmex's long-held monopoly. In 1999 the local telephone service will be privatised for the first time in decades, opening up further opportunities. In a recent speech at the opening of the second international call centre congress in Mexico, Carlos Casasús, President of the Federal Telecommunications Commission (COFETEL) assessed the growth potential of the Mexican telecoms market as big enough to support four companies the size of Telmex if Mexico achieves similar levels of telephone penetration to countries like Korea, Taiwan and Singapore in the next 15 years.

With more than 70 per cent of its rapidly growing population of 100 million or so less than 35 years of age and per capita income slowly creeping back after the peso crisis, Mexico is a much sought after growth market in its own right. P.C. growth numbers for example are above the worldwide average. Perhaps more importantly, Mexico is the gateway to the rest of Latin America, the market El Dorado of the future for everything from sneakers to satellite-based cellular phones. By the year 2010, U.S. exports to Latin America are expected to exceed those to the EU and Japan put together. Major investments are announced almost daily by U.S. companies. And others want to get closer to Mexico. Last week the Mexican government met with the European Union for the first round of negotiations on creating a free trade accord.

In line with these developments, innovative marketing techniques have taken off in recent years — sidestepping traditional distribution channels at the same time as they satisfy the thirst of Mexico's new breed of consumer for quick, convenient service. The most successful of these is direct marketing.

The development of 800 (toll free) numbers has been explosive. In 1994 there were less than four thousand. Now there are over one hundred thousand. International 800 numbers have also been introduced, allowing Mexicans to receive toll free calls from most countries. The first telemarketing company was established in 1992.

Now, only 6 years later, twelve companies have more than three hundred seats each and the industry supports twelve thousand employees.

Atención has been a major beneficiary of these developments. In addition to expanding the scale of its call centre, it has been able to make major capital investments, such as the purchase of a predictive dialler with the capacity to make over one million calls per month, a fleet of 30 cars, minivans and motorcycles for its delivery service, and a 650 cubic meter distribution centre complete with flow racks and logical routing.

The increasingly international profile of its clients has recently prompted Atención to join a strategic alliance of call centre companies worldwide. Spearheaded by leading U.S. call center company Sprint TELECENTERS, Inc, the alliance allows Atención to leverage the complementary expertise of its partners in Japan, Europe and Australia, offering clients access to uniform competencies and service standards in all major international consumer markets.

Atención's ambitions include the market for Spanish-language telemarketing in the United States. Although telecom costs are higher for a Mexico-based operation, operator wage differentials between the U.S. and Mexico are so massive that it does not take long for Atención to be ahead in cost comparisons against U.S. telemarketers.

According to Carlos Romano, the President of Atención, "There is an enormous interest in the Mexican market by high tech firms from North of the border and elsewhere. Despite the liberalisation of many sectors of the Mexican economy, there are still hurdles to doing business here which are more difficult to overcome than just the language barrier. To give an example, credit card usage is not yet so widespread here as in the United States. Around 70 per cent of payments are COD. To get around this logistical problem, we offer both a delivery service and a collection service. Another problem in Mexico is local regulation. Mexico is still on many levels a local economy with local red tape which can be difficult for foreigners to penetrate. We have experience in dealing with all levels of government and can intermediate for foreign companies. Our goal is to give our clients real benefits through integrated value-added solutions, and not just a menu of disjointed services."[1]

Once again, it is apparent that it is difficult to distinguish between call centre activities providing a service to local businesses and consumers, and those designed to serve a wider, international market. Even when it is the local market which is being addressed, it may be necessary to draw a further distinction between activities involving the marketing of foreign goods and services to the local population and those which serve indigenous companies. Whilst recognising that there is considerable overlap between these categories, we address the international dimension in the next chapter of this report.

Confining ourselves to the consideration of relocated back office functions within national boundaries, it seems likely that this

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[1] 'Mexican Call Center Helps US Firms Reach Mexican Consumers', Atención, press release, Mexico City, November, 1998.

follows closely the general pattern of economic development, especially the development of domestic markets for consumer goods and business services.

This assumption allows us to present (somewhat tentatively) in Table 3.2 opposite, a classification of countries according to their likelihood of housing call centres and relocated back offices, on the basis of a 'blind' cluster analysis.

It must be emphasised that this analysis is based only on relatively few economic indicators[1] and does not take account of all the cultural, social and regulatory factors which might profoundly influence these patterns. One obvious anomaly, for instance, is India, which is placed by this analysis in the 'low prevalence' category. Its very large population serves to dilute, statistically speaking, the impact of the recent rapid expansion of its service sector and growth in telecommunications infra-structure, and render relatively insignificant its large graduate English-speaking population. Anecdotal[2] and trade evidence suggests that India in fact has a number of call centres serving the domestic market.

No doubt there are other anomalies, equally obvious to those with first-hand knowledge of the countries concerned. Rather than adjust this analysis in the light of such, inevitably partial, information, we present it here in its raw form as a starting point for future research. It should be noted that some countries, for which the relevant data were not available, are missing from this analysis.

The distinction between telemediated work carried out within national boundaries for a domestic market and that which is relocated across national borders is, as already noted, becoming increasingly difficult to draw. In the future, this differentiation seems likely to become even harder to make, as a result of a number of factors including the globalisation of markets, the removal of controls on imports and exports of capital and information, the development of a liberalised, global telecommunications environment, and the impossibility of policing the internet.

In such a context, it seems likely that cost competitiveness will become fiercer and there will be an increasing pressure to respond to customer requirements regardless of time-zone or

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[1] Relating to GDP per capita, education levels, teledensity, internet access, growth in telecommunications and the proportion of the population living in urban areas.

[2] Including our own observation of prominent advertisements in major Indian cities on hoardings and in newspapers for mobile telephone companies, credit card companies and computer suppliers, giving details of call-centre telephone numbers.

Table 3.2: Likely prevalence of relocated back offices or call centres within national boundaries, serving domestic markets

High prevalence	Moderate prevalence	Below-average prevalence	Very low prevalence
Australia	Antigua and Barbuda	Algeria	Albania
Austria	Argentina	Belarus	Angola
Belgium	Bahamas, The	Belize	Armenia
Canada	Bahrain	Bolivia	Azerbaijan
Cyprus	Barbados	Brazil	Bangladesh
Denmark	Botswana	Bulgaria	Benin
Finland	Brunei	Dominica	Bhutan
France	Chile	Dominican Republic	Burkina Faso
Germany	Colombia	Ecuador	Burundi
Guadeloupe	Costa Rica	Equatorial Guinea	Cambodia
Guam	Croatia	Estonia	Cameroon
Hong Kong	Czech Republic	Fiji	Cape Verde
Iceland	French Polynesia	Grenada	Central African Republic
Ireland	Gabon	Guatemala	Chad
Israel	Greece	Hungary	China
Italy	Korea, Rep.	Indonesia	Comoros
Japan	Macedonia, FYR	Iran, Islamic Rep.	Congo, Dem. Rep.
Kuwait	Malaysia	Jamaica	Congo, Rep.
Luxembourg	Malta	Jordan	Cote d'Ivoire
Martinique	Mauritius	Kazakhstan	Cuba
Netherlands	Mexico	Latvia	Djibouti
New Zealand	Netherlands Antilles	Lebanon	Egypt, Arab Rep.
Norway	Oman	Lithuania	El Salvador
Singapore	Panama	Maldives	Eritrea
Sweden	Portugal	Morocco	Ethiopia
Switzerland	Puerto Rico	Namibia	Gambia, The
United Kingdom	Qatar	Papua New Guinea	Georgia
United States	Saudi Arabia	Paraguay	Ghana
Virgin Islands	Seychelles	Peru	Guinea
	Slovak Republic	Philippines	Guinea-Bissau
	Slovenia	Poland	Guyana
	South Africa	Romania	Haiti
	Spain	Russian Federation	Honduras
	St Kitts and Nevis	St Lucia	India
	Trinidad and Tobago	St Vincent/Grenadines	Kenya
	United Arab Emirates	Suriname	Kiribati
	Uruguay	Swaziland	Korea, Dem. Rep.
	Venezuela	Syrian Arab Republic	Kyrgyz Republic
	Yugoslavia, FR	Thailand	Lao PDR
	(Serbia/Montenegro)	Tunisia	Lesotho
		Turkey	Liberia
		Vanuatu	Madagascar
			Malawi
			Mali
			Mauritania
			Micronesia, Fed. Sts.

Source: Analysis by Nick Jagger and Ursula Huws, IES, 1998

language. These will drive a growing international division of labour in information processing work, which is the subject of our next chapter.

3.4 Conclusion

We can draw the general conclusion that the large-scale relocation of telemediated work within countries, in order to serve the domestic market, is to date mainly a phenomenon of the developed world. However, it is expanding dramatically and is rapidly becoming a global phenomenon. Its development in any given country is likely to run in parallel with general economic development, in particular bearing a close correspondence on the one hand to the development of domestic consumer markets and financial services, and on the other to the development of the telecommunications infrastructure.

It is therefore important to study the potential for this type of work, as well as to identify its existing distribution. In order to do so effectively there is an urgent need for empirical work, including surveys and case studies, in order to identify the appropriate indicators, so that work can be set in motion to monitor its development.

Even more important than its development within national boundaries, however, is its effect on the international division of labour. In the long term, the most crucial impact is likely to arise from the increasing tendency of this kind of work to move across borders. This is considered in the next chapter.

4. The Global Dimension

An international division of labour in information-processing work is not in itself new. To give one example, British publishers were sending non-urgent work to be typeset in Hong Kong, Malaysia and Malta as early as the 1960s.[1]

By the early 1980s, regular reports were appearing in the American trade press about routine data entry work being carried out overseas using a telecommunications link to transmit completed work, although paper-based source material was still being physically transported to the remote site, normally by air freight. In March 1982, *Business Week* reported that a number of US companies had been sending 'over-sized data entry jobs' overseas for 'over a decade' — usually to the Caribbean or the Far East. It quoted the example of the A.C. Nielsen Company which processed its magazine subscriptions in Ireland; the Analysis and Programming Corporation, based in Greenwich, Connecticut, which carried out about US$2 million worth of data entry annually at facilities in Grenada and St Kitts; the California-based Saztec Corporation, which flew batches of paper copy to Singapore to be keyed in for later transmission to Australia; and the newly-formed Satellite Data Corporation which was setting up a direct satellite link to transmit completed data entry work from Barbados to New York. It also reported on opposition to such developments from firms which carried out their data input in the United States, quoting the president of Input Services Inc. as claiming that this Atlanta-based company had 'lost millions of dollars to contracts to offshore firms.'[2]

An article in the *New York Times* later that year stated that routine data entry had been carried out overseas for 'at least 15 years', citing large corporations like AT&T as pioneers in the field and claiming that 'at least a dozen companies offer such services using facilities in the Caribbean, Ireland, India, Korea, Taiwan and the Philippines'. The article also noted that a Dallas company, Pacific Data Services, had recently opened up a data

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[1] Witnessed first-hand at Penguin Books in 1970, when it was already a well-established practice.

[2] 'The Instant Offshore Office', *Business Week*, March 15, 1982.

entry business in China, with 96 terminals operated for three shifts a day.[1]

In 1983, *Datamation* reported[2] that American Airlines had closed down its data entry operation in Tulsa, Oklahoma and hired 200 Barbadians to do the work. The same article described other examples of offshore teleworking, pointing out that although this had in the past usually involved low-skilled work, such as data entry, it was now beginning to be applied to more highly skilled work, claiming that National Semiconductor had gone to Israel to find engineers, scientists and technicians to develop its 32-bit micro; while Burroughs regularly employed software develop- ment staff in India, via an agreement with the software subsidiary of the Indian industrial giant, Tata.

The following year the *Global Electronics Information Newsletter*[3] reported that there were at least five separate employers in India's Santa Cruz Electronics Exporting Zone in Bombay producing software for export, while a San Francisco software company called Sinoam was offering the services of 250 Chinese computer science graduates, based in Beijing and Shanghai, to its American clients. The next issue of this newsletter reported on a data entry facility in China based at the QingHua University in Beijing and employing over 200 operators who were familiar with the English alphabet, though not the English language. The company advertised a capacity of over 5 billion keystrokes a year and claimed a cost saving of 50 per cent compared with work carried out in the United States.[4] This development was also reported in the local Californian press, which noted that these Chinese students earned about US$7 US per week, with a 99.95 per cent rate of accuracy.[5]

After studying this evidence in 1983 and 1984 we concluded that an international division of labour was beginning to develop in service industries very similar to the one which had become familiar in manufacturing industries like electronics, clothing, textiles and automobile manufacture during the 1960s and 70s.[6]

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[1] 'Latest Technology May Spawn Electronic Sweatshop', *New York Times*, October 3, 1982.

[2] 'Our Newest High-tech Export: Jobs', *Datamation,* May, 1983.

[3] 'Indian Software' and 'Chinese Software' in *Global Electronics Information Newsletter*, March, 1984.

[4] 'Chinese Office Work', in *Global Electronics Information Newsletter*, April/May, 1984.

[5] 'Satellites help firms move clerical work', *San Jose Mercury News,* April 23, 1984.

[6] Huws U 'Opening Address, ISIS International Conference on New Technology and Women's Employment', *ISIS Bulletin*, Geneva, Autumn 1983; 'The Runaway Office Jobs', *International Labour Reports*, March-April, 1984.

The new information and communication technologies had delocalised many forms of information-processing work, giving them the potential to become 'runaway jobs' as had already happened to many low-skilled manufacturing processes. This offered new opportunities for developing countries but could render precarious some forms of service employment in developed countries which had previously been regarded as growth areas. However, many of the types of work involved, especially data entry, were likely to be transitory in nature, because they would eventually become obsolete as newer technologies were adopted. Such developments included an increasing tendency for data to be captured at source, optical character recognition and voice recognition.[1]

By the mid 1990s it had become apparent that the scale of cross-border relocation of information processing work was considerable, and that it extended beyond simple data entry to work involving voice telephony and email communication, as well as higher-skilled work such as computer programming, accountancy and interactive work involving membership of virtual teams. It was also becoming clear that this type of employment is extremely footloose, with companies engaged in a constant search for ever-cheaper sources of labour. Thus, for instance, companies which previously carried out their data entry in Barbados were moving to the Dominican Republic; those which had set up remote offices in Ireland were investigating alternative locations like Portugal; and those which had made use of computer programming staff based in Bombay had begun to recruit programmers in the former Soviet Union.[2]

By the early 1990s, a few more systematic studies of this form of employment had been begun, mainly consisting of case studies, including those by the ILO (1990), Brain and Page for the European Commission (1992), Posthuma (1987), Soares (1992), Pantin (1995), Pearson (1993) and Warf (1995).

The starting point for most of these studies is a review of the existing literature. This inevitably means that the countries and cases already noted by researchers provide the focus for much of the discussion. This raises the danger that a normative process may develop whereby these countries come to be seen as sharing certain characteristics which make them uniquely suitable as locations for this type of work, and that these characteristics, in turn, become reified as necessary pre-conditions for offshore teleworking.

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[1] Huws U 'The Global Office: Information Technology and the Relocation of White-collar Work' in *Third World Trade and Technology Conference Papers,* Third World Information Network, 1985.

[2] Huws U, *Teleworking: an Overview of the Research,* Joint publication of the Department of Transport, Department of Trade and Industry, Department of the Environment, Department for Education and Employment, and Employment Service.

Other cases in other countries which simply have not attracted the same attention of reporters are thus left invisible (a similar process occurred in the early days of research on home-based teleworking, when a few companies, accidentally discovered and named by us as illustrative examples in the earliest study in the UK[1] became the basis for a large number of studies by other researchers, and were drawn on for the construction of elaborate definitions as though they were the only cases which existed). Aware as we were of the essentially arbitrary way in which these early cases had been identified and reported, we were reluctant to make assumptions in this study that they constituted anything approaching a definitive list of types or cases.

Unfortunately, however, there appeared to be no reliable basis for constructing a more complete and objective picture. Despite a vast (and often highly theoretical) literature on globalisation (usefully summarised by Radice[2]), we are aware of few serious attempt to quantify this development, and the empirical evidence remains largely anecdotal.

It is clear that before definitive answers can be found, a great deal of research remains to be carried out on the scale and characteristics of the activities and companies involved in this process, the technical, economic, legal and social factors which constrain or encourage these developments, the criteria which determine choice of location, and the size, demographic and skill characteristics of the workforce.

4.1 Difficulties of measurement

The challenge of quantifying this development is a formidable one. Not only are the kinds of activities involved in these operations extremely diverse, and often impermanent and rapidly changing in form; they are also largely invisible in the existing national and international statistics, whether these refer to trade or to employment, by sector or by occupation.

We first summarised these difficulties in 1996.[3] Some have since received more detailed attention, *inter alia* by Neuburger and Holt (1997) and by the OECD (1998).

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[1] Huws U, *The New Homeworkers: New Technology and the Relocation of White-collar Work,* Low Pay Unit, 1984.

[2] Radice H, 'Taking Globalisation Seriously', in Panitch L and Leys C, (eds) *Global Capitalism versus Democracy, Socialist Register, 1999,* Merlin Press, Rendlesham, 1999.

[3] Huws U, 'Beyond Anecdotes: on Quantifying the Globalisation of Information Processing Work', in United Nations University Institute for New Technologies Conference on *Globalised Information Society: Employment Implications*, Maastricht, 1996 and *Teleworking: an Overview of the Research,* Department of Trade and Industry *et al.,* London, 1996.

The problems can perhaps best be illustrated with reference to a range of hypothetical examples of forms which this telemediated work might take, together with a summary of the sorts of traces each of these might leave in the national or international statistics.

One form which cross-border teleworking might take is direct employment by a local company which is a wholly-owned subsidiary of a foreign one. An example of this is Swiftair, an Indian subsidiary of British Airways to which the company's management accounting function was transferred in 1996.[1] Here, in the employment statistics, the workers would be recorded as local employees and those engaged in telemediated work would only be distinguishable from those carrying out other functions for the same employer by means of sophisticated occupational or sectoral analysis. Unfortunately, most systems of occupational categorisation make it impossible to distinguish, for instance, a data entry clerk or a computer telephonist from more general categories of clerical work. These workers would therefore be swamped, statistically speaking, by the large volume of clerical work carried out in a non-telemediated way for local employers (for instance in central government or in banking). Sectoral classification is generally similarly broad. For instance, a graphic design company producing designs for CD-ROMs for a foreign publisher would present the same profile in the statistics as one designing menus and letterheads for local hotels.

Any attempt to deduce the number of employees from the amount of trade done by this local subsidiary company with its parent company or other members of the same group will be highly problematic, since the transfer price might well be fixed at a level which is artificially high, or low, in order to minimise tax penalties or take advantage of fluctuations in currency exchange rates. Even if it were fixed at a 'market' level, it would still be difficult to extrapolate from the value of the transaction to arrive at an estimate of the number of workers involved. To make matters still more complicated, some of the value added by the workers would accrue to the parent company in the form of profits which might be repatriated in the form of dividends, but might be retained for reinvestment in the local economy.

As far as the employment statistics are concerned, workers employed in locally-owned companies (*eg*, to take another Indian example, a software company like Tata Consultancy Services, carrying out work for overseas customers) will present an identical profile to those in foreign-owned companies. Here, it might in principle be easier to deduce the scale of this activity from the trade figures, since at least the problems raised by transfer pricing and repatriation of profits do not appear. In

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[1]   Ikon, Analytica and IATA, *The Impact of Telematics on the European Aviation Industry,* Report to the European Commission DGXVIII, 1997.

practice, however, there remain a number of problems, some of which are discussed below in the context of trade statistics.

If it is difficult to estimate the numbers of workers involved in dedicated occupational groups working exclusively on the development or delivery of a standard type of product or service, it is even more so when the work involved is variable and multi-skilled. A number of trends have recently converged to create an increase in project-based work involving what might be called 'virtual teams', many of which include a cross-border element. These trends include, *inter alia:*

- the development of strategic alliances between organisations, involving an increase in the amount of collaborative working between the partners
- the creation of internal job markets within organisations resulting in the replacement of department-based or skill-based teams by *ad hoc* project-based teams
- the growth of outsourcing, often supported by EDI (electronic data interchange) networks, involving interactive working between all partners in the supply chain
- the development of co-operative networks of small companies and individuals to form 'virtual enterprises'
- the development of software which facilitates increasingly complex computer-supported co-operative working.

There is considerable anecdotal evidence that these trends have combined to produce a situation where growing numbers of white-collar workers, predominately, but not exclusively, in technical, professional and managerial occupations, are spending increasing amounts of their time working collaboratively with remote partners in this way, either in other branches of their own employing organisations or in other organisations. These working patterns are, however, by their very nature contingent and shifting in response to short-term changes, typically varying from project to project. Although some qualitative case-study evidence exists on these new working patterns, no statistical indicators have yet been identified which can give an impression of their extent in any one country, let alone provide the basis for international comparison.

Not all telemediated work will be carried out by employees in regular employment. Some might be carried out by individuals acting as sales agents for foreign-owned companies (which may include a substantial element of after-sales service, in the case of complex products like computers). To the extent that their work involves regular telemediated interaction with the source company then such people could be argued to be teleworkers. They will appear in the employment statistics, however, as own-account workers alongside others whose work is neither telemediated nor international. Even if they are paid by commission, and the fact that this money originated from abroad

is visible, this will be indistinguishable from any other form of profit made by an independent trader importing products from abroad. An associated form of employment is the holding of a local franchise to provide customer service to the customers of a foreign company. Again, essentially the same considerations apply.

Self-employment is another possibility. The ability to transmit work electronically has greatly facilitated the international dispersal of certain kinds of freelance work, in some cases making it possible to subcontract work which was previously carried out in-house, and rendering distance immaterial. Examples of this are in translation, writing, editing, graphic or web-page design, editing, certain accounting and book-keeping functions, coding, software development, software maintenance, producing abstracts of academic reports and articles and even marking examination scripts. Most large translation agencies, for instance, now have translators on their registers scattered around the globe[1] and there is considerable anecdotal evidence of IT professionals based in such diverse countries as Russia, Bulgaria, China, and Argentina using websites as a means to search for work for clients based in North America, Australia and Europe, work which is negotiated by email and then delivered over the internet. One documented case involved a full-time teleworker in Ireland who had found work with a company in Guam which was already employing teleworkers to do similar work in Pakistan, Mexico and the United States.[2] This kind of work, which usually involves a graduate-level qualification, may not necessarily be done full-time, but could be carried out as part-time secondary employment, in addition to a main job. In such cases it may be carried out illicitly and not be recorded at all in the national employment statistics.

A further form of work which may be clandestine for rather different reasons is in the telephone or internet sex-line industry. This is a shadowy area, on which little research appears to exist. An article in the *Economist*,[3] quotes an ITU estimate that 1.5 per cent of all international telecommunications traffic is telephone sex, with a global turnover of around US$2 billion a year in 1995. Part of the explanation for the international nature of this industry is a settlement system which ensures that the country in which an international call originates and the one in which it terminates share the revenue from the call. However, this situation does not necessarily result in the sex workers being

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[1]   Information from Wordbank, a London-based translation agency which provided us with a sampling frame for an international study of freelance translators, published as Huws U, Podro S, Gunnarsson E, Weijers T, Arvanitaki K and Trova V, *Teleworking and Gender*, Institute for Employment Studies, Brighton, 1996.

[2]   Unpublished information, Analytica.

[3]   'Cybersex: an adult affair', *The Economist*, 4 January, 1997.

located in the countries through which the calls are routed. The article explains:

> *'This settlement system means that the public telephone operator (PTO) of a small developing country can benefit hugely if it can generate a large amount of incoming traffic. The PTO splits its share of settlement payments with the service provider, who drums up business and provides the girls. Often, the calls are routed back over a leased line (on which there are no settlement payments) to the country where the call began. The amorous fellow thus pays for an international call to talk to a woman who may be just a few miles away.*
>
> *The prize example is Guyana, a dirt-poor country in Latin America (GDP per head around US$2,000 a year). Since the country's PTO was taken over in 1991 by ANT, an American company, it has increased its volume of incoming calls from 23.8m minutes to 139.7m in 1995, a compound annual growth rate of 56 per cent. As a result, its yearly revenue from telecommunications services is now around US$130m, or the equivalent of 40 per cent of the country's 1993 GDP, or — to put it another way — $700 per household. Not all the revenue stays in the country, but with the money that does the PTO has been building one of the region's finest telephone networks.*
>
> *The ITU points to a couple of even more extraordinary instances. Niue, a New Zealand protectorate in the South Pacific, handles many calls from Japan, one of the fastest growing markets for telephone sex. The island has more lines than inhabitants. Some of the lines are connected to answering machines rather than human operators. Others are routed back to a call centre in Toronto which is manned by operators who can speak English, French, Spanish, Greek, Italian and Swedish. Like many other countries in the business, one of Niue's selling points is that the tiny size of its population guarantees short telephone numbers. Dial the international access code of 683, and another four numbers will connect you to your heart's desire. It would be easy for the naive or ignorant to imagine they were making a local call.*
>
> *The Dutch Antilles, in 1994, was receiving the equivalent of 2,600 incoming minutes of calls for every telephone subscriber in the country and generating at least US$1,000 a head from settlement payments.*[1]

The article also mentions Moldova and Sierra Leone as sites for telephone and internet sex-line operations.

The rapid development of interactive sex-sites on the internet has opened up new possibilities for globalisation in the sex industry. Although callers are generally charged only for a local telephone call, they are also charged by means of a credit card for access to these services, which frequently involve a sex-worker following instructions sent electronically by the customer (the sex worker being visible to the customer, but not *vice versa*). If this development follows the patterns set in other parts of the sex industry, then it is likely that many of these sex workers will

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[1] 'Cybersex: an adult affair', *The Economist*, 4 January, 1997. Reproduced with permission.

be located in developing countries. As was pointed out in the launch of a recent ILO report[1] on the sex industry in Southeast Asia, 'it is very likely that women who lose their jobs in manufacturing and service sectors and whose families rely on their remittances may be driven to enter the sex sector'. The report notes that the clandestine nature of the industry makes accurate quantification impossible but estimates that in Indonesia, Malaysia, the Philippines and Thailand, between 0.24 per cent and 1.5 per cent of the total female population is engaged in prostitution, with a larger proportion engaged in related services, and that the sex sector accounts for between two and 14 per cent of GDP in these countries.

It can be seen, then, that neither population censuses nor labour force surveys will yield useful information about remote tele-mediated work. What of other sources?

If we cannot track these activities by counting the workers involved, another possibility is to attempt to track the inputs or outputs as they enter or leave each country. In the past, this has been the standard method of monitoring movements of goods across borders, and thus recording (and in some cases controlling) international trade. Related to this activity has been the tracking of payment for these goods — an essential element both in raising taxes and in keeping the national accounts.

Unfortunately, it is in the nature of services, especially intangible services, that they are much more difficult to track than goods. The manufacture of a product generally involves a variety of inputs, ranging from raw materials, intermediate products or 'parts' and intangible products, such as designs. In the case of a car, for instance, it would be relatively easy to identify and weigh a consignment of steel passing through a port, or a consignment of headlights crossing a land border in a truck. However, it would be extremely difficult to do so for a design sketch sent by fax, or a circuit diagram sent by email, or a software programme sent through the post on a floppy disk, although all three of these might make an equally important contribution to the final car. Indeed, the contribution they make in terms of value added may be considerably higher.[2]

Even if some means could be devised for monitoring the volume of international traffic on the internet in a way which would enable it to be allocated to particular kinds of economic activity, it would be impossible to use it as an accurate indicator of the

[1] Lim L, quoted in 'Sex Industry Assuming Massive Proportions in Southeast Asia; Economic Incentives and Hardships Fuel the Growth of the Sex Sector', *ILO News Release*, Geneva and Manila, August 19, 1998.

[2] Diane Coyle, *Weightless World: Strategies for Managing the Digital Economy,* Capstone Publishing, Oxford, 1997.

scale of this activity: a computer programme representing the output of many hundred person-days of labour may be much smaller, measured in terms of bytes, or of the time it takes to transmit electronically, than a single photograph of a family pet, or a few seconds of amateur video footage, representing an infinitesimal investment of labour.

If we cannot track the passage of the inputs or outputs, then perhaps a more useful approach might be to track the payment for them. After all, by its very definition, economic activity involves the exchange of goods or services for money and at some point this money must enter or leave each of the countries involved in the transaction.

Here too, however, there are immense difficulties. Firstly, the transaction may take one of several different forms, each of which will be recorded differently in the accounts. The profit from a wholly-owned subsidiary company may be repatriated in the form of dividends to the parent company, in the form of capital gains (if the company changes hands) or in the form of income from sales (with prices calculated on a basis which may, or may not, reflect their value in the open market). Profits which are not repatriated may well be retained or reinvested locally but will not be reflected in the trade figures for that particular year. The situation becomes much more complicated, of course, if the company is not owned outright but also has local shareholders. There are many other possible arrangements. It is possible in some situations that the workers could be direct employees of a foreign company, or working on a direct contract for the supply of services, in which case the transaction could take the form of a salary payment or fee. Another possibility is a licensing or franchising agreement between the two parties, with the possibility of a wide range of different types of financial arrangement. Even where there is a direct trading relationship between a domestic company and a foreign one, much will depend on the type of contract agreed between them, and on whether what is being supplied consists of goods or services.

The OECD have illustrated the complexity of the situation in relation to the cross-border supply of software. This may take a number of different forms: the software could be provided already bundled into the hardware; it could be sold as a commodity, for instance as an off-the-peg pre-packaged diskette or CD-ROM with a user-manual; it could be sold over the internet, usually with the co-operation of a third-party credit clearing agency, to be downloaded by the purchaser from the vendor's website (known as ESD, or electronic software delivery); or a single 'gold-master' copy could be supplied to a local vendor with a license to copy it and resell it within a certain specified local market. To this we would add the further possibility that it could be supplied as a one-off 'bespoke' program, tailored to the needs of a particular client, possibly as an intermediate input to another software product. Even if one

leaves out the software delivered electronically and attempts to measure only the physically traded software, enormous disparities persist between the estimates produced by vendor countries and purchaser countries. For instance the OECD calculated that US software exports to Japan in 1994 might have been anything between US$209.8 million and US$2,436.2 million depending on which estimate was used. The report concludes:

> *'Tracking software imports and exports in trade statistics is fraught with measurement problems. Border valuations are often based on the medium (diskettes, CD-ROMs) rather than on content (the software); moreover, methodology may not be consistent over time, shipments or countries. Statistics not only underestimate the value of the software contained in the medium, but also … of copyrighted works sold in foreign markets (the gold-master problem). Finally, bundling of software … creates another sizeable source of mismeasurement.'[1]*

A further problem arises from the fact that the statistics on trade in services are not disaggregated to the same extent as those on trade in commodities. This makes it difficult to distinguish types of trade which may involve a teleworking relationship from those which do not. For instance it is often difficult to distinguish between consumer services and producer services. The transactions of a company providing offshore accountancy services, for instance, would not be readily distinguishable from a range of other transactions categorised broadly as 'financial services'.

Yet another difficulty results from the fact that many transactions involve more than two countries. It is possible, for instance, to imagine a company selling products to a global market using call-centres in each of several different time-zones. Not only are the parent company, each of the call centres, and the customers in different countries, but it is quite possible that the telecommunications supplier, the agency handling credit clearance, the companies providing delivery of the products to the customers, the company providing software support and an internet service provider are all also in different countries. Untangling these trading relationships, and assigning each to an identifiable category presents a major challenge to the statistician.

We must conclude that under present circumstances neither employment statistics nor trade statistics offer a satisfactory way of estimating the extent and distribution of cross-border tele-mediated work, although it is quite possible that, with the refinement of occupational and sectoral classification schemes, both are capable of providing much more useful information than they do at present.

Before standard instruments can be developed, however, it will be necessary for more empirical work to be carried out on the ground, both in 'source' countries in the developed world and in

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[1] Working Party on the Information Economy, *Measuring Electronic Commerce: International Trade in Software,* OECD, Paris, April 30, 1998.

developing 'destination' countries, in order to increase our understanding of the kinds of activities which are in the process of delocalisation, the forms which this delocalisation takes, and the factors which influence these developments. Once these have been understood, it will then be possible to identify appropriate indicators and study their relationship to the existing statistical categories. By a process of triangulation it should then be possible to monitor longitudinal trends and draw comparisons between sectors and countries.

As already noted, we have already developed a methodology for capturing much of this information by means of employer surveys, drawing in part on past surveys carried out in developed countries. This has been used in 1998 in surveys in India and Malaysia but the results are not yet published.[1] The methodology avoids the problem of reifying particular models of teleworking which may be inappropriate to the local situation by focusing on a series of generic business activities and enquiring in an open-ended manner how they are dealt with in any given organisation (for instance whether they are carried out in-house or outsourced; performed by homeworkers, mobile workers, or on remote sites and, if so, the criteria used in selecting the remote location). It also provides a means of identifying the position of the respondent organisation in the value chain and the nature of its trading relationships both with suppliers and customers of business services. To provide the requisite information on the prevalence of any particular form of delocalisation, random sampling is required. Because this method collects information in a highly disaggregated form, it is also necessary for several stages of analysis to be completed before meaningful results can be generated, capable of triangulation with the existing statistics to produce projections which can inform policy.

To date, few employer surveys have been completed which address such questions. One of the few exceptions to this was a 1996 US survey which found that over 100 of America's top 500 firms buy software services from firms in India, where programmers are typically paid less than a quarter of the American rate.[2] In the UK, a survey of 3,000 London employers we carried out in 1992[3] included questions about the

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[1] Survey design by Ursula Huws for UNU/INTECH, 1997-98.

[2] Survey: the World Economy', *The Economist,* September 28, 1996, pp 43-44.

[3] Huws U, *Employment and Training in London,* West London TEC for the London TECs Steering Group, Summer, 1993; *Employment and Training in London, Results from the 1992 London TECs Employment and Training Survey, 1993 Panel Update Report,* London TECs Employment and Training Survey Steering Group, 1993; and *Employment and Training in London, Results from the 1992 London TECs Employment and Training Survey,* London TECs Employment and Training Survey Steering Group, 1992.

subcontracting of work by occupational category and location, and produced some evidence that subcontracting of service activities to developing countries was indeed taking place. However, these results cannot be taken as definitive, partly because they covered only six TEC areas, mainly in outer London, and are therefore not representative of the UK as a whole, and partly because the survey was carried out in the depths of a recession when such patterns were unlikely to be typical.

Until more systematic research of this type has been undertaken, in both 'source' and 'destination' countries, we must rely on anecdotal or case-study evidence to provide us with clues which will, in turn lead us to statistical indicators which enable some rough-and-ready international comparisons to be made.

4.2 Locational factors

We have already noted, in Chapter 3.2, that it is impossible to draw sharp distinctions between domestic and foreign sites when assessing the factors determining the location of back office functions. Regions and countries are, it appears, engaged in an ever-more intense competition to attract inward investment to their areas in service industries, and many have set up special bureaux, often backed up by a raft of state-provided inducements, to attract such investment, with varying degrees of success.

In Canada, for instance, we find a number of different provinces competing to encourage companies, mainly from the United States, to locate call centres in their region. A representative from the Manitoba Call Centre Team, for example, asserts that it has an,

> 'Abundance of skilled and available multilingual labour, central time zone, low operating costs, the availability of specific call centre training programs and world class telecom infrastructure.'

> 'Provincial and federal financial assistance is available to support companies opening operations in Manitoba … training supports and assistance to re-employ unemployed Manitobans is also available. These programs are designed to be a flexible vehicle which will allow for mutual benefit.'

and goes on to reassure doubters that:

> 'Weather does not hamper our ability to work effectively in any way. Telecom is very reliable and blizzards do not shut down our cities and keep people from arriving to work.'[1]

Another Canadian region, Newfoundland and Labrador, counters:

> 'One of the greatest benefits Newfoundland & Labrador has to offer is access to labor – and plenty of it. We have the largest available labor

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[1]   Swain C, Manitoba Call Center Team, 'Site selection and site design', Tele@market Forum, March 4, 1997.

pool per capita in Canada. Our people have a very strong work ethic and are well known for their friendliness and pleasant manner, attributes that are desirable for any call center application.'

'Our people are also highly educated. More than 40 per cent of our province's available labor force possesses some form of post secondary education. Our main university campus is home to more than 17,000 full and part-time students and provides an excellent pool of labor from which to recruit highly educated agents and management personnel. Turnover and absenteeism rates are low, and average job tenures are among the highest in Canada.'

'Newfoundland and Labrador has a state of the art telecommunications network as good as anywhere else in Canada or the United States, and is more than capable of supporting a world class call center. Some examples include access to a dual toll office/central office presence, fiber optic ring technology in local centers, fiber optic ring technology for toll traffic and access to ATM technology.'

'Newfoundland & Labrador offers a low operating cost environment for call centers in general. Our labor rates in particular are quite attractive for call center personnel. And as you know, labor accounts for a very large proportion of call center operating costs (65-70 per cent). This makes Newfoundland & Labrador very appealing for call centers.'

'One advantage that our province does have is the availability of one of the best tax relief programs in Canada. Our Economic Development and Growth Enterprises (EDGE) program is available to qualifying companies and provides 10 year tax breaks in a number of areas, including municipal taxes in many instances'.[1]

Yet another Canadian province, New Brunswick, summarises its main attractions as:

'An attractive operating cost environment

Quality and quantity of skilled labor available

Strong telecommunications environment through a national network alliance with Stentor and the local telephone companies; and

Liberal regulations surrounding the call center industry

a large percentage of the population that are able to work very capably in French and English.

Much lower fringe benefit costs as it relates to labor costs. Since labor accounts for as much as 60 to 70 per cent of overall operating costs this can be a significant saving.

Lower overall cost of living.'

adding that,

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[1]   Fleming K, Network Newfoundland and Labrador, 'Smaller Communities, the new Hot Spot for Call Centers', Tele@market Forum, August 18, 1998.

'The New Brunswick team has had great success in attracting over 40 national and international businesses and for the most part all of these businesses have grown beyond their original expectations.'

'The number one strength is the operating cost environment. In a study completed by the Boyd Company of New Jersey (a well known US site consultant) New Brunswick ranked as the lowest operating cost environment as compared to several other notable US call center locations.'[1]

In Europe, there is a similar story. In the UK, a representative of the Invest in Britain Bureau boasts that,

'There are 4,500 US companies already based in Britain. Telebusiness in the UK is growing at 40 per cent every year. The latest Datamonitor report, which reviews the European call center market, shows that the UK currently has 162,000 agent positions that will rise to 243,000 by the year 2000.'

'There is a large pool of native and non-native linguists in the UK. In fact there are over 700,000 non-English native European language speakers living in the UK of which 346,000 are economically active. In London, there are no fewer than 33 communities of over 10,000 people who were born outside the UK. A further 60,000 European students are studying in Britain. With access to these resources, speaking your customers' languages is easy.'

'Strengths of the UK include: large flexible workforce (multilingual and skilled — with a can do attitude); fully deregulated telecoms and utility industries offering value for money products and services; an excellent business culture; low social costs; low corporate AND personal tax rates . . . need I say more. And don't forget the UK is a major market in its own right, nearly 30 per cent of the European market which ensures that telecommunications costs could be kept to a minimum — if the UK is a major market for your firm.'[2]

Meanwhile, a Telecom Ireland spokesman counters with,

'Ireland has a number of advantages over the UK. These include:
Young population
Education achievement
Competitive labour cost
Advanced telecommunications infrastructure
Low taxation
Only English speaking member of EUM
Quality of life.'
The UK may be able to match some of these factors, but it cannot match the full package offered.'

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[1] Sue Ellen Thibodeau, New Brunswick Call Center Team, Province of New Brunswick, 'The Ultimate Site Location Checklist', Tele@market Forum, April 17, 1997.

[2] Butler J, Vice Consul (Investment), Invest In Britain Bureau, New York, 'European Call Center Site Selection: Taking Advantage of a Growth Market', Tele@market Forum, June 3, 1998.

adding that:

> *'Ireland has the highest percentage share of pan-European call centres. This is due to the expertise provided by the various agencies and education levels including a high degree of other languages. Ireland's population stands at 3.6 million, 45 per cent are under the age of 25. One million are in full time education. Ireland is the only country in Europe with such demographics. Also, Ireland is in such an attractive place to live that other nationals are very keen to move here. Therefore, no skill shortage exists. Did you know that the highest ex-patriate population of young French males between the ages of 20 to 30, is in Ireland? The majority of these are working in call centres, serving their home market.'*

> *'Ireland has approximately 75 international call centres serving the pan-European market. The average headcount is 250+. Ireland is also the second largest exporter of software in the world.'*

> *'Telecom Eireann (Ireland) offers very competitive rates for traffic and services. The Government authority, IDA, also offers attractive packages. Combining this with the strength of the economy has made Ireland the most profitable location for US investment with return on investment being almost four times the EU and World averages over the past ten years.'*[1]

Such examples could be multiplied many times, not only in developed countries promoting themselves as a whole, but also in individual regions, or even cities, within those countries. More interestingly, there appears to be a marked convergence between such attempts and the self-promotion efforts of some developing countries. Ironically, whilst the developed economies of Canada, UK and Ireland are seeking to attract low-skilled, call centre work, often using low labour costs as a major selling point, developing countries which attracted low-skill data entry work in the early 1980s appear to have developed a strategy of attempting to reposition themselves so that they can attract more highly skilled work.

In 1992, Carl Clarke, the trade, industry and commerce minister of Barbados was quoted as saying that,

> *'The information processing industry began here 25 years ago and has grown steadily. During the early period of the industry's development, the type of work done was basic and low-skilled. However, in recent years there has been a definite shift to the higher value-added type of processing activities.'*[2]

Increased competition from the Philippines, Ireland, Singapore and other parts of the Caribbean was seen as a potential threat to Barbados's share of the total US information processing market,

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[1] Donnelly L, Telecom Ireland, 'Choosing the Best Pan European Call Center Location', Tele@market Forum, October 7, 1998.

[2] 'Caribbean seeks role as world's paperless tiger', *Financial Times*, April 9, 1992.

which was estimated at US$50 billion per year. A study for the trade union FIET,[1] also in 1992, estimated that about 2,300 workers were employed in offshore data processing in Barbados, with a further 3,500 in Jamaica, 1,000 in the Dominican Republic and a little more than 500 in other Caribbean countries. Hourly wage rates for data entry work were estimated at US$0.80 to $1.00 in Jamaica, US$2.00 to $2.88 in Barbados and US$7.00 to $8.00 in the USA.

In 1998 the website of the Barbados Investment and Development Corporation still presents low cost as the island's main selling point (with the slogan 'save as much as 40 to 50 per cent on your operating cost by doing business in Barbados!') but also highlights other benefits:

> 'Excellent infrastructure.
> Highly literate, English speaking, skilled and industrious work force.
> High levels of productivity comparable to, or exceeding, North American and European standards.
> Low rate of employee turnover and absenteeism.
> Training incentives are available.
> Lower labor costs mean higher profits.
> Special tax rate of 2.5 per cent on net profits.
> Full exemption from import duties on production related equipment such as computers.
> Full and unrestricted repatriation of capital, profits and dividends.
> Subsidized office space available for rental in fully serviced Investment parks.
> Reimbursement of a maximum of 75 per cent of wages paid to trainees during the first two years of operation.'[2]

Interestingly enough, however, the three Barbados 'success stories' summarised on the website, NDL International, Caribbean Data Services and Manulife Data Services, employing, respectively 'over' 250, 1,100 and 150 workers) are all in the data entry business, albeit in three very different sectors: market research, airlines and health insurance.

In the Philippines, too, there seems to be an attempt to move up from data processing work to more highly-skilled software development. A government website in 1998 promoted the skills of the Filipino workforce, with a strong emphasis on their technical abilities, in these words,

> 'Philippine software exports totalled US$60 million in 1993, up 50 per cent from US$40 million in 1992. Several Filipino consulting firms offer services in IT business management and support systems.'

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[1] Pantin D, *Export Based Information Processing in the Caribbean, with Particular Respect to Offshore Data Processing*, FIET, Geneva, 1995.

[2] Barbados Investment and Development Corporation website, www.bidc.com, 1998.

'The Filipino IT professional: an Outstanding Breed.'

'Quality and expertise distinguish the Filipino IT professional. As the first Asians to use database management systems, Filipinos find it easy working on DB2, Oracle, Supra, Adabas, IMS and other DBMs as well as fourth generation languages. Likewise, they are versed in implementation methodologies, including structured systems development. Over 3,000 Filipinos are adept with mainframes and familiar with a wide range of IBM hardware and large systems, NCR, Unisys, Fujitsu and Sperry. More than 5,000 are experienced in mini operations.'[1]

The site goes on to describe an advanced telephone banking facility, and a pioneering EDI facility based in the Philippines, as well as several achievements in software development.

We have perhaps quoted enough examples to establish that locational competitive advantage is not a simple matter of offering the lowest labour costs. On the contrary, it consists of a complex balance of factors including tax incentives, infrastructure, non-wage labour costs, skills (including both technical and language skills), labour turnover, grants and subsidies, a liberal regulatory climate and time zone.

For many companies, the objective is not to find a single ideal location for all its activities, but to achieve a spread of locations around the globe, catering to different markets, different language groups, different time zones and, in some cases, specialising in different types of activity.

Sprint Telecentres, for instance, a US based telemarketing company, has five call centres with 900 positions in the United States, handling over 40 million calls a year in the domestic market, but also provides a service for the rest of the world, with a total of 3,000 positions in 25 sites across the Netherlands, Germany, the UK, Greece, Canada, Mexico, Australia, Singapore, Japan, Taiwan, Hong Kong and Korea. Between them, these centres cover applications in thirty different languages.[2]

In the data conversion field, another US-based company, Saztec, employs data entry staff at facilities in the United States, Europe, Jamaica, India and the Philippines. In the US alone, the company estimates that an average of 5,000 labour hours of various data entry applications is processed each week. In the UK, the company employs over 100 personnel in Scotland.[3]

Higher up the skill ladder, a European airline representative we interviewed in 1997 reported that although the company still

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[1] DOST, 'Information Technology in the Philippines: a Tradition of Excellence', www.dost.gov.ph/DOST/Globally, September, 1998.

[2] Information supplied by Sprint Telecentres.

[3] Information supplied by Saztec.

used subcontractors in India for much of its software development, it was actively negotiating with alternative suppliers in several other locations in five other Asian countries as well as in Russia and Eastern Europe. It continued also to use sub-contractors in Europe, including individual freelances, for some of its programming work. A number of factors were taken into account when deciding on the location of the outsourcer, including the length of the contract and its complexity. Overseas contracts were seen as making heavier demands on project managers, and therefore not worth embarking on unless the project was sufficiently large in scale to justify the extra management resources.[1]

That there is some convergence between the types of activity going on at these different locations is clear. However, cost differences still remain. When Saztec was investigated by the British media in 1992, because of a report that the Home Office was considering using this company's Philippines facility to carry out the data entry for its new criminal records database, the company was reported to employ 800 Filipinos at around £75 a month – a relatively high wage by Philippines standards but only a fifth of salaries in its American offices.[2]

While it is clear that there is considerable competition between locations to attract these new and footloose activities, the competition is not universal, but differentiated according to the type of activity involved and a number of other factors, including time-zone and language. Thus, for instance, we find Ireland and India competing directly with each other for large software contracts, and Canadian provinces competing against each other for US time-zone call centres while European countries do the same for European time-zone call-centres.

In the next section of this report, we have attempted to tease out some of the patterns which this new locational competition might take.

4.3 Countries likely to be involved

Any cross-border activity necessarily involves at least two national partners: a 'source' country, from which the contract for the work originates, and a 'destination' country where the work actually takes place. It should be noted that in this report we have used this terminology in preference to talking about

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[1] Ikon, Analytica and IATA, *The Impact of Telematics on the European Aviation Industry,* Report to the European Commission DGXVIII, 1997.

[2] Money P (1992), 'Frontiers of Work: White collar jobs flow from Britain as data processors are lured by cheaper labour', *The Guardian,* August 25.

'vendors' and 'customers' because of the complexity and variety of the contractual relationships which might apply.

During the early 1980s, when the phenomenon of offshore information processing first became evident, it appeared realistic to assume that the source countries were the more developed OECD countries (in particular, the United States, the UK, Australia, Canada, Japan, France and Germany) while the destination countries were in the developing world (Barbados, Jamaica and other Caribbean countries; Brazil, Mexico and possibly other Latin American countries; India, the Philippines, China, South Korea, Indonesia, Malaysia, Taiwan and possibly other Southeast Asian countries). It seemed likely that, just as the former British colonies provided a remote, low-cost workforce for companies in the English-speaking developed countries, the former French colonies (especially in the Maghreb, but also in the Caribbean and sub-Saharan Africa) might play a similar role for French companies. After 1989, Eastern Europe was opened up as an alternative source of external literate labour, a source to which it seemed especially likely that companies based in German-speaking countries would turn. Even then, however, it seemed clear that some rapidly industrialised countries would occupy an intermediate position: Ireland, Singapore and Hong Kong, for instance, were all countries which were clearly playing an important role in the new international division of information-processing labour, but did not fall neatly into either category.

In the early 1990s, the picture became much more complicated. Not only did it become apparent that many regions of developed countries (such as New Brunswick in Canada and the North East of England) were themselves becoming destinations for high-volume, low-skilled telemediated work; it was also clear that the rapid development of economies like those of Brazil, Malaysia, Taiwan and South Korea meant that in some respects they were shifting from the category of destination to that of source. By the mid-1990s, for instance, Malaysia was a country experiencing acute labour shortages, its economy depending to a large extent on migrant workers from Bangladesh, the Philippines and Indonesia, although in the 1970s and early 1980s, it was regarded as a low-wage site for labour-intensive export-oriented activity.

It therefore seems to be the case that many countries must be regarded both as sources and as destinations and that a simple bipolar categorisation of countries is no longer useful. In order to gain some impression of the global distribution of information processing work a more differentiated approach is required.

By now, the volume of anecdotal information about the international relocation of telemediated work, and the countries involved, has become so great that no useful purpose would be served by enumerating or categorising it. There is probably not a country in the world in which it does not exist in some shape or

form; the problem confronting the researcher, however, is not whether to determine its existence but how to estimate its extent, and to identify the countries in which it is most likely to develop and those which are unfavourable for its development.

A useful starting point is an analysis of the characteristics of the early players. In many ways, the early source countries were the same as those reported in the earlier chapters of this report as being countries which are also especially likely to have a high incidence of home-based teleworking and relocated back office work within their national boundaries (see Table 3.2). In particular, we might single out the developed Anglo-Saxon-influenced economies of the United States, Australia, Canada, Singapore and the UK.

One of the things these countries have in common, apart from a dominance of the English language, is that they are rich, measured in terms of GDP per capita, as can be seen from Table 4.1, which ranks in order the 23 countries with GDP per capita of more than US$15,000 per annum.

Table 4.1: Countries with the highest GDP per capita, 1993

Country	GDP per capita ($)
Japan	33,757
Switzerland	33,572
Bermuda	26,902
Denmark	26,169
Luxembourg	25,359
United States	24,580
Norway	23,995
Austria	22,851
Iceland	22,249
France	21,719
Sweden	21,376
Germany	21,198
United Arab Emirates	20,548
Belgium	20,514
Netherlands	20,106
Canada	19,834
Singapore	19,214
Hong Kong, China	18,687
Italy	17,141
United Kingdom	16,251
Finland	16,231
Australia	16,033
Kuwait	15,354

Source: World Bank data

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Table 4.2: Countries with the highest internet access

Country	Top level domains name by host count per million population
Finland	101,087.990
Iceland	76,585.185
Norway	72,324.306
New Zealand	50,354.958
Sweden	43,550.801
Australia	42,058.688
Denmark	36,807.157
Canada	35,287.466
Netherlands	33,441.196
Bermuda	33,216.667
Switzerland	28,834.923
Singapore	21,088.298
United Kingdom	20,496.867
Austria	16,713.274
Israel	16,170.111
Luxembourg	15,362.500
Belgium	15,253.968
Germany	14,226.522
Ireland	12,666.667
Hong Kong, China	12,389.708

Source: various data sources; analysis by Nick Jagger and Ursula Huws, 1998

These countries could also be said to have a highly developed cyber-culture, in that they also appear among the countries with the highest internet access, measured by the number of high-level domain names per million of the population, displayed in Table 4.2. It should be noted that the measurement of internet access is extremely problematic[1] and that for technical reasons comparable data are not available for the United States. It seems unquestionable, however, that if they were, the USA would be at or very near the top of this list.

It seems reasonable to infer that both high GDP and high internet access are indicators of potential source countries in the new international division of information labour.

Another indicator which might well provide clues to a high propensity to generate telemediated information processing activity in any given economy is a high proportion of service activity in that economy. Here, the difficulties of comparison increase: 'services' is a category which includes many activities

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[1] OECD Working Party on Telecommunications and Information Services Policies, *Internet Infrastructure Indicators,* Paris, October 23, 1998.

in addition to those involving the processing of information, and a high proportion of service activity may be an indicator of a high level of activity in some other, non-telemediated form of service activity, such as tourism.

The list of the countries with the highest proportion of GDP resulting from service activity (shown in Table 4.3) therefore includes a number of small countries where there is very little economic activity at all other than tourism and, in some cases, off-shore banking. We have included them in Table 4.3, in part because this service activity may be an indicator that, even if they do not come within the category of a source country for offshore telemediated work, they may nevertheless be actual or potential destinations for it.

More importantly, it should be noted that the list also includes all the countries identified as early players in the export of information-processing jobs (*eg* the USA, UK, Germany and Switzerland) and, with the exception of Japan, those for which there is some evidence of home-based teleworking (*eg* Singapore, Canada, Australia and Sweden).

This list could therefore be regarded as including both the major source countries for this type of activity and some of the smaller destinations for it. Again, this suggests that this is a useful indicator for our purposes.

In order to gain a more systematic impression of the likely destination countries, it is helpful to introduce some differentiation.

One category of activity which is particularly important at the time of writing is software development and support, in part because of the huge volume of extra work created by the need to adapt existing computer systems for the year 2000 and for European Monetary Union. Locations where there are large numbers of computer science graduates are therefore likely to become particularly attractive for this kind of activity. Table 4.4 lists the countries with the largest numbers of computer science graduates for the most recent year for which UNESCO has data. Unfortunately no data is available for a few key countries, such as India, which are known to be prominent in this field. It should also be noted in interpreting these figures that a significant proportion of those graduating in computer science in the USA and UK (and possibly also in other countries, such as Russia and Canada) are foreign students who eventually return to their country of origin, bringing their qualifications with them. This serves not only to overestimate the numbers of graduates in these developed countries but also to underestimate them in the developing countries from which these students originate.

Nevertheless, we feel that this table gives a strong indication of those countries which are most likely to be able to offer a good supply of software specialists.

Table 4.3: Countries with the highest proportion of services as per cent of GDP

Country	Services as % of GDP
Bahamas, The	91
Guadeloupe	85
Kiribati	85
Netherlands Antilles	84
Martinique	83
Hong Kong, China	81
Seychelles	81
French Polynesia	78
Antigua and Barbuda	77
Djibouti	76
Israel	75
United States	75
Luxembourg	74
Panama	74
Singapore	72
St Kitts and Nevis	72
Sweden	71
Netherlands	71
France	71
Austria	70
Belgium	70
Marshall Islands	70
St Vincent and the Grenadines	70
Australia	69
Denmark	69
St Lucia	69
Cape Verde	69
Iceland	68
New Zealand	67
Canada	66
Switzerland	66
Cyprus	66
Vanuatu	66
Jordan	66
Namibia	65
United Kingdom	64
Germany	64

Source: CIA World Factbook, 1998

Table 4.4: Countries with the largest numbers of computer science graduates

Country	Computer Science graduates, all levels
United States	72,133
United Kingdom	28,941
Russian Federation	28,066
China	26,619
Canada	10,172
Mexico	9,966
Brazil	9,859
Germany	9,843
Philippines	9,772
Indonesia	8,418
Spain	6,566
South Africa	6,046
Australia	5,335
Italy	4,048
Turkey	2,800
Denmark	2,740
Algeria	2,340
Iran	2,170
Netherlands	2,022
Belgium	1,986
Ireland	1,810
Poland	1,662
Finland	1,639
Sweden	1,551
Myanmar	1,455
Jordan	1,399
Kazakhstan	1,149
Malaysia	1,098
Venezuela	1,093
Portugal	1,053
Romania	821
Greece	779
Austria	774
Georgia	698
Israel	685
Bangladesh	676
Norway	563
Bulgaria	504

Source: UNESCO data, 1996

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Whilst some of the countries on this list (*eg* the USA, UK, Australia, Germany and Denmark) could be regarded primarily as source countries, many others are already known to be destinations for offshore software development, including Russia, Bulgaria, Romania, the Philippines, China, Indonesia and Brazil. Although there is less documentary evidence, it seems reasonable to assume that the other countries on this list are also likely to be involved in these activities; if they are not already, then they would appear to have the potential to do so in the future.

When it comes to indicators for destination countries for lower-skilled offshore work, these are harder to identify.

FIET[1] quotes a 1992 study funded by the World Bank which ranks the Philippines as the world's foremost site for remote data entry, with 2,000 keystations in the country producing over 100 billion keystrokes per year. The country's major competitive edge, according to this study, lies in its relatively lower manpower cost (data entry clerks in the US charge US$65 for 10,000 keystrokes, while the going rate in the Philippines is between US$4 to $6 for the same number of keystrokes) and high accuracy rate.[2]

The FIET report goes on to list Jamaica, Korea, Malaysia, Mexico, Sri Lanka, Malta and Cyprus as remote sites for English-language data entry and Mauritius, Morocco and Madagascar as locations used by French publishers.[3]

It should be noted, however, that knowledge of the relevant language is not always a necessary precondition for being able to key it in quickly. As early as 1984, there were reports of a data entry facility in China based at the QingHua University in Beijing and employing over 200 operators who were familiar with the English alphabet, though not the English language. The company advertised a capacity of over five billion keystrokes a year and claimed a cost saving of 50 per cent compared with work carried out in the United States. The article quotes a satisfied customer as saying that 'the Chinese are very accurate — more accurate than other services we looked at, including one run by the Nevada State Prison where prison inmates type information into the computer' [4]

This development was also reported in the local Californian press, which noted that these Chinese students earned about US

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[1] Bibby A, *Trade unions and Telework,* FIET, Geneva, Autumn 1996.

[2] InfoTech Consulting, *Software Studies: India's Software and Services Export Potential and Strategies*, Maxi/Micro, 1992.

[3] *Télétravail*, June/July 1996.

[4] 'Chinese Office Work', in *Global Electronics Information Newsletter*, April/May, 1984.

$7 per week, with a 99.95 per cent rate of accuracy.[1] The curious phenomenon of higher productivity among non-English speaking operators was confirmed in a *Fortune* article in 1985. Reporting on the Mead Data company's giant Lexis and Nexis on-line databases, for which most of the input is done in Taiwan and the Philippines, Daniel Seligman, the article's author, commented, 'Somewhat mind-blowingly, much of this work is performed by keyboarders who don't understand English. Nexis executives say they prefer such workers, who are less likely to be distracted by the contents of the text they are replicating.'[2]

Elsewhere in the literature, as already noted, we find mention of Barbados, St Lucia, St Kitts, Grenada and the Spanish-speaking Dominican Republic in the Caribbean as well as India and a number of other countries in Southeast Asia and Latin America. The question is, what characteristics, if any, do these countries have in common that would enable them to be identified and compared meaningfully using the existing international statistics?

One possibility is to look at the proportion of foreign direct investment (FDI) as a percentage of GDP, to see its importance in the local economy. The global mean is just under two per cent (1.99 per cent) and Table 4.5 lists in rank order all those countries for which data exists in which FDI is above this average. As can be seen from this table, this indicator is something of a blunt instrument, since it records a great deal of investment which has nothing to do with information processing, as well as appearing artificially high in a few countries where GDP is extremely low (*eg* Equatorial Guinea, where GDP is only US$350 per annum, compared with a global mean of US$4,930, and where the FDI is associated almost exclusively with the oil industry).

The list includes a number of developed countries: Norway, Switzerland, the Netherlands, United Kingdom, Sweden, Finland, Australia, France, Austria, Denmark, the United States, Canada, New Zealand, Singapore and Germany (which undoubtedly appear on this list because they have complex economies, inter-connected in global networks and attracting FDI in the form of mutual investment and ownership). However, most of the other countries on the list (Malta, Dominica, St Vincent and the Grenadines, Vanuatu, St Kitts and Nevis, Grenada, Gabon, St Lucia, Antigua and Barbuda, Latvia, Trinidad and Tobago, the Bahamas, Guyana, Fiji, Peru, Estonia, Chile, Hungary, Belize, Suriname and Malaysia) might plausibly be considered as destination countries for this type of work, with Ireland and Israel (both known as important centres for software program-ming for the international market) occupying intermediate

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[1] 'Satellites help firms move clerical work', *San Jose Mercury News*, April 23, 1984.

[2] 'Life will be different when we're all on-line', *Fortune*, February 4, 1985.

Table 4.5: Countries with above-average foreign direct investment as per cent of GDP

Country	Foreign Direct Investment as % of GDP, PPP
Equatorial Guinea	28.97
Singapore	17.54
Malta	13.29
Norway	9.56
Switzerland	9.28
Netherlands	8.96
Dominica	7.15
St Vincent and the Grenadines	6.69
United Kingdom	6.57
Vanuatu	6.57
Sweden	6.12
Finland	5.62
St Kitts and Nevis	5.57
Grenada	4.82
Ireland	4.70
Gabon	4.56
St Lucia	4.35
Australia	4.18
Antigua and Barbuda	4.13
Latvia	3.77
France	3.70
Trinidad and Tobago	3.61
Bahamas, The	3.53
Guyana	3.40
Fiji	3.37
Peru	3.27
Estonia	3.24
Chile	2.99
Austria	2.93
Hungary	2.80
Denmark	2.75
United States	2.56
Canada	2.25
Belize	2.24
Israel	2.21
Suriname	2.07
New Zealand	2.02
Germany	2.01
Malaysia	2.00

Source: World Bank Data

positions. It should be noted, however, that some important destination countries, such as the Philippines, Barbados and Jamaica, are nevertheless missing from this list.

We can conclude that this indicator is not sufficient in itself to identify these destination countries, but is a useful pointer in the right direction.

One near-universal characteristic of the data entry sector is that its workforce is overwhelmingly female. Pantin, 1995[1] estimated that 90 per cent of data entry and information processing workers in Jamaica and over 80 per cent in Barbados are women, for instance, while Posthuma, 1987[2] claims that 'virtually all' this workforce is female. Another possibility, therefore, is to look at the countries in which there is an unusually high percentage of women working in the service sector.

For this variable, the global mean is 46 per cent, and we looked at the countries which exceeded this average. Here we found a very mixed picture. Featuring prominently in the list are a group of Islamic countries (Kuwait, Qatar, Bahrain, Saudi Arabia, United Arab Emirates, Lebanon, Jordan, Libya and Iraq) which appear to have found their way into this category because the total numbers of women in the workforce are very low, and there is an absence of female employment in manufacturing, so that services like education, health, retailing and personal services make up a very high proportion of what female employment does exist.

Alongside these are a group of developed countries (Luxembourg, Canada, Norway, United Kingdom, Denmark, Sweden, Australia, New Zealand, France, Netherlands, Israel, Iceland, Finland, Belgium, Austria, Germany, Singapore, Hong Kong, Japan, Switzerland, Spain, Portugal, Italy, Greece, Ireland, Macao). Here the high proportion of women in services appears to be an indicator firstly of the extent to which these countries have developed a knowledge-based, service economy, with a large amount of employment in retail and financial services, as well as other service industries, and secondly of manufacturing, agriculture and extraction playing a shrinking role in the national economies. Some countries in this group, such as Ireland, Israel, Portugal, and Macao, might, as already noted above, be seen as occupying an intermediate position with some part of their service sector probably devoted to information processing work for overseas customers.

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[1] Pantin D, *Export Based Information Processing in the Caribbean, with Particular Respect to Offshore Data Processing*, FIET, Geneva, 1995.

[2] Posthuma A, *The Internationalisation of Clerical Work: a study of offshore office services in the Caribbean*, SPRU Occasional Paper No. 24, University of Sussex, Brighton, 1987.

Much of the remainder of this group might plausibly be regarded as candidates for offshore data entry work. They consist of the Bahamas, Reunion, Bahrain, Guadeloupe, Brunei, Martinique, Belize, Argentina, Panama, Suriname, Puerto Rico, Trinidad and Tobago, Venezuela, South Africa, Guyana, Colombia, El Salvador, Chile, Brazil, Jamaica, Paraguay, Cuba, Nicaragua, Mexico, Ecuador, Dominican Republic, Costa Rica, Peru, Malta, Honduras, Guatemala, Macao, Kazakhstan, Slovak Republic, Fiji, Cyprus, Hungary, Croatia, Korean Republic, the Philippines, Russia, Latvia, Estonia, the Czech Republic, Slovenia, Lithuania, Nigeria, Georgia, Barbados, Malaysia, Belarus, Cape Verde, Armenia, Kyrgyz Republic, Mongolia, Bosnia and Herzegovina, Poland and Moldova.

It should be pointed out, however, that the high proportion of women in service occupations in the former COMECON countries probably results from the high general female economic activity rates in these countries. This does not, of course, preclude their becoming sites for offshore telemediated work. This list does capture most of the smaller countries already known to be locations for this kind of work. The notable exceptions are China and India where we must assume that the sheer size of the population renders this kind of activity comparatively unimportant, even if in absolute terms it is of a considerable size.

Although, as we have noted, language skills may play a part in determining the location of offshore data entry, they are not by any means a critical requirement. However, if we turn to another form of relatively low-skill cross-border telemediated work, the call centre, we find that language assumes critical importance, since direct communication with the customer becomes an essential part of the job. Here it is also associated with another variable, that of time-zone.

We therefore thought it useful to analyse countries by the main European world languages spoken and by time-zone. For the purposes of this analysis, the languages were restricted to English, French and Spanish (Table 4.6). This is not to deny the importance of other world languages, such as Arabic, Russian and the main Asian languages. We were unfortunately unable to obtain data broken down to sufficient geographical detail to carry out an analysis based on where these are spoken.

While it gives a useful indication of the countries likely to be the main contenders for single-language call centres in each time-zone, this table does not, of course, give a complete picture. Some of the developing countries featured here have comparatively low literacy levels, and, even when English, French or Spanish is the official language, may in practice have a relatively small proportion of the population who can read it or speak it fluently. In other countries, although the first language is not one of those listed, in practice a high proportion of the population may be fluent in one of these world languages.

Table 4.6: Countries with English, French or Spanish as first language by time-zone

English-speaking Country	Time relative to GMT	French-speaking Country	Time relative to GMT	Spanish-speaking Country	Time relative to GMT
United States	–5 to –12	French Polynesia	–10	Costa Rica	–6
Canada	–5 to –8	Canada	–5 to –8	El Salvador	–6
Belize	–6	Haiti	–5	Guatemala	–6
Bahamas, The	–5	Guadeloupe	–4	Honduras	–6
Jamaica	–5	Martinique	–4	Nicaragua	–6
Antigua and Barbuda	–4	French Guiana	–3	Mexico	–6
Barbados	–4	Cote d'Ivoire	–1	Belize	–6
Bermuda	–4	Togo	–1	Colombia	–5
Dominica	–4	Burkina Faso	0	Ecuador	–5
Grenada	–4	Guinea	0	Peru	–5
Guyana	–4	Mali	0	Cuba	–5
Puerto Rico	–4	Senegal	0	Panama	–5
St Kitts and Nevis	–4	Belgium	1	Bolivia	–4
St Lucia	–4	Benin	1	Chile	–4
St Vincent & Grenadines	–4	Central African Rpblc	1	Dominican Rpblc	–4
United Kingdom	0	Chad	1	Paraguay	–4
Gambia, The	0	France	1	Puerto Rico	–4
Ghana	0	Gabon	1	Equatorial Guinea	1
Ireland	0	Niger	1	Spain	1
Sierra Leone	0	Switzerland	1		
Cameroon	1	Cameroon	1		
Malta	1	Luxembourg	1		
Nigeria	1	Burundi	2		
Botswana	2	Lebanon	2		
Lesotho	2	Comoros	3		
Malawi	2	Djibouti	3		
South Africa	2	Madagascar	3		
Zambia	2	Mayotte	3		
Zimbabwe	2	Reunion	4		
Kenya	3	Seychelles	4		
Uganda	3	New Caledonia	11		
Mauritius	4				
Seychelles	4				
India	5.5				
Hong Kong, China	8				
Malaysia	8				
Philippines	8				
Singapore	8				
Australia	10				
Guam	10				
Micronesia	11				
Fiji	12				
Kiribati	12				
Marshall Islands	12				
New Zealand	12				
Tonga	13				

Source: various sources, including CIA World Factbook, 1998

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In Denmark, for instance, most of the population speaks excellent English, while in Egypt, French is spoken by a majority of the educated classes, though neither country appears on the list because the official language is not one of these. In addition, the scale of migration globally has meant that most major cities have substantial minority communities speaking a variety of different languages. Indeed some cities, such as Toronto, Sydney, London and New York could be regarded as 'world cities' where speakers of virtually all languages can be found in sufficient numbers to provide staff for large call centres.

Nevertheless, in the fierce global competition to attract call centres, being able to show that the majority of the population speaks the desired language is an important selling point, and those countries whose official first language is a major world language clearly have a competitive edge. If this is combined with other factors, such as the appropriate infrastructure, low cost, a favourable tax regime and an appropriate skills base, it is likely to place them at an advantage within the time-zone in which they are situated.

Ideally it would be possible to integrate the results of this analysis, together with an analysis of other relevant indicators, in order to produce definitive lists of the most likely source and destination countries both for high-skilled and for low-skilled cross-border teleworking. However, the range of variables, together with the range of different types of work, is so complex that additional empirical work will be required before a sufficiently robust scheme of classification can be developed. The information presented in Tables 4.1 to 4.7 gives a number of clues to the countries which might feasibly be regarded as having some stake in the new global information economy. This gives a useful starting point for further research in the future but should not be regarded as definitive.

From the point of view of development it is perhaps even more important to identify those countries which seem likely to miss out on this opportunity. There is a real danger that the global information economy will be one in which there are many losers as well as winners. An identification of the ingredients of success will also, of course, give us clues to ways in which failure might be averted, and thus make a useful contribution to the development of policies aimed at minimising such polarisation.

While we cannot pretend to have produced any conclusive insights, we end this section with a list of those countries which seem, on the basis of our analysis to date, to be most at risk of being bypassed by the development of cross-border telemediated work. This is the result of a 'blind' cluster analysis of a number of variables which appear to be relevant.

We must conclude that in all of these countries some, if not all, of the population is at risk of exclusion and that special measures

Table 4.7: Countries most at risk of being excluded from the global information economy

Afghanistan	Guinea	Rwanda
Albania	Guinea-Bissau	Samoa
Andorra	Guyana	Sao Tome & Principe
Angola	Haiti	Senegal
Armenia	Honduras	Sierra Leone
Azerbaijan	India	Solomon Islands
Bangladesh	Indonesia	Somalia
Benin	Jamaica	Sri Lanka
Bhutan	Kenya	Sudan
Bolivia	Kiribati	Suriname
Bosnia & Herzegovina	Kyrgyz Republic	Swaziland
Burkina Faso	Lao PDR	Syrian Arab Republic
Burundi	Lesotho	Tajikistan
Cambodia	Liberia	Tanzania
Cameroon	Madagascar	Togo
Cape Verde	Malawi	Tonga
Central African Rep.	Mali	Turkmenistan
Chad	Marshall Islands	Uganda
China	Mauritania	Ukraine
Comoros	Mayotte	Uzbekistan
Congo, Dem. Rep.	Micronesia	Vanuatu
Cote d'Ivoire	Moldova	Vietnam
Djibouti	Mongolia	West Bank and Gaza
Egypt, Arab Rep.	Morocco	Yemen Rep.
El Salvador	Mozambique	Congo Rep.
Equatorial Guinea	Myanmar	Zambia
Eritrea	Nepal	Zimbabwe
Ethiopia	Nicaragua	
Gambia, The	Niger	
Georgia	Nigeria	
Ghana	Pakistan	
	Papua New Guinea	
	Paraguay	

Source: analysis by Nick Jagger and Ursula Huws

may need to be developed to ensure that they are not disadvantaged by it. In other words, although they may have begun the process of finding a strategic niche in the new global division of labour, further progress will be necessary if the benefits are to extend beyond a privileged minority to the general population. It is only when this process has taken place to a significant degree, and the multiplier effects have made themselves felt, we must contend, that a significant contribution to economic development can be said to have taken place.

The developing countries which do not feature on this list can be assumed to have entered, to some degree, the global information society and to have some export-oriented information-processing work located within their boundaries. However the extent and nature of this work can only be established when further empirical work had been carried out. Once this has taken place, and the appropriate indicators have been identified, then it will be possible to monitor its future progress within a comparative framework.

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4.4 Qualitative issues in economic development

In assessing whether economic development can be said to have taken place in any given national or regional context it is necessary to take account of qualitative indicators as well as quantitative ones. Even if large numbers of jobs are created, the value which they will add to the local economy will be limited if, for instance, they are very low paid, if they are temporary in nature, or if they bring no new skills or knowledge to the local community capable of being transferred to locally-owned enterprises. Any benefits they bring must be weighed against costs, which might include such things as environmental degradation, damage to workers' health or diversion of resources away from socially-beneficial projects.

In the context of developing economies, it is therefore useful to focus not just on the numbers of jobs created, and their location, but also on the working conditions of the workforce and the nature of the skills which are acquired in the new telemediated forms of employment.

The technologies which are enabling the new international division of labour are bringing about an unprecedented 'shrinking' of distance in terms of instantaneity of communication; they are often producing a situation where many workers are in closer and more frequent 'virtual' contact with customers, managers, subordinates and co-workers who may be located on other continents than they are with their immediate neighbours in 'real' space but with whom they have no telematic links.

A side-effect of this new situation is an unprecedented convergence in labour processes and working conditions between workers in different countries. Regardless of where their workstations are situated, we now have a situation where information processing workers are fingering identical keyboards, watching identical monitors, and using identical software, which may also be monitoring their progress and pacing their work in identical ways. If they are working for the same transnational corporations, they may also find that these near-standardised working practices are also embedded in corporate cultures which are increasingly applied universally and subject to the same fads (such as the introduction of 'total quality management', 'lean management', 'downsizing', 'rightsizing' or 'business process re-engineering') no matter where they are based geographically.

Whether this represents an improvement or a deterioration in working conditions for the workers concerned will depend on what it has replaced, and what the available alternatives may be. Any process of levelling will, inevitably, involve an element of 'levelling up' for some workers in some national contexts and types of office environment, even while it involves 'levelling down' for others. In some environments it may offer a staging

post to new opportunities which are absent in others. It is therefore important to avoid overly simplistic extrapolations from one national context to another, such as, for instance, categorisations of particular work processes as necessarily and inevitably deskilling or as antagonistic to women's interests. In any given situation there are complex and contradictory tendencies at work, and some scope for local adaptation and negotiation, variable though this may be from one environment to another.

The range of tasks involved in cross-border telemediated work is too diverse and, on the whole, too poorly documented for meaningful generalisations to be drawn about working conditions across the board. We focus in this report on the two forms which appear to be the most important in numerical terms and which have given rise to most concern amongst researchers and policy-makers. These are data entry and call-centre work.

Data entry

Since the late 1970s evidence has been mounting that data entry work is associated with health hazards, because of the repetitive nature of the work involved, and the tendency for workers to be monitored (and often also paid) by results, leading to a pressure to key in at speeds which are too high for the human musculosketal system to cope with for long periods.

This evidence, mainly from studies in Japan, North America, Australia and Europe, points to an association between keyboard work and repetitive strain injuries, eye strain and a range of stress-related disorders as well as a possible link with reproductive disorders. These hazards are related to the way in which the work process is designed, not to its location *per se*, so they must be regarded as generic to data entry work rather than specific to teleworked data entry work. As such, they can be (and sometimes are) alleviated by such measures as rotation of tasks, reduced targets or work quotas, self-pacing (as opposed to machine pacing) of the work, good ergonomics, regular breaks and management by trust (with a reduction in the monitoring and surveillance of work by managers).[1]

Nevertheless, such evidence as there is suggests that some of these problems may be particularly acute when data entry work is carried out offshore, especially when the workplaces involved are not unionised and local labour laws comparatively lax. It is interesting to note that when employers are assessing the relative merits of rival locations for this kind of work, many of their questions relate to local regulations governing working

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[1] The extensive literature on this subject is summarised in Huws U, *VDU Hazards Handbook,* London Hazards Centre, London, 1987.

hours or other aspects of employment protection.[1] This suggests that the absence of strong regulation is seen as one of the features which makes a location more attractive from the company's point of view.

Pantin's study[2] of data entry workers in Jamaica and Barbados found that, despite the efforts of trade unions in both countries, workplaces were typically non-unionised, with working conditions which were highly conducive to stress. Shift-working was the norm, with many companies operating three round-the-clock shifts. Another study in the Caribbean[3] reported that most workers also tend to be young, in the 17 to 29 age range, and recruited from high school with no previous job experience, noting that most keyboard operators tend to quit their jobs after two or three years, largely because of the absence of promotion opportunities for all but a very small minority. The author of this report also expressed the opinion that the workers suffered from a range of health hazards resulting from repetitive screen work, but failed to present any documentary evidence of this.

A study of data entry workers in Brazil[4] found high levels of tenosynovitis, back, neck and arm problems and eye strain. The work studied was carried out under extremely stressful conditions. Staff were electronically monitored, had restricted rest breaks and were not permitted to talk at work. A system of payment by results produced pressure to work too fast for health, and discouraged solidarity between workers.

One of the main sources of stress was the very high level of surveillance, both electronic and in person, to which the workers were subjected.[5] It should be noted that in this particular case the workers in question were employed by a local public sector Brazilian organisation and were not involved in cross-border work. One group could be described as teleworkers, however, in that they had been moved to suburban back offices away from the central facility. Interestingly, this group suffered much more from social isolation and a sense of exclusion than those workers left behind in the larger central office, where there was a greater

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[1]   Tele@market, various general forum discussions.

[2]   Pantin D, *Export Based Information Processing in the Caribbean, with Particular Respect to Offshore Data Processing*, FIET, Geneva, 1995.

[3]   Pearson R, 'Gender and New Technology in the Caribbean: new work for women?', in Momsen J, (ed.), *Gender Analysis in Development*, Discussion Paper No. 5, University of East Anglia, Norwich, 1991.

[4]   Soares A, 'The Hard Life of the Unskilled Workers in New Technologies: Data Entry Clerks in Brazil' in Bullinger H J (ed.), *Human Aspects in Computing*, Elsevier Science Publishers, Amsterdam, 1991.

[5]   Soares A, 'Telework and Communication in Data Processing Centres in Brazil' in Gattiker U E (ed.), *Technology-Mediated Communication*, Walter de Gruyter, Berlin and New York, 1992.

shared sense of camaraderie among the workforce, and a greater possibility of unionisation.

Similarly, a 1989-1990 Malaysian study[1] which found a high incidence of eye, wrist, shoulder, neck and back problems among 'information workers' (not all of whom were doing data entry) was based on a sample who were not in fact engaged in cross-border work. These findings nevertheless echo closely the results of many earlier surveys of data entry operators, for instance in the UK[2] and in Japan.[3]

An article in *International Labour Review* in 1993[4] reviews some of these studies but, apart from quoting Pantin's work, presents no evidence drawn from surveys of workers actually engaged in cross-border work. We must presume that part of the reason for the paucity of such studies has been the reluctance of employers to allow access to their workers for research purposes. Whilst such research would be welcome, it is reasonable to assume that the conditions are no different in their essentials from those of other workers engaged in data entry, and that the problems are amenable to some of the same remedies.

Fortunately, this is a field where some work has been done at an international level, *inter alia* by the World Health Organisation, to develop standards and codes of good practice. To the extent that these can be applied internationally, they supply a means whereby minimum standards can be maintained, and limits put on the extent to which workers' health and wellbeing may be compromised in the competition to offer employers the most attractive location package.

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[1] Crepsa M and Yussoff W F W, 'Health Consequences of VDT Work in Malaysia', in Ng C, and Munro-Kua A (eds), *Keying into the Future: the Impact of Computerization on Office Workers,* Women's Studies Unit, Universiti Pertanian Malaysia, Kuala Lumpur, 1994 and Ng C, and Othman J, 'Occupational Health and Safety among Office Workers: a preliminary study' in Nicholas C and Wangel A (eds), *Safety at Work in Malaysia*, University of Malaya, Kuala Lumpur, 1991.

[2] Huws U, *Keying into Careers: Opportunities for Keyboard Operators in the GLC's Central Reprographic Service and Central Computer Service*, Greater London Council Equal Opportunities Group, London, 1984.

[3] Committee for the Protection of Women in the Computer World, *Women and Microelectronics in Japan,* Committee for the Protection of Women in the Computer World, Tokyo, 1983.

[4] Pearson R, and Mitter S, 'Employment and Working Conditions of Low-skilled Information Processing Workers in Less Developed Countries' in *International Labour Review,* Geneva, April, 1993.

Call centres

Perhaps because its rapid growth is such a recent phenomenon, much less work has been done to date on the development of good practice in call centre work.

There is, however, a growing body of evidence, at least in developed countries, that working conditions in call centres create a range of problems for the workers. Studies of call centre workers show that working conditions may be extremely stressful, with a very high rate of staff turnover, attributed to a combination of comparatively low wages, poor promotion prospects and exceptionally intensive levels of monitoring and control.[1] The authors of one study comment that,

> *'The possibilities for monitoring behaviour and measuring output in call centres is amazing to behold ... Indeed, the advertising brochure for a popular call centre software package is titled TOTAL CONTROL MADE EASY.'*

They go on to describe how,

> *'Real time screens display status information such as the number of existing calls in queue, how long the oldest call has been waiting, how many agents are on calls and how many are logged out or unavailable.* Schedule adherence monitoring *allows the supervisor to see whether agents are adhering to what they are scheduled to be doing at any given moment.'*[2]

Recent literature on the subject shows a growing concern to avoid 'overheating' and 'staff burnout' and the need to develop good practice in this area.[3] This is partly because staff retention is becoming a major problem for employers, not just because of the cost of recruiting replacements but also because of the disruption caused when staff leave without notice. Call centre consultant Simon Roncoroni recounts how: '*I've known cases where people might have a bad morning and they go off for a lunch break and don't even come back to collect their wages — they just can't take the stress any more.*'[4] In the UK, this problem is being actively

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[1] Reardon G, 'Externalising Information Processing Work: Breaking the Logic of Spatial and Work Organisation', United Nations University Institute for New Technologies Conference on *Globalised Information Society: Employment Implications*, Maastricht, 1996.

[2] Fernie S, *Call centres — the workplace of the future or the sweatshops of the past in a new disguise?*, Centrepiece, Centre for Economic Performance, London School of Economics, 1998.

[3] See, for instance, McLouchlin U, 'Call Centre Staff Development' in 't' *magazine*, October, 1997, Dives S, 'Customer Service in Call Centres, in *Training Officer*, October, 1997, and Incomes Data Services, *Pay and Conditions in Call Centre*, IDS Report 739, London.

[4] Roncoroni S, *Call Centres — a new way of working*, presentation at Institute of Personnel and Development Annual Conference, Harrogate, October, 1998.

addressed by many employers, often with the help of occupational psychologists, and improved practice models are being developed in a number of call centres, especially where trade unions are recognised.[1]

As call centre work spreads into more highly skilled work, it is likely that such concerns will increase. Workers with specialist skills which may have taken years to develop, such as those working in medical call centres, on-line human resources departments or social services crisis lines, are likely to have sufficient bargaining power (and to be sufficiently expensive to train, and replace) to be able to demand more humane working conditions.

Little research appears to have been carried out on conditions in call-centres dealing with cross-border telephone traffic. There have, however, been a number of cases where trade unions have organised successfully in this area. In Ireland workers in a number of call centres, including the large UPS pan-European call centre in Dublin which employs workers from throughout the EU, have begun to join trade unions, and have won recognition on several sites.[2] In 1996 a historic trade union agreement was reached with Air Canada, agreed jointly with the trade unions from three different countries, Canada, the United States and the United Kingdom, covering call centre workers in each of these countries, guaranteeing job security for a defined period and controlling the conditions under which 'overflow' calls could be transferred from one country to another.[3]

It is possible that improved conditions in call centres in the developed countries, and the resulting increases in costs, might be one of the factors stimulating employers to look for cheaper and more compliant workers in developing countries. To date, there is little evidence on this. FIET reports that international telemarketing to the North American market is being undertaken to a limited extent from Caribbean centres, but gives no detail of how this arrangement came about.[4] Neither, to our knowledge, has any research yet been published on working conditions in call centres in the developing world. All the evidence suggests that this type of employment is increasing very rapidly, an increase which is likely to accelerate in the future as telecommunications costs continue to tumble in the wake of liberalisation, increased competition, and technological advances.

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[1] Incomes Data Services, *Pay and conditions in call centres 1998,* IDS Report No. 771, October, 1998.

[2] Information supplied by Chris Hudson, Communication Workers Union of Ireland, and by the Irish Trades Union Congress.

[3] Information supplied by the International Transport Workers Federation and the United Auto Workers Union of Canada.

[4] Bibby A, *Trade Unions and Telework,* FIET, Geneva, Autumn 1996.

There is therefore an urgent need for systematic research on working conditions in call centres internationally and for an investigation into whether there is a need for global standards to be laid down to ensure minimum standards of health and safety, both physical and psychological for computer telephonists.

In addition to general issues relating to workers' wellbeing, these developments raise questions of gender equality. In general, cross-border teleworking appears to reproduce, often in quite an extreme form, the gendered division of labour found elsewhere in most societies. Thus the higher-skilled offshore work, such as computer programming, tends to be done most often by men, while, as we have already noted, employment in data entry is strongly feminised. Many commentators, such as Posthuma,[1] interpret this as a confirmation of women's secondary place in the labour market. However Pearson interprets the evidence differently, arguing that employment in data entry work in the Caribbean may give young women the skills and experience to start up their own businesses, although she admits that there is so far no evidence that this is taking place.[2]

Employment in call centres also appears to be strongly segregated by gender. Women, generally young women, form the overwhelming majority of those working in incoming call centres (estimated at 82 per cent of all call centres globally[3]) engaged in routine tasks such as those involved in telephone banking, directory enquiries, booking maintenance calls, dealing with customer complaints, selling airline tickets or vacations, or mail-order selling. Men are more likely to be found, however, in higher-skilled technical types of call centre work, such as computer help-lines, and in outgoing call centres, thought to require a more aggressive approach and involving such activities as selling financial services, or debt collection.

It seems likely that many of the selection criteria for these jobs draw on stereotypes of femininity and masculinity, with women being considered more friendly, patient and helpful than men, and less likely to lose their tempers with rude or awkward customers. Television commercials and magazine advertisements for such services as telephone insurance generally picture the tele-sales operators as attractive, smiling young women, waiting only to serve the customer, very much in the manner of airline stewardesses, waitresses or other traditionally feminine 'service'

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[1] Posthuma A, *The Internationalisation of Clerical Work: a study of offshore office services in the Caribbean*, SPRU Occasional Paper No. 24, University of Sussex, Brighton, 1987.

[2] Pearson R, 'Gender and New Technology in the Caribbean: new work for women?', in Momsen J, (ed.) *Gender Analysis in Development,* Discussion Paper No. 5, University of East Anglia, Norwich, 1991.

[3] Call Center News, *International Call Center Statistics,* 1998.

occupations. Indeed the Northern Ireland Development Board, not untypically, not only shows a smiling young woman on its advertisements, but also uses the slogan 'the smile on the phone' in its attempts to attract new call centres to the region.[1] The 'masculine' call centre occupations, by contrast, are associated implicitly with such attributes as technical expertise and authority.

The development of remote telemediated work does not just reproduce and reinforce existing patterns of inequality, it can also serve to undermine some of the equal opportunities policies and positive action programmes which have been developed over the past two decades to try to counteract them. This comes about as a result of the introduction of a spatial dimension to the gender division of labour. When work is outsourced, or carried out on a distant site, a physical impediment is introduced to the career advancement of these workers, who cannot be promoted without moving to an office which may be in a different region, a different country or even a different continent.

This can be illustrated with reference to the banking industry. This example is drawn from the UK experience, but the pattern is broadly similar in many other countries. This is a sector in which telematics has already brought about major changes in the location of work. For instance, most major banks have introduced telephone banking, with specialist call centres established to respond to customers. Other functions which have been relegated to remote back offices include data entry, word processing and other routine administrative tasks, such as the processing of mortgage applications. These developments have coincided with the closure of many traditional multi-functional branches.[2] However, they have also coincided with a complete restructuring of employment in the industry.

Traditionally, banks recruited staff, both men and women, straight from school. Everybody started on the lowest grade, usually in a local branch, carrying out a mix of work, some based at the counter dealing with customers, some in the back room. Extensive training was provided, with the opportunity for those who wanted to obtain professional qualifications by attending

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[1] IDB Northern Ireland advertisement in *Call Centre Focus,* October, 1998.

[2] Gosling P, *Financial Services in the Digital Age,* Bowerdean, London, 1996.

Huws U, Korte W, and Robinson S (1990a), *Telework: Towards the Elusive Office,* John Wiley, Chichester.

Huws U, (1990b) 'Pinning down the mobile worker' in *Practical Computing,* March.

Huws U, (1994) *Teleworking in Britain,* Research Series No. 18, Employment Department, Sheffield.

college-based courses (which included day-release for attendance, at the employer's expense).

In theory, promotion was equally available to both men and women, but in practice this system favoured men, partly because women were less able to take time out of their domestic lives for study during the evenings, partly because in order to progress above a certain level it was necessary to accept transfers to branches in other parts of the country, which women were less able to accept, and for several other reasons.[1] During the 1980s a number of initiatives were taken to improve equality of opportunity within the sector, including career-break schemes for women, special 'women into management' training schemes and the introduction of job-sharing. These had (and in some cases still have) some value where work was based in multi-function branches. However the introduction of remote working has placed very large numbers of women workers outside their scope. There has been a radical transformation of the career structure in the sector. Most staff are now recruited to specific posts rather than as general workers, and the 'grow-your-own' approach to training specialists hardly exists. Graduate recruitment is now the norm for specialist posts, while clerical workers are recruited, often on short, fixed-term contracts, to carry out a single specialist task.

At the remote centres, hierarchies are flat and promotion prospects normally limited to the move from operator to supervisor. If workers did want to progress further, they might have to move many hundreds of miles in order to do so. Direct comparisons with male co-workers (in order to establish that work is of 'equal value') become well-nigh impossible when there are such major differences in how and where these workers are employed. Remote workers are often explicitly excluded from the career-break schemes and other forms of support which exist for the dwindling number of women based at multi-functional centres.[2]

Even within a single country, the implication is not just that there is a general danger of widening differences in employment opportunities between the populations of different regions but that, because a spatial dimension has been introduced to the gendered division of labour, there will also be a growing difference in the opportunities open to women (and men) depending on whether they live in a favoured or less-favoured

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[1] Crompton R, and Jones G, *White-collar Proletariat: deskilling and gender in clerical work,* Macmillan, Basingstoke, 1984.

[2] Reardon G, (1996) 'Externalising Information Processing Work: Breaking the Logic of Spatial and Work Organisation', United Nations University Institute for New Technologies Conference on *Globalised Information Society: Employment Implications,* Maastricht, October 17-19.

region. When work is transferred across national boundaries then the implications are even more extreme, and a danger of increasing polarisation between different types of remote site is opened up. If these remote sites involve different kinds of activity, with a different gender profile, then both the geographical and the sexual dimensions of the new international division of information labour will have been further cemented into position.

We would like to end by emphasising that we do not believe that this process is an inevitable one. The new division of labour is both rapidly changing and profoundly contradictory. Whilst in many ways it would appear to reinforce existing divisions by placing huge physical distances between groups of workers, it also, paradoxically, brings them closer together in other ways, both by imposing on them all an increasingly standard universal set of working practices and by placing them in direct, interactive communication with each other through the new communications media. Thus workers are free to compare their working conditions, consult websites to find out what the going rate of pay is in other countries and develop new forms of 'virtual' information and organisation networks.

It is likely that in the future there will be some convergence in pay and conditions in the kinds of footloose information-processing jobs which are the subject of this report. Whether this convergence will involve a levelling up or a levelling down will depend on a number of factors, including the scarcity of the skills involved and the extent to which the workers concerned succeed in developing these new networks. What is more doubtful is whether this convergence will extend beyond the footloose information jobs into the general labour market in the countries concerned, where many millions of jobs in agriculture, extraction, manufacturing, education, health, leisure, personal services and other sectors will remain firmly rooted to a single geographical spot. It is perhaps only when such a generalised harmonisation has taken place in any given country that development can genuinely be said to have taken place.

If cross border teleworking can be introduced in a way which facilitates this, then it might yet make a positive contribution to economic development in the poorest countries of the world.

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