

# Modelling eWork

– Towards a better understanding of information technology’s impact on workplaces  
and work locations –

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## 1 Introduction

“eWork” is a term which has found increasing use in recent years, although – as is the case for the majority of newly invented so-called “e-phenomena” – there is next to no common understanding at all of its concrete meaning. In some cases, eWork started to be used as a replacement for “telework”, which many observers and policy-makers thought was not anymore adequate for describing the diversity and variety of information technology (IT) supported work forms which have started to crop up<sup>1</sup>. In other cases, eWork stands for everything which has changed in working organisation under the influence of recent technological advancements – in particular, of course, the Internet.

Such lack of conceptual clarity can deeply harm policy-making. This is because any discussion about the pros and cons of eWork, and the necessity for measures that might support or hinder the further development of IT-supported new ways of working, suffers from diverging and sometimes contradictory information: on what such workforms look like, on how wide-spread they are and will be in the near future, and on what concrete implications they have for workers, employers, and the society as a whole. For example, there are diverging statements being made about the development of telework in the last two decades. While some sources suggest that the number of teleworkers has stagnated recently and that it remains a marginal phenomenon (e.g. Sturesson 2001; Helminen et al. 2003; Brynin 2004), others found that it has increased significantly throughout Europe (Heinonen 1998; European Foundation 2002; CEC 2003).

<sup>1</sup> See for example CEC 1999, 2001.

From early on the notion of telework, i.e. workplaces which have been made locationally flexible by the use of IT, arose in policy-makers hopes for achieving a number of goals, from reduction of private car traffic (most prominently in the USA) over integration of the disabled into working life (in the EU) to breathing new life into remote areas which are threatened by depopulation (for example in Finland). In many cases, this debate has been resting on an image of teleworkers as fairly low-skilled, mostly female workers who have been provided by the employer with a computer workplace in their home and who spend more or less all of their working time there.

Much recent data, however, seems to suggest that this image does not reflect reality adequately. Large majority of teleworkers seem to spend most of their working time at a central office. They also often carry out some of their work at third places, enabled by mobile office technology. Moreover, teleworkers are more likely to be male, high-qualified, and located in urban agglomerations rather than female, low-skilled, and living in remote areas, as the original scenario suggested.

In a parallel (but largely overlooked) development to the spread of telework, working conditions at workplaces which are co-located together in central offices are becoming increasingly more similar to those of teleworkers. This might be, for example, because work results become the result of extensive use of IT-mediated cooperation processes which take place regardless of traditional space and time constraints (Empirica 2003) – we call this tele-cooperation or tele-collaboration. ICTs are also being made use of for “delocalising” work across space in the form of remote back offices, electronic outsourcing and offshore telework. The term “eWork” has found increasing usage for including this wider definition of ICT-enabled locational flexibility, as well as telework in its original meaning (Huws & Regan 2001). The implications of office-based forms of eWork on the fundamental characteristics of employment are obviously quite different than those of traditional, home-based telework.

All of this means that further diffusion of locationally flexible work will not *necessarily* contribute towards fulfilling the hopes of policy-makers. It must be clear that policy measures will only be successful if they rest on a proper understanding of reality, and on a grasp of the interrelations which exist between the development of individual types of eWork, and between eWork and more general trends in employment patterns, business imperatives, and social values and attitudes.

In this paper, we will try to contribute to the establishment of a model of eWork diffusion. Firstly, the paper will review the latest research on telework, and how its findings compare with the hopes and beliefs of futurologists and policy-makers (section 2). Secondly we will suggest how the concept of telework can sensibly be widened to encompass other forms of telemediated and locationally flexible work, taking due account of the work done in the EMERGENCE project on defining eWork (section 3). And finally (section 4), we will identify from the literature the main expected determinants of eWork growth in a country, and draw some conclusions for future need for research. The paper makes some reference to the situation of Finland, which will help us to understand the importance of the national context for diffusion of types eWork.

## **2 The changing face of telework in the public debate**

### *2.1 Hopes and illusions*

The discussion on telework began in the mid-70s, set off by the first oil crisis 1973 as well as by recent technological developments which represented the first steps towards computer-

enabled digitisation of work content (see Kordey 1994). First publications about telework (or telecommuting, the term commonly used in the USA) dealt almost exclusively with the possibility to reduce private commuting by means of telecommunications (Golver 1974, Pye et al. 1974, Nilles 1976). Indeed, telework has been used extensively as part of the State of California's (and other US states') strategy to reduce volumes of car traffic (JALA 1990). In Finland, objectives related to regional development, especially concerning the sparsely populated parts of the country, were often behind the support of telework initiatives (Cronberg 1985; Köppä 1998).

But telework was not only considered as a tool. As the 1970s turned into the 1980s, full-scale speculation began about the effects of ICTs on work organisation in general. In his influential futurist tome from 1980, Alvin Toffler foresaw the emergence of "electronic cottages" which would replace centralised sites of production. This was obviously a scenario which was strongly influenced by the anti-urban ideology which is not unusual for US futurologists, especially those from the right part of the political spectrum<sup>2</sup>. By returning work into the fold of the family, writers like Toffler sought to promote a conservative lifestyle which was at odds with many basic developments in society.

Much of this thinking was firmly rooted in technological determinism (Stanworth 1998), combined with notions of how a better society should look like which were derived from US circumstances (Robins & Webster 1999). It was assumed that technology would, almost by an inbuilt automatism, lead to (beneficial) social outcomes. Consequently, Toffler predicted that by now, 10 to 20 percent of the US population would exclusively work from home.

Today, it is safe to say that Toffler's prediction has been wide off the mark: The share of fully home-based teleworkers in the workforce was a mere 0.6% in 1998 (Di Martino 2001:30). While ICTs have certainly contributed much to profound changes in the way we work, these changes point in a direction which is very different from Toffler's scenario – non home-based new ways of working have spread fast because they have proven better compatible with existing organisational cultures. Toffler's mistake was to ignore the developments and structures which are underlying the technological trends he discussed and, more generally, to underestimate the persistence of basic features of late capitalist economic development in the face of economic restructuring (Gillespie et al. 2001; Webster 2002).

## 2.2 *The look of telework today*

In order to discuss the path of diffusion of telework, it is necessary to draw a distinction between certain different types of telework, because huge differences exist between these types with regard to preconditions, stakeholder involvement, and socio-political implications (Gareis 1999). We distinguish between home-based telework, mobile telework and telework by self-employed who work from SOHOs, i.e. small offices in their home (Empirica 2003; see Figure 2-1). These are defined as depicted in the figure below. Among home-based teleworkers, we additionally distinguish between permanent (>90% of working time), alternating (at least one full working day per week) and supplementary teleworking (some working time, but less than one full working day per week).

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<sup>2</sup> For a discussion of the long tradition of anti-urbanism in the USA (which stretches back to Thomas Jefferson), see Fishman 1987.

It is important to note here that this definition of telework requires that *paid working time* is spent at remote locations. This definition implies that some form of agreement between employee and supervisor/employer exists about the issue<sup>3</sup>.

**Figure 2-1: Types of telework and interrelations**

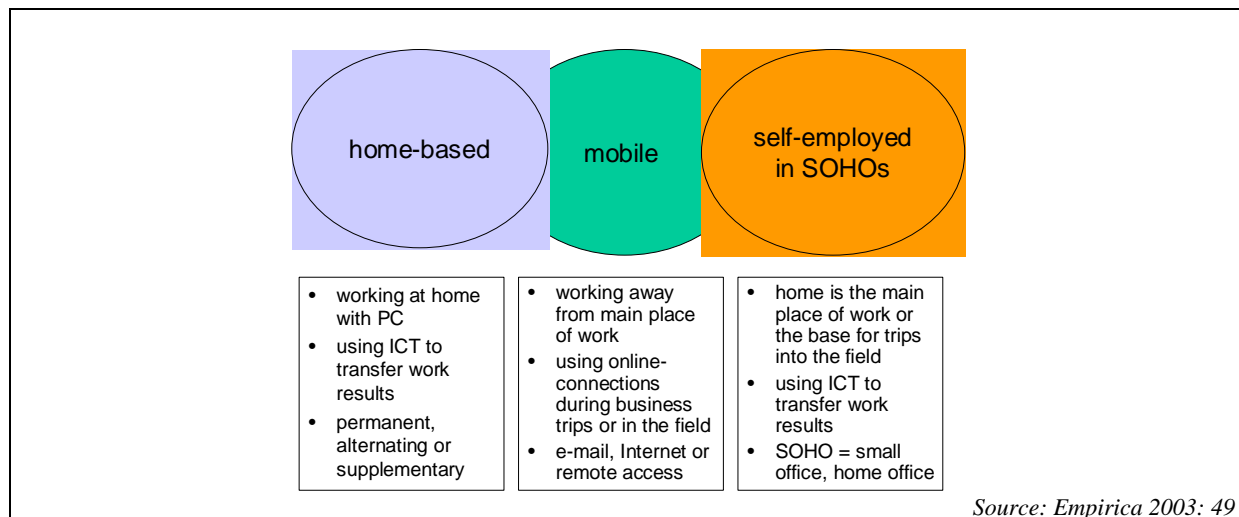


Table 2-1 shows how diffusion rates of these different types of telework have developed in recent years (averages for EU15 and Finland), while Table 2-2 presents national shares of teleworkers in the EU15, ten then Accession countries, Switzerland, and the USA. The data has been validated using a number of national as well as international sources (e.g. European Foundation 2000).

**Table 2-1: Development of telework in % of all persons employed (weighted averages) in EU15 and Finland**

Type	EU15		Finland	
	1999	2002	1999	2002
Alternating and permanent home-based telework	2.0	2.1	6.7	4.7
Supplementary home-based telework	2.0	5.3	6.0	11.0
Mobile telework	1.5	4.0	2.6	6.2
Self-employed telework in SOHOs	0.9	3.4	2.2	3.2
<b>All telework (excluding overlaps)</b>	<b>6.0</b>	<b>13.0</b>	<b>16.8</b>	<b>21.8</b>

Looking at home-based teleworking first, the overall share of the EU workforce practising this type of telework is 7 percent. Of these, only 2 percentage points spend at least one full working day per week at home (alternating telework), and their number has not grown much at all in the last three years. Permanent telework by persons with a contract of employment is so rare in Europe that it could not be measured in a statistically significant way using the

<sup>3</sup> Definitions which also include unpaid work-related activities quickly arrive at figures of between a quarter and half of all workers doing work at home (Di Martino 2001:33; Ylöstalo 2003:85).

SIBIS sample of ~ 12,000 interviews in the EU15 (Among the self-employed, permanently working from home is more wide-spread, for obvious reasons). These findings have been confirmed by research carried out at the national level (Germany: Freudenreich et al. 1997; USA: ILO, quoted in Di Martino 2001:30; UK: Di Martino 2001:37; Finland: Statistics Finland 2003).

**Table 2-2: Types of telework (in %)**

	All home-based teleworkers	Home-based teleworkers – alternating/permanent	Mobile teleworkers	Self-employed teleworkers in SOHOs	All teleworkers (excluding overlaps)
AUSTRIA	6.7	2.0	3.7	5.7	13.8
BELGIUM	7.5	2.2	2.4	2.5	10.6
DENMARK	17.7	2.6	2.7	2.9	21.5
FINLAND	15.7	4.7	6.2	3.2	21.8
FRANCE	4.4	2.2	2.1	0.8	6.3
GERMANY	7.9	1.6	5.7	5.2	16.6
GREECE	6.0	2.1	3.5	3.4	11.1
IRELAND	6.0	0.5	4.2	3.3	10.9
ITALY	2.5	0.8	5.5	2.6	9.5
LUXEMBOURG	3.3	0.9	1.5	1.8	5.6
NETHERLANDS	20.6	9.0	4.1	5.0	26.4
PORTUGAL	1.6	0.5	0.3	1.5	3.4
SPAIN	2.3	0.3	0.8	2.0	4.9
SWEDEN	14.9	5.3	4.9	2.0	18.7
U.K.	10.9	2.4	4.7	4.5	17.3
<b>EU 15</b>	<b>7.4</b>	<b>2.1</b>	<b>4.0</b>	<b>3.4</b>	<b>13.0</b>
CH	11.4	4.2	7.6	2.2	16.8
USA	17.3	5.1	5.9	6.3	24.6
BULGARIA	3.6	1.5	1	1.2	5.5
CZECH REP.	1.4	0.1	2.1	1.6	4.7
ESTONIA	7.8	3.7	3.9	1.8	12.2
HUNGARY	0.8	0.6	0.9	2.1	3.6
LATVIA	3.1	1.1	2.4	1.5	6.5
LITHUANIA	7.6	2.3	n.a.	1.5	9.2 <sup>4</sup>
POLAND	4.9	1.0	1.0	2.8	8.4
ROMANIA	1.1	0.3	0.6	0.3	2.0
SLOVAKIA	0.9	0.5	1.8	1.6	3.7
SLOVENIA	4.4	1.6	3	2.3	8.6
<b>NAS 10</b>	<b>3.0</b>	<b>0.8</b>	<b>1.2</b>	<b>1.7</b>	<b>5.4</b>

Base: All persons employed (N=5,901), weighted; EU averages weighted by EU15 population.

Source: SIBIS 2002, GPS

It has become more and more obvious in recent years that permanently teleworking at home, while having potential benefits for the environment (Schäfer 2004) and regional development (Millard 2002), is in most cases not sustainable with regard to psychosocial (Huuhtanen 1997) and economic factors (see Gareis 1998). The FAMILIES project (see Cullen et al. 2003) has reported evidence from a major Danish company according to which telework's mid-term effect on productivity was slightly negative in case of permanent or near-permanent telework, while it was very positive for alternating teleworkers. The reasons given for the poor performance of permanent teleworkers refer to the lack of social and informal interaction with colleagues, which resulted in a loss of motivation and insufficient access to intra-company information flows.

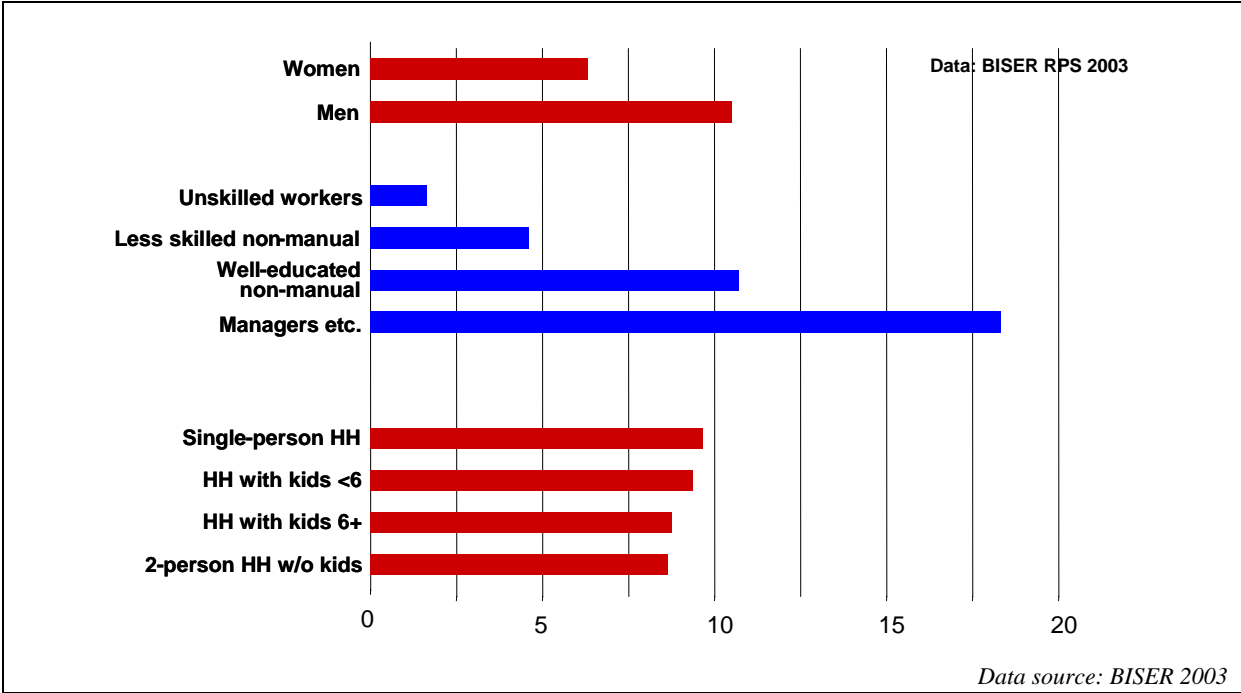
<sup>4</sup> Does not include mobile teleworking

But while permanent teleworking at home remains an exotic phenomenon, and alternating home-based telework is hardly increasing at all, supplementary home-based telework is on the rise (see Table 2-1). In 2002, there were more than two and a half times more supplementary teleworkers in the EU15 than three years before.

These findings suggest that there is a shift of home-based teleworkers towards less time spent at home. Obviously, the progress in the availability of cheap and powerful remote access technology has not led to workers spending more and more time working at home, but rather to more and more workers spending only a fraction of their weekly working time at home. This points towards a greater flexibility in the use of individual working locations, but at the possible expense of some of the traditional advantages ascribed to telework such as savings on commuting.

But not only do teleworkers spend much less time at home than it was originally predicted. They are also recruited from quite different groups of people. In contrast to pervading images of telework, most teleworkers are not female, and they also do not live in households with young children. Even when looking at home-based telework only, data such as that from BISER (Gareis & Kordey 2003) strongly suggest that women and households with small children are not more likely to telework than other members of the labour force.

**Figure 2-2: Teleworkers as share of employment, according to sex, social grade and household status (in percent)**



This finding is confirmed by other research which used representative (probability) samples, as opposed to case study research with hand-picked teleworkers.

Mobile teleworkers are those who spend a considerable share<sup>5</sup> of their working time away from their home and their main place of work, e.g. on business trips, travelling or on customer's premises, and make use of online connections while doing so. According to the SIBIS survey, 4% of the EU15 workforce can be described as mobile teleworkers.

<sup>5</sup> Here: 10 hours per week or more.

Switzerland is the leader here among the countries in the survey, followed by Finland, the USA, Germany and Italy. The penetration in Eastern and Central Europe is much lower with an average of about 1%, although Estonia and Slovenia have impressively high figures.<sup>6</sup>

Mobile computing technology and online access have diffused fast in recent years and are increasingly used for work. The share of mobile teleworkers has grown from 1.5% to 4% in the course of only three years. This is likely to benefit employers, in particular, as the efficiency of business process increases because of more continuous communication flows (Julstrud 1998, Gareis 2003). The advance of 3G mobile networks and the surrounding mobile applications will act as another strong push in this direction. Working from just anywhere does not sound such a futuristic proposition anymore today. This trend is also reflected by data from the Working Life Barometer 2002 in Finland (a forerunner country with respect to mobile phone usage) according to which almost 40% of wage and salary earners have been carrying out work tasks in their leisure time by means of a connection to their employer via mobile phone or ICT network (Ylöstalo 2003). The boundaries between work at a central office, on the road or in the field, at customer's premises, at teleservice centres and at home are likely to further disappear step by step. The same applies, it seems, to the boundaries between working time and leisure time (Voß 1988).

It has been suggested that to categorise teleworkers as “home-based” or “mobile” teleworkers distracts from the fact that many teleworkers spend their working time at a number of different locations (CEC 2003b), among which the home might be only one option (see also Market-visio 2002). This trend has obviously been enabled by mobile office technology which has liberated work from being bound to a particular space and time. For this phenomenon, the term “multi-locational work” has been invented (CEC 2003b; BISER 2003). It implies that persons work wherever it suits their work tasks, business schedule, and/or lifestyle. Table 2-3 gives a picture of how this might look in practice. The interview asked in detail for time spent at each of five “atypical” working locations. The table now shows the share of those teleworking from one of these locations (columns) who also work at each of the other locations (rows). For example, of persons teleworking from the home (a) 11.5% also work at a second location of their employer and use online connections to stay in contact when doing so. Another example: 42.5% of those who telework from mobile locations (e) also spend time teleworking from home.

The figures in the table provide evidence that multi-locational work has indeed become a normal way of working for a considerable share of total employment. Only persons teleworking from home are unlikely to spend time teleworking from other locations. The reason for this might be that the equipment in home offices is often fixed in space, i.e. cannot be used for teleworking from other locations (e.g. desktop, home-bound Internet access). On the other hand, once workers have access to mobile computing equipment, they seem to choose any of a number of different working locations, including a second location of their employer, the premises of customers or clients, hotels and meeting venues, and temporary locations while travelling.

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<sup>6</sup> Data from Lithuania is missing for this indicator.

**Table 2-3: ICT-supported multi-locational work – working locations**

ICT-supported multi-locational work					
Base →	(a) at home or the same grounds	(b) at second location of employer	(c) at customers/ clients	(d) at a hotel/ meeting venue	(e) on the move
at home or the same grounds	100.0	40.4	42.2	39.1	42.5
at second location of employer	11.5	100.0	52.5	57.4	55.6
at customers/ clients	17.4	76.0	100.0	64.6	71.9
at a hotel/ meeting venue	9.2	47.4	36.9	100.0	50.1
on the move	14.2	65.2	58.3	71.0	100.0

Base: all multi-locational workers. Data source: BISER RPS 2003, weighted.

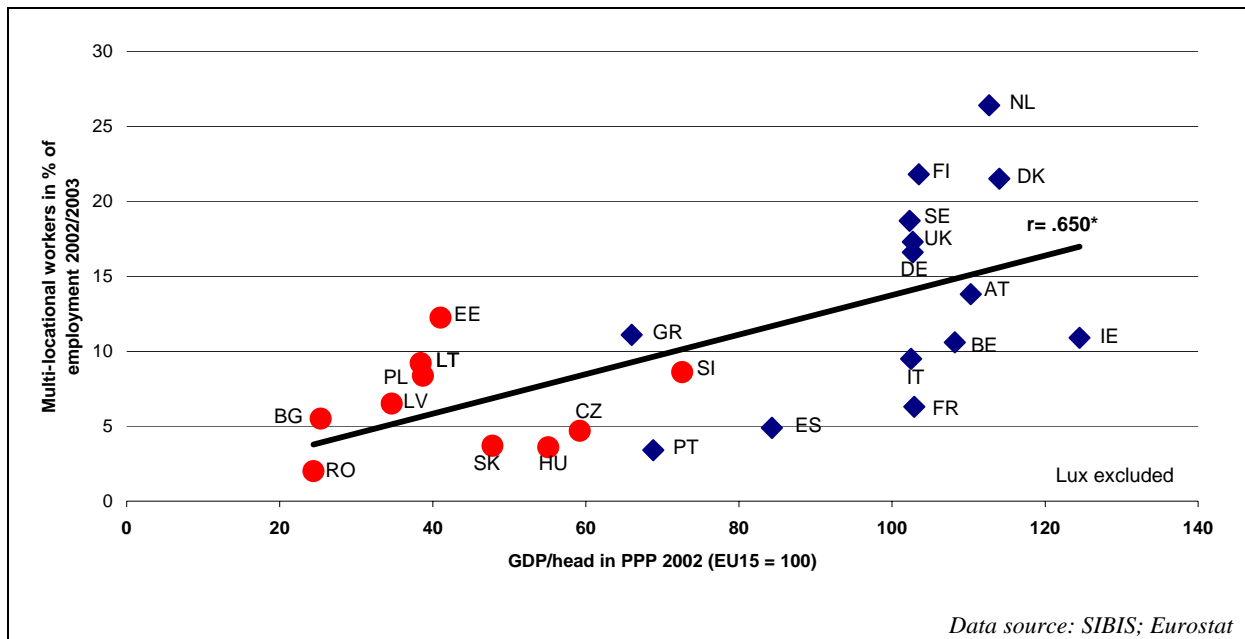
Self-employed teleworkers in SOHOs are self-employed persons who work from home, on the same grounds as their home or with their home as their base, and use online ICTs for interaction with clients, collaborators and suppliers. The survey showed that 3% of EU employment belong to this group, which translated into 21% off all self-employed. The share of teleworkers is therefore considerably higher among the self-employed than among workers with a contract of employment. Telework seems to be on the way to becoming the standard working mode for the majority of the self-employed and among them freelancers (many of which traditionally work from home), in particular. Austria, Germany, the Netherlands and the UK have the highest share of SOHO-based teleworkers in Europe. Greece also has a high score on this indicator which is mainly due to the massive overall share of self-employed in the workforce. Between 1999 and 2002, the number of SOHO-based teleworkers has grown from 1% to more than 3% as a result of annual growth rates averaging more than 50%. The candidate countries (average 2%) are somewhat behind the EU, but to a lesser extent than it is the case for the other types of telework.

The percentage of total teleworkers, as defined in this paper, is shown in the last column in Table 2-2. The share is considerable lower in the European Union than in the USA, but still on average 13% of EU employment involves some kind of teleworking. In the USA, every fourth worker has some type of teleworkplace. In the EU15, percentages stretch from 27% in the Netherlands to only 5% in Spain. As was to be expected, the countries from Central and Eastern Europe lag behind in telework penetration (average: 5.5%). However, there are comparatively high numbers in Estonia (12%) as well as in Lithuania (9%), Slovenia (9%) and Poland (8%).

Interestingly, although differences between countries can partly be explained by economic wealth (as measured in GDP per head), other factors must be more important (see Figure 2-3): While there is a number of EU Member States with about on average GDP/head in 2002, their telework penetration rates vary between 6% (France) 22% (Finland).

Additionally, considerable differences in the availability of appropriate technological infrastructure can be expected to play an important role, together with organisational practices in companies, political and legal frameworks, housing conditions (spare room for home-based telework), as well as cultural factors such as common attitudes of management and workforce towards techno-social change. This is an area where empirical research (e.g. van Ommeren 1998) has not been able to shed much light on discriminating factors in reality.

Figure 2-3: Telework (all types) and national income (GDP/head)



In our opinion, the scarcity of evidence on the reasons for the very different spread of telework (and eWork – see below) between countries is partly due to the lack of a comprehensive and holistic model which positions telework in the context of more general ICT-related developments in work organisation (Hanhike et al. 2000). We will return to this point below.

To summarise the current knowledge about telework diffusion, telework (as defined in this paper) has attained importance in current working life (especially in forerunner countries such as Finland where 22% of the workforce are already practising some kind of telework), but its classical image as persons who spend full working days teleworking from home remains a marginal phenomenon in reality. Most telework today takes place in flexible settings, with the home acting as only one of a bigger number of options for work locations. Consequently, the number of mobile teleworkers is likely to outnumber home-based teleworkers soon.

Most teleworkers spend only some hours per day working at home, and still commute to a more traditional working environment for the brunt of their work. The home becomes a “touch-down office”, which is equipped for giving online access to company resources whenever needed. The number of teleworkplaces (in the technical sense of a networked workplace installed permanently or temporarily in the home) is increasing at a rapid rate, but the number of persons working at home at any given point in time remains modest. The location of work becomes more footloose, but there is no general shift of work from the office into the home.

The reasons for this have been subject of extensive debate among researchers and practitioners in recent years. There is much evidence which suggests that a perceived need for (ad-hoc rather than pre-planned) face-to-face interaction with colleagues (subordinates, co-workers, superiors), customers and/or other persons plays a key role. Underlying this are more general barriers related to organisational culture: Traditional management attitudes concerning supervision of workers tend to be incompatible with remote working: they rely on control “by eyeball” rather than trust relationships and “management by objectives” (Hanhike et al. 1998). In addition, companies have not succeeded in creating knowledge management systems which diminish the central role of tacit knowledge, which tends to be better transmitted via face-to-face contact than through ICT connections.

On the demand side, Empirica (2003) reports that about one quarter of all jobs are considered feasible for alternating home-based teleworking by their holders, more than 10 times the number of actual people teleworking in this way. Together with very high interest expressed by the labour force in home-based telework in the same survey, these figures suggest that the demand for teleworking from home is much higher than the supply provided by employing organisations (see the data in Gareis et al. 2003). More and more companies prove willing to give their staff remote access to their computer network (eBusiness Market Watch 2003), but the acceptability of staff working from home whole days seems to be limited.

These trends should be reason enough to rethink some of the original assumptions about telework and how it will affect society. Telework seems to be part of a general move towards greater variability and flexibility of the way work is organised, and is being implemented in ways that are believed to maximise the effectiveness and efficiency of the work process. It is clear from this that the focus of public debate and policy-making should shift at least partly towards non-traditional forms of telework such as supplementary telework, multi-locational working and SOHO-based entrepreneurial telework. Many of the economic, social and legal questions arising from the current spread of these types of telework still need to be tackled.

### **3 From telework to eWork**

Discussion on telework has in recent years been subsumed under the newly invented term “eWork” (CEC 2001), a development which has certainly not led to more clarity in the discussion about ICTs impact on work locations. From the research and practitioner literature<sup>7</sup>, it appears that the way in which notions of eWork change from the earlier concept of telework are the following:

- While telework in the traditional sense is mostly focussing on individualised changes of work location, most prominently at home<sup>8</sup>, eWork also includes remote work in shared office premises, such as call-centres and (other) remote back offices.
- The discussion around eWork usually also covers telemediated work forms carried out by workers being located in traditional office environments, as in the case of virtual teams which stretch across the boundaries of single organisations and, by implication, mostly also across sites, regions and even countries.

With respect to the former point, the typology of “work delocalisation” developed for the EMERGENCE project by Huws & O’Regan (2001:5) is relevant. It distinguishes between types of workplace (individualised and shared office) and the contractual basis for work performance (see Table 3-1). The typology was developed for asking establishments what types of delocalised work they practice.

Basic features of delocalised types of work according to EMERGENCE are:

- “that is remote: i.e. it takes place at a geographical distance from the establishment where the respondent is based; and
- that it is telemediated: i.e. that a telecommunications link is used to deliver the work” (Huws & O’Regan 2001:5).

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<sup>7</sup> For an overview, see Eichmann et al. 2002

<sup>8</sup> Exceptions which have often been mentioned include tele-centre developments. These have, however, never attained anything like the prominence as originally foreseen, see Korte 1998.

The researchers set up a list of “delocalisable services” and enquired for each of them at which location it is carried out, and (in case of remote locations) which channels were used for transmitting work results (see Huws & O’Regan 2001:9 for discussion of the methodology).

**Table 3-1: The EMERGENCE typology of work delocalisation**

		Contractual basis	
		Internal / employees	External / outsourced
Type of workplace	Individualised (away from “office” premises)	<ul style="list-style-type: none"> <li>• Employed tele-homeworkers</li> <li>• Mobile employees</li> </ul>	<ul style="list-style-type: none"> <li>• Freelance teleworkers or mobile workers</li> </ul>
	On shared “office” premises	<ul style="list-style-type: none"> <li>• Remote back offices / call centres</li> <li>• Employees working in telecottages or other, third party premises</li> </ul>	<ul style="list-style-type: none"> <li>• Specialist business service supply companies</li> <li>• Outsourced call centres</li> </ul>

Source: Huws & O’Regan 2001:5

The basic analytical approach chosen by Huws and O’Regan is to look at performed work as a service which is provided by a worker/contractor and delivered (via telemediation) to a taker (client or “respondent” in the same organisation). This allows them to interpret employees, freelancers and specialist service supply companies as different types of basically the same phenomenon (eWork).

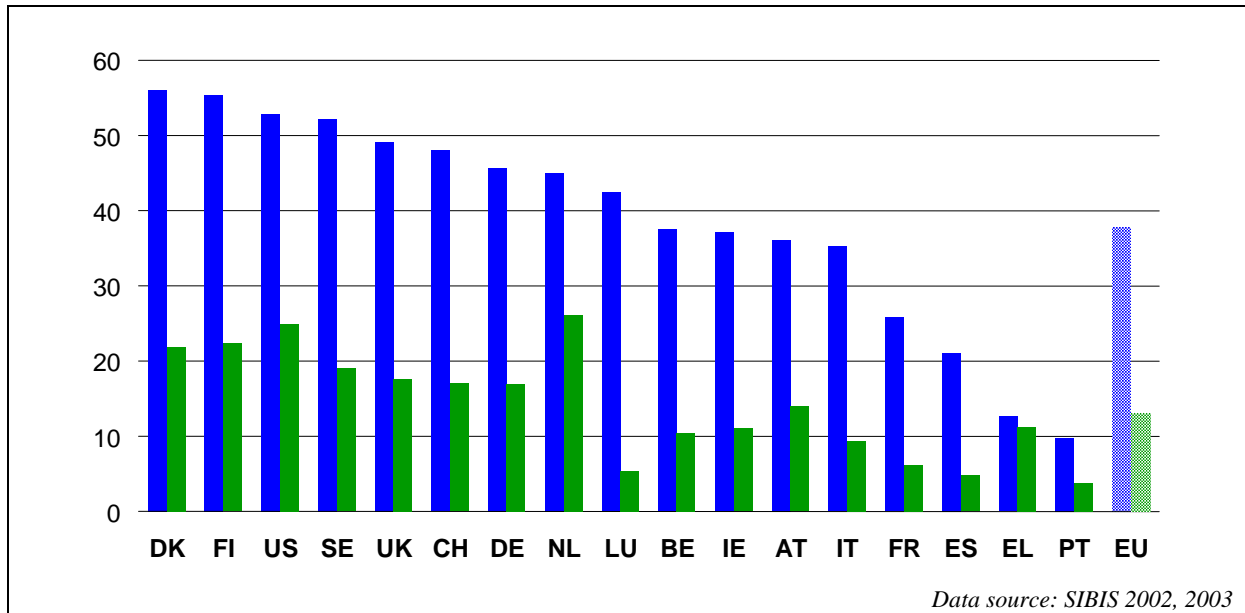
The roles of client and contractor, as used in EMERGENCE, could also be called *principal and agent* to highlight the fact that these type of relationships can be coordinated via the open market, but are also common practice inside of all hierarchical organisations. The principal is somebody who does not act directly but instead by giving incentives (such as money, career prospects) to other persons, called agents. Principal-agent theory (see Eisenhardt 1989) assumes that as a result of self-interest and potential goal conflicts, the fact that a situation of asymmetrical information exists between principal and agent leads to a problem of control (PonTell et al. 1996) – a common theme in much of the management literature on telework (see e.g. Nilles 1998, Dimitrova 2003) and also out-sourcing and collaboration.

To reduce eWork to this kind of principal/agent relationships is a simplification which limits the value of the typology (Table 3-1) for the purpose of drawing a line between eWork and other (traditional) types of work. Not all work performance conforms to the agent/respondent model. In many cases, there is no hierarchical relationship between co-workers, but rather cooperation or collaboration (see also Eichmann et al. 2002:12). Collaboration in general means, as the Cambridge dictionary puts it, “when two or more people work together to create or achieve the same thing”.

SIBIS collected data on the extent to which the EU labour force is involved in tele-cooperation already. For this, a very basic definition was used which included everybody who regularly uses e-mail or the Internet to communicate with work contacts located at other business sites, either in other organisations or at other sites of the same organisation.

Figure 3-1 shows that more than every third worker in the EU15 is involved in regular tele-cooperation, if defined in that way – about three times as many as there are teleworkers.

Figure 3-1: Telework (right columns) and tele-cooperation (left) in percent of employment



A more precise definition of tele-collaboration needs to address *what* kind of information is transmitted, and for what purpose. For this purpose we suggest that one should speak of collaboration only when an explicit (e.g. written, but not necessary legally binding) agreement about common aims has been made. In this context, we define collaboration in virtual teams as a group of individuals who (or: some of whom) are located remotely from each other and who work together to create or achieve the same thing, and in which interaction takes place exclusively or almost exclusively via telemediation (compare Lipnack & Stamps 1997). They can, but do not have to stretch across organisational boundaries.

We must assume from existing data that tele-collaboration (sometimes also called *in situ* telework) defined as such does play a key role in a high number of jobs across Europe. It is also likely to have a significant influence on the location of work in general because it enables “flexible configurations of human capital without actually having to move people from one place to the other” (Gareis & Korte 2002).

Our definition of eWork therefore comprises *any type of telemediated remote work* and includes the following types:

- *individualised or shared-office based* (this refers only to the physical workplace of the worker, not to the fact that they share an office with the principal or collaborators);
- *collaborative work* (tele-cooperation, virtual teams) or work which is performed in the context of *principal-agent* type relationships;
- work interaction which is *inter-organisational*, i.e. coordinated over the market (such as in client/contractor relationships and freelance work) or work interaction which is *intra-organisational*, i.e. not coordinated over the market.

It should be noted here that the latter distinction has become less clear-cut in recent years, since many transactions inside of companies are nowadays managed very similarly than market transactions, e.g. in the case of individual profit centres which together make up a larger, often multi-national corporation.

We define “telemediation” as the transfer of work inputs and/or outputs via data telecommunications links.

Remoteness refers here to the physical distance between persons involved, either principal and agent or various collaborators. Any definition (as in “remote work”) either leaves much room for interpretation, or must appear rather arbitrary. Nevertheless, most often remote work is being (implicitly) defined as meaning different sites/locations/addresses. For example, telemediated work exchange between two establishments, even if they belong to the same organisation, should be considered eWork if they do not share the same address. On the other hand, co-located workers who nevertheless make extensive use of computer supported collaborative work should not count as eWorkers, because distance does not play any significant role in their case.

“Work” in this context is any type of gainful employment<sup>9</sup>.

Table 3-2 represents an adaptation of the EMERGENCE typology (Huws & O’Regan 2001:5) to include telemediated types of collaboration.

**Table 3-2: Modified typology of eWork**

		Involved actors			
		Principal/agent		Collaboration	
		intra-organisational	inter-organisational	intra-organisational	inter-organisational
Type of workplace	Individualised (away from office premises)	<ul style="list-style-type: none"> <li>Employed home-based telework</li> <li>Mobile telework</li> </ul>	<ul style="list-style-type: none"> <li>Freelance teleworkers (mostly in SOHOs)</li> </ul>	---	<ul style="list-style-type: none"> <li>Virtual teams made up of self-employed teleworkers</li> </ul>
	On shared office premises	<ul style="list-style-type: none"> <li>Other sites of same company (e.g. remote back offices)</li> <li>Employees working on third party premises</li> </ul>	<ul style="list-style-type: none"> <li>Outsourcing to specialist business service supply companies</li> </ul>	<ul style="list-style-type: none"> <li>Virtual teams composed of employees from a single company</li> </ul>	<ul style="list-style-type: none"> <li>Virtual teams composed of employees from different companies</li> </ul>

*Source: the authors, based on Huws & O’Regan 2001*

It is important to note here that individual workers and organisations can be involved in many types of eWork at the same time.

eWork which takes place as collaboration is often referred to as “virtual teamwork” or (in case of co-operation stretching across organisational boundaries) “virtual organisation” (see Vartiainen 2001). For an overview of current research on working in virtual teams and organisations, see Jackson (1999).

“Outsourcing of business services to external organisations” is included in the typology above. Here, work relationships become blurred with traditional trade relationships on the market for services. As soon as a discussion on telework and related developments includes services supplied over the market by freelancers and specialised companies, it becomes obvious that eWork and eBusiness are closely related areas which need to be explored together rather than as separate phenomena. The issue is not any more the difference or relation between telework and homework, but rather the relation between eWork and the other “e’s” which are currently being discussed in the policy domain, such as eBusiness, eLearning, eServices and so forth. This poses considerable challenges to empirical research.

<sup>9</sup> For use in empirical research, this definition needs to be supplemented by a temporal criterion, such as “on a regular basis which accounts to more than 10 hours of paid working time per month”.

#### 4 Conclusions and outlook: towards modelling eWork

The approach outlined in the preceding sections produces nine different types of eWork. Each of these is characterised by a unique mixture of preconditions, push factors, barriers and implications which underlines the need for differentiated analysis as well as informed and targeted policy-making. Some of the main issues for each of these types of eWork are discussed below.

Type ↓	Main push factors
Employed home-based telework	<ul style="list-style-type: none"> <li>• Need for higher productivity &amp; quality of work</li> <li>• Retaining scarce and valued labour</li> <li>• Cost reduction</li> <li>• Workers' needs for better work-life balance</li> <li>• Individualised lifestyles</li> <li>• ICTs</li> </ul>
Mobile (multilocal) telework	<ul style="list-style-type: none"> <li>• Urge to reduce time-to-market by keeping communication channels open</li> <li>• Mobile ICTs</li> <li>• Growing inter-organisational co-operation</li> <li>• Globalisation of production</li> <li>• Urge for getting closer to customers</li> </ul>
Freelance teleworkers	<ul style="list-style-type: none"> <li>• Urge for increasing adaptability &amp; flexibility</li> <li>• Growing demand for specialist expertise</li> </ul>
Virtual teams made up of self-employed teleworkers	<ul style="list-style-type: none"> <li>• Growing demand for combining specialist expertise from different areas</li> <li>• Better market transparency due to Internet, etc.</li> </ul>
Other sites of same company (e.g. remote back offices)	<ul style="list-style-type: none"> <li>• Cost reduction by exploiting low-cost locations</li> <li>• Geographical widening of market areas (globalisation)</li> <li>• Decentralisation of production</li> <li>• Urge for getting closer to customers</li> </ul>
Employees working on third party premises	<ul style="list-style-type: none"> <li>• Urge for increasing adaptability &amp; flexibility</li> <li>• Regional development initiatives</li> </ul>
Outsourcing to specialist business service supply companies	<ul style="list-style-type: none"> <li>• Cost reduction</li> <li>• Urge for increasing adaptability &amp; flexibility</li> <li>• 24-7 operability</li> <li>• Urge to access labour which is scarce on home labour market</li> </ul>
Virtual teams composed of employees from a single company	<ul style="list-style-type: none"> <li>• Growing decentralisation of production (globalisation)</li> <li>• Reduction of time-to-market by combining human resources across different locations for specific tasks</li> </ul>
Virtual teams composed of employees from different companies	<ul style="list-style-type: none"> <li>• Urge to reduce time-to-market by combining human resources across different locations for specific tasks</li> <li>• Growing complexity of supply chains</li> <li>• Shortening product life cycles</li> </ul>

In future research, this typology and the hypotheses in the table above need to be explored. The authors will carry out an analysis of the SIBIS data in order to explore to what extent the

huge differences in eWork diffusion across European countries can be accounted for by the main explanatory factors found in the literature. Results are planned to be discussed at the 2004 workshop of the International Telework Federation (September, Greece). In the medium term, fresh data collection will be required to explore the issue of tele-collaboration. The significance of collaborative forms of working has been acknowledged by policy-makers at the EU as well as Member State level, but determinants and effects at the individual, business and country level still need to be explored in depth to enable more effective policy action.

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