Is Teleworking Sustainable?

- An Analysis of its Economic, Environmental and Social Impacts
The SUSTEL project was financed by the European Commission’s Information Society Technologies initiative (www.cordis.lu/ist). The project partners were:

- an Italian consultancy and research organisation focusing on the environmental and social impacts of business www.avanzi.org

- the UK’s largest provider of telecommunications services and a leader in teleworking practice www.bt.com

- Denmark’s state research organisation www.teknologisk.dk

- a German consultancy and research organisation focusing on e-business and e-work www.empirica.com

- an NGO which supports the development of Dutch teleworking www.teleworkforum.nl

- an NGO research organisation on sustainable development and the project co-ordinator www.ukceed.org

See www.sustel.org for more information.

IST Teleworking Projects
A number of other projects within the IST programme have explored specific aspects of teleworking, including:

- ATTRACT - telework techniques for the insurance sector www.cyberce.gr/attract.
- Beep (Best eEurope Practices) - cases and other information www.beep-eu.org.
- ECATT - research and cases on teleworking in Europe www.ecatt.com.
- Emergence - employment relocation in the e-economy www.emergence.nu.
- Families - the impact of ICT on work-family interactions www.families-project.com.
- PROTELEUSE - teleworking tools for the services sector www.cbt.es/proteleuses.
- SIBIS - indicators for the e-economy, including telework www.sabis-eu.org.
- STAR - economic and work impacts of new technologies www.databank.it/star.
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The SUSTEL Project

There has already been a considerable amount of research into teleworking, much of it financed by the European Union. However, most of this research has focused on a relative small number of aspects, such as the impact of telework on commuting or work-life balance.

The SUSTEL (Sustainable Teleworking) project - which has been funded since 2002 under the European Commission’s Information Society Technologies (IST) programme - was set up to:

- Provide a more comprehensive assessment of the overall relationship between teleworking and sustainable development (which involves assessing its economic, environmental and social impacts)
- Explore aspects of telework which had previously been little researched (for example, whether telework leads to greater involvement in local communities)
- Integrate this new with existing knowledge in a form which can be useful for organisational decision-making.

In order to obtain a variety of national and organisational perspectives, it has brought together seven different kinds of organisation from five countries, Denmark, Germany, Italy, Netherlands and the UK (see the back cover for full details).

The project began with the identification of 15 aspects of the relationship between teleworking and sustainable development (see the sub-sections of this report for details of each of them). Following a survey of existing knowledge, 27 remaining research questions were identified. These were then researched through:

- 30 case studies in the five partner countries (see the final page for a full listing).
- Surveys of teleworkers in six organisations (an anonymous public sector Danish organisation, the insurer Continentale in Germany, the Emilia Romagna regional authority in Italy, the Dutch subsidiary of the IT company Oracle, and the airports operator BAA and telco BT in the UK).

The research has several limitations which should be borne in mind when considering its results:

- It only covered organisational teleworking schemes and therefore did not address the important topics of self-employed telework or telework-enabled migration between organisations (and countries)
- The cases and surveys can’t be representative of telework in all European organisations.

Nonetheless, SUSTEL is probably the most detailed comparative and integrated research on the economic, environmental and social impacts of telework yet undertaken. Attempts were also made to avoid biases towards positive interpretations, both in selection of cases and research methodology. This does give its conclusions considerable significance.
Teleworking and Sustainable Development
- The Verdict

The boxes summarise the conclusions which emerge from the SUSTEL research, using the same ‘traffic light’ coding scheme as our on-line teleworking assessment tool for organisations (at www.sustel.org).

Of course, the ‘balance sheet’ for any individual telework scheme is impossible to calculate without detailed information about it. Hence, these conclusions are indicative rather than definite for European teleworking as a whole. However, they do demonstrate that:

● Many organisational schemes can produce significant benefits in all areas of sustainable development

● Many of the well-publicised negative aspects of telework, such as social isolation, do exist but can be minimised by careful design and implementation of teleworking

● Where negative effects do occur they do not appear to be sufficiently serious to offset the many positive effects of well-managed telework schemes,

Hence, our conclusion is that well managed teleworking schemes which recognise, and seek to minimise, negative impacts should be accepted as sustainable unless there is clear evidence to the contrary. The following pages explain why.

Economic Impacts

Teleworking was economically beneficial in most - but not all - of the cases. But, even though they were selected for the depth of their information, only 12 were felt to have a complete understanding of telework’s costs and benefits.

**Added Value - Positive.** Teleworking generally resulted in improved work performance, less absenteeism, and improved recruitment and retention. In most cases these offset additional costs such as home equipment. Mobile teleworking also cut office costs considerably. However, poorly designed telework schemes can be financially negative.

**Human Capital - Mixed.** Most survey respondents felt that teleworking had a positive influence on their competencies and skills. But a worryingly large minority felt that the impact on their careers was negative.

**Employment - Insufficient evidence, although we found some examples of teleworking changing the geographic location of work.**

**Personal Wealth - Positive on balance.** Financial benefits like reduced travel and child care usually outweighed costs such as more home heating.

**Resilience - Positive on balance.** Teleworking allowed staff to overcome travel and other disruptions, on many occasions. However, it does increase vulnerability to systems failures.
Environmental Impacts
A complete analysis of the environmental impacts of telework requires detailed life-cycle assessment and the aggregation of different kinds of impact. SUSTEL couldn’t do this but has suggested that transport rebound effects don’t outweigh commuting savings, and that environmental benefits from more efficient use of offices can be considerable. Our provisional conclusion is that teleworking has a small positive effect on balance - and, at the very least, environmental impacts are not sufficiently negative to block any economic or social benefits from being achieved.

<table>
<thead>
<tr>
<th>Environmental Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transport</strong> - Positive on balance through avoidance of congested periods and less travel - but reductions in commuting travel were partially offset by additional journeys.</td>
</tr>
<tr>
<td><strong>Air Quality</strong> - Positive because reduced transport means less emissions. But a few teleworkers may be at risk through higher indoor exposures e.g. in high radon areas.</td>
</tr>
<tr>
<td><strong>Resource Consumption</strong> - Negative when telework didn’t result in more efficient use of office space (currently the norm) because equipment tends to be duplicated. Positive when it did because buildings are energy and material intensive to operate and run.</td>
</tr>
<tr>
<td><strong>Built Environment</strong> - Too soon to tell. Mobile teleworking results in redesign of work spaces and, sometimes relocation. This can have negative impacts on transport if flexible offices are not well located for public transport.</td>
</tr>
<tr>
<td><strong>Safety</strong> - No discernable effect.</td>
</tr>
</tbody>
</table>

Personal and Social Impacts
Almost all the SUSTEL survey respondents felt that, on balance, teleworking was beneficial for them. Positive social impacts also outweighed negative ones.

<table>
<thead>
<tr>
<th>Personal and Social Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Inclusion</strong> - Positive on balance. Several cases created new, or maintain existing, employment opportunities for people who might otherwise be excluded. However, there was some evidence of discrimination against people without sufficient working space at home.</td>
</tr>
<tr>
<td><strong>Quality of Life</strong> - Positive. Almost all respondents felt that this has been improved by telework, despite - in many cases, and especially in the UK - increased working hours.</td>
</tr>
<tr>
<td><strong>Work Life Balance</strong> - Positive. A large majority felt that it had been improved by telework.</td>
</tr>
<tr>
<td><strong>Health</strong> - Positive. Many respondents felt teleworking had beneficial effects, whereas very few didn’t. And teleworkers usually had less sick leave than non-teleworkers.</td>
</tr>
<tr>
<td><strong>Community</strong> - Positive. Teleworking has lead to increased use of local services and, for a significant minority, to greater involvement in community activities.</td>
</tr>
</tbody>
</table>
Mobile Teleworking

The numbers in all groups are increasing, but the fastest growing are mobile teleworkers, who currently form around 5% of the European workforce. A number of SUSTEL cases, and several of the surveys, focused on this group. They suggest that successful mobile working can produce considerable economic benefits beyond those of ‘traditional’ home-based teleworking. In particular, well managed moves to mobile forms of telework can greatly reduce property costs, create better work performance, and reduced absenteeism and recruitment costs.

The surveys show that mobile telework can be a stressful way of working and is clearly not for everyone. Mobile working also seems to exacerbate the tendency towards longer working hours which has been observed with traditional telework. However, the surveys indicate that many mobile workers appreciate their increased control of location and time, and use this to improve their work-life balance and quality of life. Their mobility also appears to overcome the social isolation which has been identified as a problem with home-based teleworking.

The environmental impacts of well-managed mobile working also appear to be positive on balance. It can achieve large reductions in office space requirements and commuting travel. However, rebound effects - particularly in the form of in-work travel and perhaps extensions or relocations of homes - may be greater than with home-based telework.

As with telework in general, it seems reasonable to have a working assumption that mobile teleworking is sustainable. However, it is also clear that mobile teleworking requires even more careful management to ensure that environmental and social impacts are not unduly negative.

Types of Telework

The SIBIS project (www.sibis-eu.org) estimated that the European Union had an estimated 10 million teleworkers in 2002, representing around 13% of the total workforce. There are four main types:

- Home-based employed teleworkers, most of whom alternate between working at home and on the employer’s premises, either in a fixed pattern or more flexibly
- Self-employed teleworkers who normally work from home (about
- Mobile workers who spend at least ten hours per week away from home or their main place of work, for example on business trips, travelling or on customers’ premises, during which time they use online computer connections
- Casual workers who could fall under the first group (home-based), but spend less than ten hours per week teleworking from home.
Telework Synergies

The SUSTEL research found synergies between the different dimensions of telework, for example:

- People who find that telework reduce stress through reduced transport and improved work-life balance often find that they perform better at work, and have more time for involvement in their local communities - which in turn improves their perceived quality of life and creates a ‘virtuous circle’ of benefit.

- Conversely, people working at home who feel more socially isolated may drive more to achieve human contact, and become less effective in their work, thereby creating more stress and a ‘vicious circle’ of disbenefit.

Sustainability Is Indivisible at Solvision

The Vision Web is a Dutch-based company employing around 400 consultants in ICT applications such as data warehousing, wireless networks and e-commerce. Telework has been a vital element in its rapid growth from start-up in 1996 to 46m euros of turnover in 2002.

The Vision Web’s success is based on self-organising people working on ‘micro enterprises’ within a larger group, a ‘virtual’ office (with no fixed desks and encouragement of mobile working), and a philosophy of respect for and trust in individuals. Teleworking is therefore not just a means of work organisation but an embodiment of its business vision.

The Vision Web’s largest unit, Solvision, has only 18 employees working at fixed locations, in Dordrecht and Delft. Everyone else teleworks, making use of flexible workspaces at one of the company’s five ‘meeting places’ whenever they need to. The centrepiece of each place is a ‘grand café’, which is surrounded by multifunctional rooms that can host meetings. Employees can book them via the Intranet. These arrangements mean that Solvision needs only three square metres of space per person. This is not only economically good, but also environmentally beneficial because buildings are energy and materials intensive.

Although Vision Web’s main goal is to be a profitable business it also has a social mission of showcasing the benefits of new ways of working. Staff feedback suggests that they create a virtuous circle in which employees experience better quality of life and satisfaction, and therefore become even more entrepreneurial and productive.
New Insights from the SUSTEL Research

**Teleworking patterns are variable**

Many people change their teleworking pattern daily, weekly or monthly, depending on the tasks to be completed, personal preferences and other factors. 2-3 days a week at home is the optimum for most people.

**Teleworking differs between countries**

Avoiding high property costs and transport disruption are very important in the Netherlands and the UK, but much less so elsewhere. British teleworkers are particularly likely to work longer hours than others. And while most countries require a strong business case for teleworking, in Denmark it is usually considered a basic labour right, which does not need to be justified in financial terms.

**Teleworkers often work longer - but apparently without negative consequences**

Teleworkers usually extend their working hours through one or more of starting earlier, finishing later and working at weekends. Many also increase their total working hours (but this may also be true of office-based workers). Most survey respondents doing this nonetheless felt that their quality of life and work-life balance was better because they have increased time flexibility and/or can better match work to their ‘body clocks’.

**Many organisations don’t have a complete picture of financial costs and benefits**

This was true of more than half of the organisations examined for the SUSTEL cases. Commonly neglected areas include absenteeism, equipment costs and space impacts.

**Home and office - both the same?**

Teleworking creates offices which are more like homes - because social interaction by mobile workers is an increasingly important function. Teleworker’s homes are also becoming more like offices with separate work areas, broadband connections etc.

**Teleworking can create more work travel**

Some teleworkers drive even they don’t need to do so because organisational car and expenses policies - and sometimes tax provisions - encourage them to do so, e.g. by minimum mileage requirements.

**Broadband is creating new telework opportunities**

Broadband and other advanced communication technologies are allow higher volumes of data to be transported to and from people’s homes. This can mean that tasks requiring frequent access to large files can now be done from home.

**Teleworking catalyses relationships …for good or ill**

Teleworking usually means that household members see more of each other - and this has a powerful effect on personal relationships, especially between adult partners. For most,
the catalyst is positive and relationships become less pressured and more satisfying - but for a minority the catalyst has negative effects.

**Teleworking is greater than work**

‘Leading edge’ organisations see teleworking as a micro-level demonstration of a new model of doing business which is much more flexible and adaptive than previous ones.

**Teleworking needs formality**

Teleworker’s increased freedom to work where and when they like sometimes has to be balanced by less flexibility about communication and contact. For example, requiring teleworkers to make contact with their manager every day, participate in regular conference calls and be in the office at set periods when everyone else is also there.

**Teleworking cuts absenteeism**

People are often prepared to work at home when they would be ill to travel. They can also work at home when travel disruptions prevent them from travelling to work.

**Teleworking fosters vital skills**

Teleworking can enhance people’s abilities and employability by making them better at acting autonomously and managing their time - key skills for tomorrow’s work. On the other hand, people who don’t have this competence will struggle with telework.

**Older people like telework**

Telework doesn’t just interest people with dependent children. Older staff can also value telework because they are fed up with a lifetime of commuting, have a retired partner, care for aged parents, or want a transition into retirement.

**Telework can make work more fulfilling**

The SUSTEL research shows that many teleworkers find work more fulfilling by giving greater control and allowing tasks - especially those which require concentration - to be done to a higher standard.

**Telework can be socially exclusive**

Poorer people may lack sufficient space, be at risk of possible theft of equipment or have other income-related reasons which prevent them from working from home.

**Teleworkers can stretch time**

Many teleworkers do routine tasks such as washing or cooking done in breaks during the day - thereby creating more ‘quality time’ when they want it, such as children coming home or at the weekends.
The Economic Dimension of Telework

The initial SUSTEL analysis identified five key economic aspects of telework:

- **Added value** - the financial benefits arising from telework within the organisation.
- **Human capital** - the effects of telework on skills and personal development.
- **Employment** - the impacts of telework on the location and nature of work.
- **Resilience** - the relationship between teleworking and an organisation’s vulnerability to disruption.
- **Personal wealth** - financial benefits to individuals arising from telework.

**Electronic Evidence of Teleworking’s Economic Benefits**

It is hard to get accurate information on the economic (and other) impacts of teleworking because it is usually only one of many possible causes. For example, most employees today are under pressure to perform better. A finding that telework is associated with improved work performance might be explained by all staff being under pressure to work harder. Establishing with certainty that telework is the cause requires a control group of non-teleworkers, which is usually difficult to do in practice.

However, two SUSTEL cases show that exact comparisons can be made when work is electronically monitored. Telecom Italia’s Info412 call centre operation has almost a quarter of its workforce teleworking. They spend 15% less time on calls than non-teleworkers. For this and other reasons they take 3.3% more calls per hour. Other benefits include savings in office costs, reduced absenteeism, and greater flexibility. The teleworkers themselves also feel that they have benefited from more time with family and less commuting.

Similar results came from a carefully monitored pilot scheme amongst Bradford Council benefits staff, who process all claims electronically. The teleworkers achieved an 11-38% productivity improvement (measured as claims processed per hour), with an overall average gain of 25%, compared to non-teleworkers. Accuracy levels have remained similar. The teleworkers also had an 80% reduction in absenteeism rates, and reported increased job satisfaction and quality of life.
Added Value

The main ways in which telework creates organisational added value are:

- Better work performance
- Reduced absenteeism
- Improved recruitment and retention
- Reductions in space requirements (discussed under environmental benefits).

Of course, benefits can be offset by additional costs such as computers at home.

Even though the 30 SUSTEL cases were selected for the depth of their information:

- Only 12 had a complete understanding of telework’s costs and benefits
- 10 had a partial understanding
- 8 had only a limited understanding.

The reasons for this included an absence of comparisons because everyone teleworks, or schemes were set up some time ago. Cultural/legal barriers are also important. In Denmark, for example, telework is often seen as a ‘right’ which does not need detailed justification or monitoring.

SVI Has a Convincing Business Case for Teleworking

The German data processing company SVI evaluated the benefits and costs of a teleworking pilot, using a spreadsheet developed for the EU’s Flexwork project (available from www.flexwork.eu.com or, in simplified form, from www.sustel.org). The scheme involved set-up costs of around 5,500 euros, plus monthly running costs of 120-225 euros, per person. In addition, there were intangible costs for planning, training etc.

Benefits were at least 3-4 times greater than these costs. They included:

- Technology savings of 1200-1300 euros per person at work
- Increased productivity of 2-5% per year
- Reduction of sick leave by an average of 2 days annually
- Savings in recruitment and training costs because of increased retention.

SVI believes that the intangible benefits of improved quality of work, faster processing of tasks, and higher motivation and commitment, are even more important.

The quantitative analysis persuaded even the sceptics that teleworking was cost-effective. SVI now has 30 of its 240 staff working in this way.
Better Work Performance

A majority of respondents in all the surveys felt that their work performance had improved in recent years. Most also felt that teleworking had made a contribution to this, with 32-76% feeling that it had made a major contribution.

We asked the respondents with improved performance how they felt this was manifested. As exhibit 1 shows, higher productivity and better quality of work were the main form of improvement in all countries.

Exhibit 1 - Forms of Performance Improvement Amongst Teleworkers

<table>
<thead>
<tr>
<th>Form of Performance Improvement</th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Productivity</td>
<td>63.8%</td>
<td>80.9%</td>
<td>65.4%</td>
<td>69.6%</td>
<td>60.1%</td>
<td>72.2%</td>
</tr>
<tr>
<td>Better Quality of Work</td>
<td>68.1%</td>
<td>66.2%</td>
<td>76.9%</td>
<td>65.2%</td>
<td>56.9%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Higher Total Output</td>
<td>21.3%</td>
<td>42.6%</td>
<td>46.2%</td>
<td>34.8%</td>
<td>50.5%</td>
<td>38.9%</td>
</tr>
<tr>
<td>More Creative Work</td>
<td>2.1%</td>
<td>29.4%</td>
<td>26.9%</td>
<td>30.4%</td>
<td>28.7%</td>
<td>50.0%</td>
</tr>
<tr>
<td>Other Effects on Performance</td>
<td>-</td>
<td>5.9%</td>
<td>-</td>
<td>4.3%</td>
<td>5.3%</td>
<td>-</td>
</tr>
</tbody>
</table>

This suggests that the longer working hours which are often associated with telework are not, as some have claimed, the main reason for performance improvement. This conclusion was confirmed by another question asking respondents about the causes of their performance improvement. Increased working hours were significant - but less so than reduced stress and better concentration.

Teleworking Enables 24/7 Responses at BMW

Teleworking by around 2000 staff has allowed BMW's international project teams to collaborate more effectively. By working from home, teleworkers in Germany can schedule their working time to give up to a 30% increase in the amount of overlap with counterparts in the USA or Asia. The result is faster and more efficient - by up to 16% according to BMW - completion of tasks. A survey also found that:

- 94% of teleworking respondents had increased work satisfaction through telework
- 90% said that taking up and implementation of new ideas had improved
- 69% mentioned a reduction of fatigue.

These were far higher figures than for negative impacts such as increased isolation.
Reduced Absenteeism

This was a major benefit of telework in 12 of the cases. None showed any disbenefits. This picture was confirmed by survey respondents, many of whom stated that teleworking had allowed them to overcome problems in reaching work (see exhibit 2). In all countries illness of adults or children was a major reason why people were prevented from travelling. British and Dutch respondents - who live in countries with some of Europe’s most congested (and, in the UK, decrepit) travel systems - also highlighted the ability to overcome travel disruptions.

Exhibit 2 Respondents Able To Work When Prevented From Reaching A Work Location

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>46.8%</td>
<td>30.9%</td>
<td>80.8%</td>
<td>91.3%</td>
<td>73.7%</td>
<td>72.2%</td>
</tr>
<tr>
<td>No</td>
<td>53.2%</td>
<td>69.1%</td>
<td>19.2%</td>
<td>8.7%</td>
<td>26.3%</td>
<td>27.8%</td>
</tr>
</tbody>
</table>

Retention and Recruitment

As exhibit 3 shows a significant minority of respondents stated that teleworking was an important factor in their joining and/or staying with the organisation.

Exhibit 3 Impact of Teleworking on Personal Career Decisions

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joining Current Employer</td>
<td>10.9%</td>
<td>2.9%</td>
<td>-</td>
<td>26.1%</td>
<td>5.4%</td>
<td>10%</td>
</tr>
<tr>
<td>Staying with Current Employer</td>
<td>4.3%</td>
<td>33.8%</td>
<td>11.5%</td>
<td>39.1%</td>
<td>10.3%</td>
<td>20%</td>
</tr>
<tr>
<td>Moving to Present Position</td>
<td>-</td>
<td>2.9%</td>
<td>11.5%</td>
<td>8.7%</td>
<td>15.1%</td>
<td>-</td>
</tr>
<tr>
<td>Staying in Present Position</td>
<td>2.2%</td>
<td>17.6%</td>
<td>26.9%</td>
<td>4.3%</td>
<td>16.8%</td>
<td>20%</td>
</tr>
<tr>
<td>Not relevant</td>
<td>82.6%</td>
<td>42.6%</td>
<td>50.0%</td>
<td>21.7%</td>
<td>52.4%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Imagetime Retains Staff through a Satellite Telework Office

Imagetime is an Italian marketing and communications company of around 50 employees, half of whom telework. This began when employees at its Milan head office expressed a desire to return to their home towns. As the company believes that an employee only produces a profit after two-three years, it was reluctant to lose them. Hence, it set up satellite offices in Genoa and Rome from which a small number of employees started to work, whilst still managing clients in Milan. Imagetime also hopes that the offices will help to expand its potential pool of recruits. However, career opportunities remain concentrated in Milan offices so that employees in the satellite offices will need to change their working pattern if they become managers.
Human Capital

This is needed to create the wealth to support environmental and social initiatives, and to provide individuals with satisfactory standards of living. SUSTEL defined human capital as personal competences and skills and generated these findings:

Of the 30 cases, 7 reported that teleworking had a positive impact on human capital, 5 a mixed impacts, 8 no impact and 5 a slight negative effects.

The positive effects mentioned are mostly related to improved skills and competencies - both in handling the technologies connected to telework, and in-tangible competencies like “self-management” and “self-organisation”, which are seen as crucial for future career development.

The most important negative impact appears to be actual or perceived ‘invisibility’, and therefore fewer development or promotion opportunities.

The surveys examined this issue further and, as exhibit 4 shows, found that most respondents felt that it had a positive or neutral effect.

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
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<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Positive</td>
<td>8.5%</td>
<td>17.6%</td>
<td>34.6%</td>
<td>34.8%</td>
<td>24.7%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Slightly Positive</td>
<td>2.1%</td>
<td>27.9%</td>
<td>26.9%</td>
<td>39.1%</td>
<td>42.5%</td>
<td>22.2%</td>
</tr>
<tr>
<td>None</td>
<td>89.4%</td>
<td>44.1%</td>
<td>34.6%</td>
<td>17.4%</td>
<td>24.2%</td>
<td>55.6%</td>
</tr>
<tr>
<td>Slightly Negative</td>
<td>-</td>
<td>10.3%</td>
<td>3.8%</td>
<td>8.7%</td>
<td>8.1%</td>
<td>-</td>
</tr>
<tr>
<td>Very Negative</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.5%</td>
<td>-</td>
</tr>
</tbody>
</table>

Another question about the impact of telework on career development also showed that many more people rated it as positive than negative, with the exception of the German survey organisation. However, it is clear that the career development implications of telework can be problematic for some staff and that this is something which employers need to consider carefully.
Exhibit 5 Perceived Influence of Teleworking on Career Development

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Positive</td>
<td>6.4%</td>
<td>1.5%</td>
<td>34.6%</td>
<td>34.8%</td>
<td>24.7%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Slightly Positive</td>
<td>31.9%</td>
<td>1.5%</td>
<td>26.9%</td>
<td>39.1%</td>
<td>42.5%</td>
<td>22.2%</td>
</tr>
<tr>
<td>None</td>
<td>61.7%</td>
<td>53.0%</td>
<td>34.6%</td>
<td>17.4%</td>
<td>24.2%</td>
<td>55.6%</td>
</tr>
<tr>
<td>Slightly Negative</td>
<td>-</td>
<td>33.3%</td>
<td>3.8%</td>
<td>8.7%</td>
<td>8.1%</td>
<td>=</td>
</tr>
<tr>
<td>Very Negative</td>
<td>-</td>
<td>10.6%</td>
<td>-</td>
<td>-</td>
<td>0.5%</td>
<td>=</td>
</tr>
</tbody>
</table>

One important enabler of human capital development is internal communication and knowledge sharing within organisations. Our examination of this in the cases found that:

- 7 cases found a significantly positive, and 5 a slightly positive, impact from teleworking.
- Only 2 cases showed a negative impact (with the remainder finding no impact, or having insufficient information to judge).

The positive effects are generally related to conscious attempts to address the issue during implementation of the scheme - often involving the introduction of technologies such as knowledge management software which did not exist previously.

Mentors Ensure the Preservation of Corporate Knowledge at ASK

The Danish National Board of Industrial Injuries (Arbejdsskadestyrelsen - ASK) deals with worker compensation for accidents. A move to digital processing of claims has enabled a teleworking scheme. This has been very successful in retaining skilled staff, raising productivity and reducing absenteeism. It has also improved the quality of claim processing, resulting in fewer complaints.

However, dealing with claims requires a lot of discussion and knowledge sharing by staff. Junior staff have also learnt important aspects of the job through informal interaction with experienced colleagues. Both these were impeded when staff first began to work from home. ASK has overcome these problems by:

- Introducing more formal training of new employees
- Instituting a mentoring scheme
- Establishing an FAQ (frequently asked questions) database on the Intranet, which is monitored and updated by senior staff.
Employment

Teleworking influences employment in a variety of ways:

- At an aggregate level, by enabling greater organisational efficiency and effectiveness, with consequent impacts on the total number and type of jobs.

- By influencing competitiveness and therefore job location - for example, several SUSTEL cases have shown that teleworking can improve the efficiency and effectiveness of call centres (as well as making their work more satisfactory for employees), which could slow any movement of jobs to cheaper countries.

- By providing local employment opportunities for people who may not otherwise have access to employment, such as the disabled.

A Telework Start Up Creates Jobs When Mines Close Down

The northern part of Nottinghamshire in the UK has been badly hit by coal mine closures. In 1996 Nottinghamshire County Council (NCC) set up a pilot telecentre in the village of Warsop to provide alternative forms of employment. The centre had a broadband link into the Council’s mainframe and other facilities in Nottingham, about 60 kilometres away. The centre’s initial work was the design of publications and web sites for the Council, and the provision of training courses to local people. It has since become the Council’s main source of web development and management and, since 1999, supplies not only the Council itself but also other public sector and charitable organizations. The centre now has seven staff - and is planning to expand further - and has become a symbol of the area’s economic regeneration.

Resilience

September 11th highlighted the potential vulnerability of organisations to disruption. Teleworking can help to overcome resulting problems by allowing staff to work from other locations. This happened at one SUSTEL case, the Lombardy regional government, in Italy. Its teleworkers were able to continue working when their office colleagues were prevented by a light aircraft crashing into their workplace, Milan’s Pirelli building. The research also showed that teleworking can overcome transport and weather-related disruption, and help to retain individuals with critical skills.

Of course, these benefits will be difficult to realise if Intranets and other IT systems are disrupted but none of the cases demonstrated any problems of this kind.

Teleworking Reduces Vulnerability to IT Breakdowns

Bankdata provides mission-critical IT services to a consortium of Danish banks. Many staff telework, making it easier to respond instantly whenever a problem occurs. According to Bankdata’s HR manager “we couldn’t survive as a company if the facility management personnel had to come in every time there is a system breakdown.”
Personal Wealth

12 of the 30 SUSTEL case organisations believed that teleworking was having a positive influence on employee’s personal wealth and none that it was having a negative impact. As exhibit 6 shows, this view was confirmed by survey respondents.

Exhibit 6 The Effect of Teleworking on Survey Respondent’s Personal Finances

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substantial benefit (800+ Euro/year)</td>
<td>8.5%</td>
<td>17.6%</td>
<td>34.6%</td>
<td>34.8%</td>
<td>24.7%</td>
<td>22.2%</td>
</tr>
<tr>
<td>Some benefit (0-800 Euro/year)</td>
<td>2.1%</td>
<td>27.9%</td>
<td>26.9%</td>
<td>39.1%</td>
<td>42.5%</td>
<td>22.2%</td>
</tr>
<tr>
<td>No Effect</td>
<td>89.4%</td>
<td>44.1%</td>
<td>34.6%</td>
<td>17.4%</td>
<td>24.2%</td>
<td>55.6%</td>
</tr>
<tr>
<td>Some costs (0-800 Euro/year)</td>
<td>-</td>
<td>10.3%</td>
<td>3.8%</td>
<td>8.7%</td>
<td>8.1%</td>
<td>-</td>
</tr>
<tr>
<td>Substantial costs (800+ Euro/year)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.5%</td>
<td>-</td>
</tr>
</tbody>
</table>

The surveys also showed that:

- The main financial benefit is reduced commuting costs.
- A small but noteworthy number of BT respondents indicated that the influence of teleworking on residential location was important, suggesting that there is some substance to the argument that teleworking can influence choice of location (and therefore travel patterns).
- The main cost identified was increased energy costs (which only a minority of the case organisations reimbursed).
- Few cases or survey respondents identified any impact of teleworking on non-salary benefits. For those that did the main impact was the effect of teleworking on their car mileage levels (where a minimum level usually has to be reached for tax reasons).

Telecom Italia’s Rents Space in Teleworker’s Homes

Telecom Italia initially set up its call centre teleworking scheme - which now has 500 teleworkers - to soften the blow when it closed some offices. To encourage people to telework - and in agreement with its unions - it introduced a generous package. This includes paying a rental for 4 square metres of space in the teleworker’s house (with the rate varying according to location) and a supplement to cover additional electricity costs for every hour worked at home. This is in addition to an estimated 114 euros per month savings per teleworker from the avoidance of commuting costs.
The Environmental Dimension of Telework

The environmental impacts of telework are difficult to disentangle but for convenience we divided them into:

- **Resource Consumption** - changes in the amounts of energy and materials used by teleworkers.
- **Transport** - which consumes energy, creates pollution and carbon dioxide emissions, and influences levels of congestion (which in turn has economic, environmental and social impacts).
- **Air Quality** - in addition to the effects of transport on external air quality, changing work locations influence exposure to indoor air pollution.
- **Built Environment** - the impact of telework on use of office and home space (with resulting impacts on resource consumption) and the design and location of offices (which often has transport impacts).
- **Safety** - changes in occupational health and safety as a result of telework.

**Telework and Rebound Effects**

Life is complex and a significant change often results in second or third order ‘rebound’ effects. So it is with teleworking, and there has been considerable debate as to whether its apparent environmental benefits are offset by phenomena such as:

- **Transport rebounds** - for example, when the availability of cars at home because people are no longer commuting results in additional use.
- **Location rebounds** - when people decide to move home, or employers offices, because the need to be at a given location five days a week is less important.
- **Space rebounds** - when savings in office space from hotdesking are offset by individuals gaining more space at home through moving or extending.

SUSTEL has provided the most comprehensive data yet available on short-medium term transport rebound effects (see below). It shows that these are indeed significant - but that they don’t negate all the benefits of reduced commuting. We couldn’t properly research medium-long term locational or space rebounds, which will play out over decades. However, whilst they will undoubtedly occur - especially in countries with large variations in property prices - there are barriers to them, as following pages discuss.

Whilst more research is needed, our provisional conclusion is that rebound concerns should not prevent the introduction of telework schemes. However, employers must ensure that their car provision, travel expense, and other policies don’t encourage teleworkers to drive unnecessarily.
Resource Consumption

Teleworking influences this through changes in:

- Energy consumed for transport (see below)
- Energy and materials associated with equipment used by teleworkers
- Energy used to heat, light and cool office and domestic buildings
- Aggregate building space requirements, which results in more or less construction materials (and their embedded energy) being required.

Substantial duplication of equipment (desks, computers, peripherals etc) was occurring in 16 out of 30 cases. The organisations without major duplication were generally those which had introduced hotdesking arrangements.

The picture was more mixed for paper consumption with 2-29% of survey respondents feeling that teleworking created more printing of documents, and 4-31% a decrease. In three organisations (Denmark, Oracle and BT) a majority perceived a significant decrease. This appears to be linked to extensive use of the Intranet.

Teleworking which does not involve substantial reductions in workspace requirements usually has a limited impact on office energy consumption. But working at home can considerably increase heating, lighting, and other energy-consuming activities. We used home occupancy as an indicator of this and found that:

- In three surveys (all of organisations with home-based or mobile teleworking schemes) a large number of people - 53% in Italy, 41% in Germany and 37% in BT - reported that their home occupancy went up by 21 hours a week or more
- By contrast 94% of Danish and 54% of BAA respondents - both of whom were supplementary teleworkers - were at home for an additional 10 hours or less.

Taken together, the results suggest that more traditional forms of teleworking tend to have quite negative impacts on energy, equipment, and materials use, without creating significant offsetting reductions in office building-related energy consumption.

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Teleworking Contributes to Reduced Paper Use in BT

BT has consistently reduced its internal paper usage in recent years - most recently by 3% in 2001-2002 - despite increasing output. Storing many documents on its Intranet - and people’s growing confidence that they no longer need the ‘security blanket’ of printed copies - is a major reason for this. For example, when BT replaced a printed flier of internal job vacancies with an on-line version it saved 1.25 million pages of paper a week, and made it easier for users to search. The SUSTEL research showed that BT’s teleworkers are considerable users of this Intranet. This explains why 26.3% of survey respondents reported a decrease in their printing of documents as a result of teleworking, compared to 13.5% reporting an increase.
Transport

Almost all studies of teleworking report a reduction in commuting travel and, as exhibit 8 shows, the SUSTEL surveys are no exception. The high level of reductions in BT, Germany and Italy reflect the ‘full time’ nature of their teleworking. In two cases - BT in the UK and Italy - reductions in rail commuting were greater than for car. This demonstrates that teleworking could influence the use - and therefore economics - of public transport. However, this seems unlikely at present or foreseeable levels. Public transport in most European countries is very over-crowded at the peak periods when telework would have the greatest impact.

Rebound Effects

A key question in teleworking research is whether savings in travel commuting are offset by ‘rebound’ effects such as:

- Non-work travel previously undertaken as part of commuting trips.
- Use of the cars which become available for other purposes when people do not commute.
- Travel for work purposes other than commuting.

11-39% of survey respondents said that they had to make special trips for activities previously carried out as part of commuting. As exhibit 7 shows the main reasons for this were shopping and transporting children.

Exhibit 7 Journeys Made Which Otherwise Would Be Carried Out When Commuting

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shopping</td>
<td>61.7%</td>
<td>32.4%</td>
<td>19.2%</td>
<td>31.8%</td>
<td>23.3%</td>
<td>16.7%</td>
</tr>
<tr>
<td>Transporting children</td>
<td>34.0%</td>
<td>11.8%</td>
<td>26.9%</td>
<td>31.8%</td>
<td>13.6%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Leisure</td>
<td>12.8%</td>
<td>-</td>
<td>-</td>
<td>4.5%</td>
<td>10.2%</td>
<td>5.6%</td>
</tr>
</tbody>
</table>

11-39% of respondents also stated that they or other household members had undertaken additional journeys which would not have been possible if they had not been commuting.

Teleworking Enables IKMN To Cut Car Travel by Relocating to Utrecht City Centre

When the lease on its previous office ran out the Kankercentrum Midden Nederland used it as a spur to redesign its working practices, with teleworking as an important component. This reduced its office space requirements by almost half, making it feasible to take new premises near the centre of Utrecht. The office’s excellent bus and train connections make it much easier for staff to travel by public transport both for commuting and in-work journeys.
Exhibit 8 Commuting Reductions and Rebound Effects

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean estimated reductions in weekly commuting travel (km)</td>
<td>105</td>
<td>283</td>
<td>242</td>
<td>98</td>
<td>253</td>
<td>61</td>
</tr>
<tr>
<td>Mean estimated additional travel (km)</td>
<td>77</td>
<td>53</td>
<td>33</td>
<td>42</td>
<td>60</td>
<td>15</td>
</tr>
<tr>
<td>‘Rebound effect’ as a percentage of commuting savings</td>
<td>73%</td>
<td>19%</td>
<td>14%</td>
<td>43%</td>
<td>24%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Exhibit 8 provides figures for average commuting savings, additional journeys undertaken and net rebound effects (based on total travel for the sample, i.e. including those who reported no additional journeys). The figures are based on respondents estimates, and may be unreliable for both this reason and because they might include double counting between mileage estimates for different kinds of additional journey. They are therefore indicative rather than exact. Even so, they suggest that teleworking is significantly reducing non-business travel even when short-term offsetting or rebound effects are taken into account. The surprisingly high figures for Denmark could be explained by a high proportion of female respondents. The Danish respondents were also making more journeys for shopping and child care. It may therefore be that women - and especially mothers - use the car more when working at home than men.

Of course, SUSTEL could not address the longer term rebound effects of people deciding to move further away to take advantage of cheaper property prices and/or a perceived higher quality of life because of the greater flexibility which telework provides. This can maintain or even increase transport because a smaller number of longer trips is substituted for a larger number of shorter ones. However, whilst this certainly occurs, there are constraining factors on it:

- Relocation from more to less densely populated areas often reduces access to alternative employment opportunities and/or work-related networks and therefore creates a degree of risk
- Long-distance travelling can be vulnerable to disruption and, in some countries, disproportionately expensive per kilometre compared to short distance journeys.

Relocation rebound effects may therefore be a specific problem, for example, in areas with very high differentials in property prices (e.g. England) and/or relatively cheap and uncongested long distance transport (e.g. parts of America).

A final point, of course, is that teleworking substitutes some energy consumption in telecommunications for transport. However, most studies suggest that this is considerably less.

For these reasons it appears reasonable to conclude that teleworking does reduce transport-related environmental impacts, but by significantly less than initial commuting reductions suggest.
In-Work Transport

In five of the six survey organisations few respondents said that teleworking had any impact on this. However, in BT - which was different from the others in that most respondents were mobile teleworkers - we found that:

- 18% of respondents stated that their in-work travel had increased, with a mean distance of 267 miles.
- 9% stated that it had decreased, with a mean distance of 394 miles.

The main reason for the increases appears to be additional visits by people who no longer have to travel to an office at the start or finish of the working day. It may also be that, for people with some discretion over travel, there is a ‘hydraulic effect’ in which people have a rough amount of time they are willing to spend travelling. Hence, if commuting travel decreases they are more willing to travel for work (e.g. by attending a meeting in person rather than by conferencing).

Rebound effects on work travel therefore appear to be potentially significant amongst mobile teleworkers, but research into a larger number of organisations is needed to validate this.

Congestion

In addition to influencing the number and distance of trips, teleworking can also influence their timing. This can be of disproportionate importance if it shifts some journeys from peak periods into off-peak periods. In order for this to have a noticeable effect on congestion it require substantial numbers of motorists shifting their journey time. At the current level of telework diffusion this is unlikely to have a major effect except in a few special cases (e.g. London).

As can be seen in exhibit 9, the reduction in commuting was accompanied by considerable savings in time, especially in Italy and at BT. As the quality of life section discusses, less time commuting often results in a considerable reduction in stress.

Exhibit 9 Reduction in Time Spent Commuting (Hours Per Week Per Person)

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 hours</td>
<td>33.3%</td>
<td>1.5%</td>
<td>-</td>
<td>-</td>
<td>7.1%</td>
<td>-</td>
</tr>
<tr>
<td>1-2 hours</td>
<td>46.7%</td>
<td>16.7%</td>
<td>3.8%</td>
<td>19.0%</td>
<td>11.2%</td>
<td>81.3%</td>
</tr>
<tr>
<td>3-5 hours</td>
<td>15.6%</td>
<td>37.9%</td>
<td>19.2%</td>
<td>57.1%</td>
<td>17.1%</td>
<td>18.8%</td>
</tr>
<tr>
<td>6-10 hours</td>
<td>2.2%</td>
<td>24.2%</td>
<td>57.7%</td>
<td>14.3%</td>
<td>41.8%</td>
<td>-</td>
</tr>
<tr>
<td>11-15 hours</td>
<td>2.2%</td>
<td>16.7%</td>
<td>7.7%</td>
<td>9.5%</td>
<td>12.9%</td>
<td>-</td>
</tr>
<tr>
<td>16+ hours</td>
<td>-</td>
<td>3.0%</td>
<td>11.5%</td>
<td>-</td>
<td>10.0%</td>
<td>-</td>
</tr>
</tbody>
</table>
Air Quality

Reductions in transport means fewer harmful emissions and therefore better external air quality. However, most people’s highest exposures to hazardous air pollutants are within buildings and vehicles. Hence, teleworking tends to reduce exposures when people drive less. Shifts from working at home in an office to home could also change exposures to pollutants. This is particularly important when people live in areas where soil, rocks etc give off high levels of radon, a radioactive gas which can cause cancer. Employers whose staff might be susceptible should take this threat more seriously. For most people, however, the net effect of telework on indoor air quality is likely to be neutral or positive. Indeed several survey respondents commented that they were glad to escape what they thought to be the enervating effects of stuffy offices.

Can Teleworking Help to Reduce Pollution Around London’s Heathrow Airport?

Air pollution is a major problem at Heathrow - caused not only by emissions from the planes themselves but also from the vehicles which ferry passengers and freight to, from, and within it. These also create congestion problems on local roads. The airport operator, BAA, is therefore under great pressure to minimise road traffic - especially since this was made an explicit condition of permission for a fifth terminal.

A key target in this campaign has been BAA’s 4000 or so staff, with various measures to encourage them to use public transport, to share cars, and to telework. Even though the latter has been applied in only some areas it seems to have been the most successful, saving around 64 kilometres of travel for each day teleworked.

Safety

Teleworking leads to changes in the timing and duration of work in different locations. If the home environment or mobile environment is ‘riskier’ than the office environment then changes in exposure will lead to lower safety and a rise in health and safety incidents e.g. accidents, strains, stress etc., and vice versa. Some studies have found that some home based teleworkers have experienced poorer health and safety conditions at home than in the office. However, only 3 of the 30 SUSTEL cases revealed differences in the area of occupational health and safety between office and home and these were minor. The main points were back problems from carrying laptops and joint problems from computer keyboards. Someone also noted that “my office is under the stairs (just like Harry Potter) and I keep bumping my head!”

Health and Safety Matters at Telecom Italia

Almost a quarter of the 2100 employees at Telecom Italia’s ‘Info412’ call centre operation are full-time teleworkers. They have both initial and follow-up training on the topic. There is also a home inspection - and advice given on ergonomics and safety - before approval is given. And Telecom Italia insists on installing, retaining ownership and maintaining not only the IT equipment but also all electrical connections between it and the power supply.
Built Environment

Teleworking enables organisations to make more effective use of office space through hotdesking and other methods. In aggregate, this can reduce overall demand for buildings and - as they are energy and resource intensive to construct and maintain - thereby create considerable environmental benefit.

We found that:

- 12 of the 30 SUSTEL cases needed less office space as a result of telework
- 3 were expecting it in the near future
- The other 15 cases had not reduced their space requirements.

In practice, it is economics rather than environment which is the main driver of space reductions. They are therefore likeliest where property costs are highest, such as the Netherlands or UK. In one case - the UK company Word Association - the stimulus was so great that it led to the closure of its central office.

However, more flexible buildings do not automatically achieve cost savings. One case organisation had not made the organisational changes needed to reduce the amount of time people spent in its new building, so that it faced problems of overcrowding.

Offices to support teleworking may also have different locations to those designed for more conventional working patterns, with significant impacts on transport, urban sprawl and other factors. In one case, teleworking enabled the organisation to afford an office in a city centre, which in turn enabled more people to access it by public transport. But in another case, several new offices were being built on the edge of cities, making access to them by public transport almost impossible.

Teleworking can also impact on the design and location of homes, particularly by people moving or adding extensions in order to create more domestic working space. We did not address this issue but it is likely that effects of this kind will offset some of the reductions in office space.
Financial Success is Fun at Oracle

Oracle BV, the Dutch subsidiary of database providers Oracle Corporation, invested around 9 million Euros in a teleworking scheme in the late 1990s. Over the following five years it has identified tangible benefits of 23 million Euros from increased productivity, reduced office space and increased staff retention. Oracle employees also report an increased quality of life. Other Dutch companies have been impressed too, with over 250 making study visits since the scheme began.

The high initial investment was needed to turn many of the company’s buildings into ‘FUNctional offices’. These were aimed at meeting staff needs for working spaces but in a more efficient way than previously, with greater use of hotdesking, electronic access to documents and other means. At the same time they were designed to be fun locations, where people could get a buzz from convivial activity and meeting unexpected colleagues. Two means of achieving this are bright colours and a central café.

According to Oracle’s facilities manager, “our FUNctional office only requires 13 square metres per person instead of 23 previously. It also allows us to respond more flexibly to changing business conditions. And, perhaps most important, it creates more interaction between departments and individuals, which improves communication and sparks many new ideas.”

Can Telework Help to Solve Europe’s Housing Problems?

A study by the UK Royal Institute of Chartered Surveyors concluded that British business was wasting up to £18 billion (25 million Euros) a year - around 1.5% of GDP - through inefficiency in their use of property. Over a third - £6.5 billion – of the estimated savings were thought to be available from hotdesking and other new working practices, of which teleworking is an important component. In addition to increased office efficiency, and decreased need for new office construction, the report also concluded that the freed office space could help ease housing shortages in London and surrounding areas. Although the very high level of UK property costs means that potential savings would be less in other European countries, it nonetheless shows that the potential space benefits of teleworking can be considerable.
The Social Dimension of Telework

We identified five main social impacts of telework:

- **Social inclusion** - effects on the work options and satisfaction of potentially excluded groups such as the disabled, or parents of young children.
- **Quality of life** - both of teleworkers themselves and their ‘significant others’.
- **Work-life balance** - an especially important topic in countries with long working hours.
- **Health** - which can be influenced through changes in stress, diet, exercise and other variables.
- **Community** - whether teleworkers use the additional time they have at home to become more involved.

Teleworkers Are Happiest if They are Well Supported

Giving up a permanent desk to become a mobile teleworker - alternating work between home, office hotdesks and other places - can be scary and some people cannot adapt. So when BT introduced its Workabout scheme to encourage this transition it accompanied it with the creation of a support unit. This is based at BT’s Leeds office and has had up to five staff at the periods of highest demand. The unit runs a telephone help desk, provides briefing materials and sometimes runs workshops when a number of people in the same office or team are switching. It also manages an information and discussion area on the BT intranet, with sections for those about to ‘become a home worker’ and another for ‘existing home workers’.

The unit also provides registrants with computers (often the PC or laptop they were using in the previous office), dedicated phone line(s) and a furniture budget of £650 (1000 euros) per worker. There are four standard packages of computer and peripherals, which are selected based on the kind of work being undertaken.

The scheme has generally worked well, and is seen as an important factor in the feelings of most Workabout registrants - who now number over 6000 - that they have good quality of life and other benefits from telework, and do not feel isolated from colleagues. However, the importance of good support was demonstrated by a temporary blip in perceptions when 2001-2002 when many staff wanted, but weren’t getting, ADSL connections.
Social Inclusion

Telework can support this by providing work or promotion for people who might have difficulty in travelling to and/or working in a local office, or who live in remoter areas with limited local work opportunities. It can have the opposite effect if it excludes people (e.g. because they do not have sufficient space to work at home), or makes it more difficult for them to work, be promoted or have satisfactory working conditions.

As the SUSTEL research is focused on individual organisations, it was difficult to address the issue of people outside them who might be excluded. As far as their internal effects were concerned, eleven of the 30 case study organisations provided evidence that their teleworking was contributing to social inclusion whilst none found the opposite. The two main examples of this were teleworking helping disabled people and females on maternity leave to remain in employment. In these areas, at least, it seems that teleworking is supportive of social inclusion.

Annie Connect

You might expect a call centre business set up by, to be unorthodox and you’d be right. The Dutch call centre company Annie Connect BV was established (by Leo Dijkgraaf, an actor and drama teacher) in January 2000. It now has over 500 agents answering calls from home, over half of them previously unemployed disabled people and many of the others mothers with young children.

Annie Connect remedies two weaknesses of conventional call centre operations - demotivation of staff and a resulting high turnover. Employing people who would otherwise find it difficult to work, and training them well, results in high motivation, good customer service and retention of staff. Home working also gives greater flexibility in offering 24/7 service basis and fast responses, and greatly reduces office costs. These benefits more than outweigh the high costs of ADSL-based telecoms infrastructure, intense training, and the lower productivity and higher absenteeism which occurs with some disabled staff.

Teleworkers need good support

Telework can help the disadvantaged .. but also exclude
Quality of Life

Quality of life is not always easy to define so in the SUSTEL surveys we focused on people’s own perceptions of whether they had it or not. A large majority (75-94%) of respondents in all six organisations felt that they had a good or very good quality of life. When asked about the contribution of telework to this, a similarly large majority felt that it was positive (see exhibit 10).

Exhibit 10 Perceived Effects Of Teleworking On Respondent’s Quality Of Life

<table>
<thead>
<tr>
<th>Considerable Positive Effect</th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slight Positive Effect</td>
<td>26.1%</td>
<td>60.3%</td>
<td>73.1%</td>
<td>60.9%</td>
<td>54.9%</td>
<td>29.4%</td>
</tr>
<tr>
<td>No Effect</td>
<td>56.5%</td>
<td>38.2%</td>
<td>23.1%</td>
<td>39.1%</td>
<td>35.4%</td>
<td>58.8%</td>
</tr>
<tr>
<td>Slightly Negative Effect</td>
<td>13.0%</td>
<td>1.5%</td>
<td>3.8%</td>
<td>-</td>
<td>3.0%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Considerable Negative Effect</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.6%</td>
<td>-</td>
</tr>
</tbody>
</table>

Some of the other survey questions provide insight into the reasons for this improved quality of life. They include the personal advantages (greater job satisfaction, reduced stress) of better work performance, the flexibility and psychological benefit which comes from greater control of personal time, the reduced stress of commuting, and the opportunities to spend more time with partners and children.

Connectedness and Isolation

This is an important factor in quality of life and other sustainability impacts and we found that:

- 38-58% of survey respondents felt more isolated from work colleagues, with very few feeling less isolated (the remainder being neutral).

- Of those feeling more isolated, large majorities - 63-75% of those answering in this way - felt that this was negative rather than positive in four organisations (Denmark, Italy, Netherlands, UK-BT).

- In Germany and UK-BAA most respondents were neutral, with more of the remainder seeing it as negative in Germany but positive at UK-BAA.

The main positive benefits seem to be greater ability to concentrate, which other questions showed to be an important factor in improved work performance. The main negative factors are feeling unsupported, and missing the human interaction of an office.

In all countries except Denmark, more people (from 23-52%) felt less isolated from non-work colleagues than felt more isolated (5-17%). Almost all respondents felt that this was positive. In Denmark the opposite was true, for reasons which are unclear.
Most teleworkers have good quality of life ... despite longer working hours for some

A ‘Buddy System’ Reduces Isolation and Increases Productivity at LVM

The German insurer LVM has an unusual system of telework. Staff are paired with each other and then take turns to work at home and in the office. Typically one of them works from home on a Monday and LVM on a Tuesday whilst the other does the opposite.

The system has been so successful that LVM now has 600 people working in this way in a headquarters workforce of 2100. The system has created savings in office space of around 50 million Euros. And teleworkers have proved to be more productive than colleagues, with the result that a 5% increase in workload has been agreed with the works council. Absenteeism is also 14% lower than among non-teleworkers.

An LVM board member, Werner Schmidt, believes that “the pairing of teleworkers has played a major role in our teleworking success. It provides a flexible and effective means of organising work and helps to minimise the problems of social isolation which teleworkers can sometimes feel.”

How Can Workaholics Have a Better Quality of Life?

The finding that many teleworkers report both longer working hours and more time for non-work activities (see opposite) and a better quality of life is paradoxical. More time working is usually associated with increased stress, domestic tension and other factors which reduce quality of life.

One possible explanation is that, for many individuals, their increased working hours will be less than the time they have saved in commuting. Hence, they still have more time available for family and other activities. For some, the stress associated with commuting (especially for long distances) may be less than that arising from additional working time. Perhaps most significantly, teleworking can in effect create time through opportunities for multi-tasking or greater control of activities. As one respondent noted: “Things like washing, shopping can be fitted into a working day leaving the weekends free for leisure rather than catching up on the weeks household duties.”
Working Hours

A number of previous studies have suggested that teleworkers tend to work longer hours than non-teleworkers but there has been little quantitative data on the topic. This is worrying because long working hours are often associated with increased personal stress, isolation, family conflict and reduced quality of life.

As exhibit 11 demonstrates, the surveys showed that a large number of respondents - especially in BT - believed that their working hours had increased rather than decreased over the last two years.

**Exhibit 11 Changes In Total Amount Of Time Spent Working In The Last Two Years**

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased</td>
<td>23.4%</td>
<td>41.2%</td>
<td>38.5%</td>
<td>56.5%</td>
<td>75.7%</td>
<td>38.9%</td>
</tr>
<tr>
<td>Stayed the same</td>
<td>76.6%</td>
<td>54.4%</td>
<td>42.3%</td>
<td>30.4%</td>
<td>18.3%</td>
<td>50.0%</td>
</tr>
<tr>
<td>Decreased</td>
<td></td>
<td>4.4%</td>
<td>19.2%</td>
<td>13.0%</td>
<td>5.9%</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

**Exhibit 12 Additional Working Hours Per Week For Respondents Reporting An Increase**

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 hours/week</td>
<td>72.7%</td>
<td>78.6%</td>
<td>50.0%</td>
<td>38.5%</td>
<td>29.1%</td>
<td>71.4%</td>
</tr>
<tr>
<td>6-10 hours/week</td>
<td>27.3%</td>
<td>21.4%</td>
<td>40.0%</td>
<td>46.2%</td>
<td>40.2%</td>
<td>28.6%</td>
</tr>
<tr>
<td>11-15 hours/week</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15.4%</td>
</tr>
<tr>
<td>16+ hours/week</td>
<td></td>
<td></td>
<td>10%</td>
<td></td>
<td>11.0%</td>
<td></td>
</tr>
</tbody>
</table>

Exhibit 12 shows that in all but the Netherlands and UK-BT increased working hours were mainly less than one hour a day on average.

What the survey was unable to do was ascertain the extent to which teleworking is a cause of increased working hours. It may be that non-teleworkers are also experiencing this problem - as is probably the case at BT and Oracle, which are both in the hard pressed ‘tech’ sector.

It also seems that working hours are related to the type of telework and the type of organisation. The limited working hours occurring in Denmark for example are probably due to the fact that the host is a public administrative body, where overtime work is generally not accepted.
The opposite case of BT partially reflects the fact that the respondents are very mobile - and generally professional - teleworkers with few formal constraints on their work tasks.

In addition to generic organisational pressures, another reason given for longer working hours is the use of increased control of time to complete tasks in one go. Whilst this does not necessarily lead to longer working hours (some time off could be taken the following day to compensate), in practice this does not seem to be the case for many. Presumably the reasons are that work is either being undertaken to higher standards, sometimes for greater job satisfaction, and/or more work is being undertaken than previously.

Other factors in increased working hours are the inability to resist reading the latest e-mail and a need (actual or perceived) to impress managers.

Whatever the total amount of time worked teleworking certainly changes the pattern of work. 20 out of the 30 cases found this to be the case. The survey responses confirmed this fact and also revealed how teleworkers are taking advantage of greater flexibility with:

- 34-91% of respondents working more in the evenings
- 15-82% of respondents working more at weekends
- 42-81% of respondents starting work earlier.
Work-Life Balance

Many people feel that their work-life balance is wrong and that teleworking might be part of the solution. The IST FAMILIES project has shown that this can be true, although in more complex ways than often imagined. The SUSTEL surveys built on its work and found that:

- A majority - from 75-94% - of respondents in all six survey organisations felt that they had a good or very good work-life balance
- Most others felt that it was neither good nor bad, except in the UK where 22% of BT and 11% of BAA respondents felt that it was poor.

As exhibit 13 shows, teleworking has also created more time for non-work activities.

Exhibit 13 Impact Of Teleworking On Time Available For Non-Work Activities

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased</td>
<td>67.4%</td>
<td>89.6%</td>
<td>96.0%</td>
<td>91.3%</td>
<td>75.2%</td>
<td>60.0%</td>
</tr>
<tr>
<td>No Effect/</td>
<td>32.6%</td>
<td>10.4%</td>
<td>4.0%</td>
<td>8.7%</td>
<td>24.8%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Decreased</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The key reasons for improved work-life balance appear to be greater autonomy and flexibility in work planning and performance. 86-100% of survey respondents felt that teleworking gave them better control of when to work. As a result, people can more easily optimise their work and non-work requirements, for example by:

- Allowing parents to spend time with their children in the morning and when they return from school, and make up for it by working into the evening
- Allowing working partners to better optimise their schedules
- Allowing people to seize opportunities, such as taking time off on a sunny day.

Teleworking Can Help Domestic Life

Matthias K. is an employee in the customer services department of the German insurer, Continentale. During the week he works three days at home and two days in the office. Matthias says that he used to lose a lot of time every day for his journey to the office. Now he is able to use this saved time much more effectively for both personal and work purposes. Nowadays, he enjoys being able to look after his children more often and to be at home when they return from school. Because of his flexible working hours he can also carry out more household chores and thus relieves his self-employed wife. Initially, Matthias felt that he had to do more work than necessary when he was at home to convince dubious colleagues in the office that the scheme was working, but he was soon able to resume a more normal pattern. As he works with fewer disturbances, and has better concentration, than in the office, Matthias is convinced that Continentale is also benefiting through his improved work performance.
Health

Teleworking creates less absenteeism - but could one reason be that teleworkers are not any healthier but under more pressure to work when they should be on sick leave? To test this, and also because it is an interesting question in its own right, the questionnaire asked people to assess the overall effect of telework on their health. As exhibit 14 shows, a large majority in all countries felt that it had a positive effect. Exhibit 15 demonstrates that, for those who identified improved health, the reasons are varied. Some may find the importance of changes in diet and exercise to be unexpectedly high.

Exhibit 14 Effects Of Teleworking On Health

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Considerable Positive Effect</td>
<td>4.3%</td>
<td>16.4%</td>
<td>46.2%</td>
<td>8.7%</td>
<td>18.9%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Slight Positive Effect</td>
<td>23.9%</td>
<td>34.3%</td>
<td>38.5%</td>
<td>47.8%</td>
<td>36.0%</td>
<td>41.2%</td>
</tr>
<tr>
<td>No Effect</td>
<td>60.9%</td>
<td>47.8%</td>
<td>11.5%</td>
<td>43.5%</td>
<td>34.8%</td>
<td>47.1%</td>
</tr>
<tr>
<td>Slightly Negative Effect</td>
<td>8.7%</td>
<td>1.5%</td>
<td>3.8%</td>
<td>-</td>
<td>9.1%</td>
<td>-</td>
</tr>
<tr>
<td>Considerable Negative Effect</td>
<td>2.2%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.2%</td>
<td>-</td>
</tr>
</tbody>
</table>

Exhibit 15 Causes of Improved Health from Teleworking

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Stress</td>
<td>10.9%</td>
<td>29.4%</td>
<td>65.4%</td>
<td>na</td>
<td>42.1%</td>
<td>23.5%</td>
</tr>
<tr>
<td>Personal Stress</td>
<td>13.0%</td>
<td>39.7%</td>
<td>69.2%</td>
<td>na</td>
<td>34.1%</td>
<td>29.4%</td>
</tr>
<tr>
<td>Domestic Harmony</td>
<td>8.7%</td>
<td>23.5%</td>
<td>57.7%</td>
<td>na</td>
<td>32.3%</td>
<td>23.5%</td>
</tr>
<tr>
<td>Less Driving</td>
<td>17.4%</td>
<td>47.1%</td>
<td>19.2%</td>
<td>na</td>
<td>39.0%</td>
<td>41.2%</td>
</tr>
<tr>
<td>More Exercise</td>
<td>21.7%</td>
<td>17.6%</td>
<td>38.5%</td>
<td>na</td>
<td>36.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Better Diet</td>
<td>-</td>
<td>22.1%</td>
<td>30.8%</td>
<td>na</td>
<td>31.7%</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>2.2%</td>
<td>2.9%</td>
<td>11.5%</td>
<td>na</td>
<td>3.0%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

Teleworking Cuts Absenteeism at Solvision

In 2001 the fast growing Dutch ICT company Solvision - only 18 of whose almost 250 staff have a permanent office - had a sickness rate of only 1.25%, compared to 5.3% nationally for all companies providing business services, and 7.2% for those over 100 employees. One reason is the way that teleworking enables people to work at home through mild illness, or when travel is difficult. However, managers believe that it is also an outcome of the company’s vision of creating maximum autonomy for individuals in the manner and place of their work. They feel that this has an energising effect on morale, and reduces negative stress (which is often linked to feelings of lack of control of working conditions and tasks), with consequent benefits for health. Further evidence of this came during the post-millennium ICT recession when a temporary need for cost control and letting some staff go coincided with a significant increase in absenteeism rates.
Community

Thriving local communities are a fundamental aim of sustainable development. Teleworking can have a considerable impact upon them because it allows people to spend more time at home, and therefore gives them greater opportunities to be involved in or to support local activities. As exhibits 16 and 17 demonstrate, this is happening with a significant number of respondents.

Exhibit 16 Survey Respondents Making Increased Use Of Local Services As A Result Of Teleworking

<table>
<thead>
<tr>
<th>Country</th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12.8%</td>
<td>40.3%</td>
<td>54.2%</td>
<td>39.1%</td>
<td>58.6%</td>
<td>50.0%</td>
</tr>
</tbody>
</table>

Exhibit 17 Survey Respondents Stating That Teleworking Makes It Easier For Them To Be Involved In Organised Community Activities

<table>
<thead>
<tr>
<th>Country</th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>43.5%</td>
<td>51.7%</td>
<td>61.5%</td>
<td>35.3%</td>
<td>40.2%</td>
<td>33.3%</td>
</tr>
</tbody>
</table>
Teleworking and Technology

The profile of teleworking that emerges from the SUSTEL surveys and cases is surprisingly ‘low tech’:

- Only a minority of teleworkers surveyed have laptops
- Only a small proportion are communicating with their offices over broadband links
- Very few have PDAs or are accessing the Internet through mobile phones.

However, the prevalence of these technologies is higher in the organisations which have moved to hotdesking forms of organisation.

As exhibit 18 shows, many respondents felt that changing this situation would be beneficial. The most common concern appears to be about connection speeds. The fast speeds which are possible with broadband can allow Internet-related activities to be done more quickly. It may also encourage greater usage - reflected increased familiarity with, and confidence in - organisational Intranets. This is an important enabler of mobile forms of teleworking, and is also an important means of ensuring that teleworking does not increase paper consumption through multiple printing of documents.

Exhibit 18 Will Advanced Communication Technologies (ICT) Will Improve Your Work Performance And/Or Quality Of Life?

<table>
<thead>
<tr>
<th></th>
<th>Denmark</th>
<th>Germany</th>
<th>Italy</th>
<th>Netherlands</th>
<th>UK - BT</th>
<th>UK - BAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>19.1%</td>
<td>24.2%</td>
<td>28.0%</td>
<td>77.3%</td>
<td>94.8%</td>
<td>100%</td>
</tr>
<tr>
<td>No</td>
<td>80.9%</td>
<td>75.8%</td>
<td>72.0%</td>
<td>22.7%</td>
<td>5.2%</td>
<td>-</td>
</tr>
</tbody>
</table>

Several of the cases also demonstrated that broadband can open up new opportunities for telework because it becomes feasible to transfer, or be able to access, data and documents more easily and cheaply than over ISDN and ordinary telephone lines.

A more unsung technology which is also opening up new opportunities to telework is that of sophisticated switchboards which allow calls to be easily - and often automatically - routed between different locations. As the Annie Connect and Telecom Italia cases show, this then enables teleworking for call centre staff.
Plain Ordinary Audio Conferencing Can Still Help Teleworkers

Many non-teleworkers used to regular face-to-face meetings with office colleagues wonder how mobile teleworkers can manage without them. One answer is that they can’t - but they can have fewer, manage them better and use audio, video and/or web conferencing in between to make decisions and maintain communication.

AT BT almost all teleworkers now have an on-line ‘Meet Me’ account which allows them to set up a conference call within seconds - and without any need to work through an operator. They e-mail a time and numerical code to other participants, who key the code into their phone to join the voice conference. In a small but growing number of cases, participants will also log in to a parallel web conference which allows documents to be viewed, diagrams to be drawn etc.

A BT survey of over 5000 conferencing users carried out in parallel with SUSTEL found that - in a succinct summary of the majority view by one respondent - conferencing enables a virtuous circle in which:

“Travelling less = more time at home = balance of home/work priorities = less stress = better performance.”

The survey found that:

- 38% of respondents believed that conferencing had considerably increased, and 44% that it had slightly increased, their work performance.
- 44% of respondents stated that conferencing has enabled them to work when they were prevented from reaching another working location.
- 71% of respondents stated that their last conference call had definitely or probably replaced a meeting, with avoided travel (and equivalent costs) of at least 91-100 miles for car users and 94 miles for train users.
- 75% of respondents stating that conferencing was having a positive impact on their quality of life. See www.sustainit.org for more information on the survey.
Long-term Changes in Telework

One aim of SUSTEL was to examine longitudinal changes in telework schemes. As the research was conducted within a year it was difficult to do any on-going monitoring of these. However, the topic was addressed in three other ways:

- Gathering of data on the evolution of teleworking schemes within the case study companies, based on multiple interviews to reduce subjectivity and cross-checking with written sources wherever possible
- Asking questions of survey respondents on changes in their behaviour and attitudes since beginning telework
- Statistical analysis of whether survey responses were related in any way to the length of time which people had been teleworking.

One interesting feature of many of the cases was that of unexpected benefits from telework because it enabled, or was found to be synergistic with, beneficial changes in work practices (e.g. extension of service hours because these are now easier to staff). Many of these changes in work location or practices are in turn linked with developments in ICT technology such as the introduction of broadband, or the ability to operate virtual call centres.

The cases also provided evidence on a topic which has emerged in previous literature, which is the maintenance of telework-related economic benefits over time. It has sometimes been said that these often erode, for example, because there is attrition in the number of teleworkers, or attitudes or practices revert to their previous situation after the initial novelty has worn off.

Only a small number of the cases had any examples of a significant number of individuals starting to telework, and then ceasing to do so. Indeed in most of the SUSTEL cases numbers continued to grow, often beyond initial expectations. One reason for this seems to be a ‘contagion’ effect. As other workers discover that teleworking is an option, they become interested in trying it for themselves. Another is the organisation’s recognition that benefits are real and, as noted, are often unexpectedly synergistic with business objectives.

Both the cases and surveys also provide evidence that telework benefits can often increase rather than diminish as a result of organisational and individual learning. At the organisational level there was often a gradual extension of telework in many organisations from “white-collar” to “blue-collar” workers. This occurs both because the example set by the former becomes well known, and also because new technological developments changes the nature and content of even blue collar work.

At the individual level, the surveys provided some limited evidence of a positive link between the length of time teleworking, and important variables such as work performance and competencies and skills.
Telework Futures

Teleworking has usually been seen as an optional and instrumental activity, concerned with achieving specific objectives for:

- Employers, in the form of better retention, performance etc
- Specific groups of employees such as parents of young children.

It has also assumed that teleworkers usually work at home when they are not in the office. However, the development of ICT is now allowing many white collar staff to work almost anywhere if they choose to do so. This flexibility of location can also be easily translated into flexibility of time (I will check my e-mail from home so that I can leave the office a few minutes earlier). Hence, many more people are adopting some features of telework than are evident in official statistics. This trend is strengthened by the rise of fully fledged mobile telework. This creates a market for supporting infrastructure and products which can then be utilised by occasional users.

The difficulty in distinguishing between ‘ordinary’ work and telework is compounded by the growing heterogeneity of teleworkers themselves. Not only are the numbers of mobile teleworkers growing disproportionately, but also teleworkers themselves often change their working patterns according to season, job tasks and other factors. At some periods they work home for a number of days per week, at others spend much of their time in organisational offices and therefore be indistinguishable from conventional workers.

At a strategic level, a growing number of companies see teleworking - and especially its mobile form - is an integral part of a flexible, networked, and digital way of working which is seen as essential in an inter-connected business world. In many ways, the new ways of working which such organisations are built upon are impossible without telework. Their practices are of disproportionate importance because:

- They tend to employ influential professionals with considerable influence on organisational decision-making, and therefore economic and social impacts
- They tend to operate in the most dynamic, fastest growing, sectors of the economy such as ICT and professional services
- They are early adopters, and often developers of, many new ICT innovations.

Increasingly therefore, telework is just ordinary work taken to extremes and the two may become increasingly difficult to separate in coming decades.

Some may see this as a negative trend, because it tends to blur boundaries between work and other activities - with potential dangers of overwork and intrusion on domestic life - and creates a less cohesive workforce.

But others are likely to see it as positive, either enthusiastically, or because it seems one of the least worst means of reconciling competitiveness-based demands for increased flexibility and performance with a concern for employees and sustainable development.

The SUSTEL research findings are not sufficiently representative to provide closure on these debates. But they do provide a bias towards an optimistic assessment of organisational telework. They also suggest that many of the advantages can be maximised, and the disadvantages minimised, by the actions of Governments and organisations, as the following pages discuss.
Business Implications of the SUSTEL Research

The SUSTEL project, and the previous research it has built on, shows that teleworking can create considerable - and varying - benefits for organisations and their employees. However, achieving these benefits is not inevitable. Doing so requires organisations to:

- Carry out a detailed analysis of all the potential benefits - but also costs - so that a complete business case is prepared
- Understand that one of the key telework benefits - reduced space - requires radical changes in working practices to be achieved
- Consult with staff and other stakeholders during design and implementation
- Introduce telework as part of a broader flexible working package so that everyone can potentially benefit
- Manage by objectives rather than worker visibility
- Ensure that telework does not discriminate against or exclude particular groups
- Accept responsibility for health and safety when work is done at home
- Understand that there will be environmental and social rebound (secondary) effects which, when negative, need to be addressed.

More information on these topics can be obtained from the SUSTEL business guidance materials, and the on-line sustainability assessment tool, on www.sustel.org.

Drivers and Stakeholders for Telework

<table>
<thead>
<tr>
<th>Business Drivers</th>
<th>Internal Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing property costs</td>
<td>Senior managers; facilities and finance departments</td>
</tr>
<tr>
<td>Improving employee satisfaction through better work-balance and other advantages of more flexible employment</td>
<td>HR, unions/staff representatives and employees themselves</td>
</tr>
<tr>
<td>Improving work performance</td>
<td>Senior managers, line managers and employees</td>
</tr>
<tr>
<td>Better matching of workload and resources to avoid staff shortages, improve service, reduce overtime costs and other reasons</td>
<td>Senior and line managers</td>
</tr>
<tr>
<td>Recruiting and retaining staff, by overcoming geographic and travel constraints and through more satisfying work</td>
<td>HR, line managers and - if it allows existing employees to keep their jobs - unions</td>
</tr>
<tr>
<td>Reducing travel problems for all staff, and society as a whole</td>
<td>CSR (corporate social responsibility), environment, facilities and transport managers</td>
</tr>
<tr>
<td>Building or enhancing a reputation as a progressive employer</td>
<td>Senior managers, HR and CSR managers</td>
</tr>
</tbody>
</table>
Policy Implications of the SUSTEL Research

SUSTEL has produced a report on the policy implications of its research (see www.sustel.org). The report suggests that well-managed teleworking - and especially its mobile variants - can help to achieve the economic modernisation objectives of the Lisbon strategy by:

- Contributing to improved European competitiveness through better work performance, the reduction of space needs, the reduction of congestion, and reduced absenteeism and recruitment costs
- Achieving this whilst also, on balance, benefiting employees, society as a whole, and to - at least some (and probably a substantial) degree - the environment
- Helping to increase employment rates for older workers.

However, teleworking is not living up to its full potential because of:

- Continuing concern by some stakeholders (some employees, unions, NGOs) about negative social impacts from telework (e.g. isolation, limited career development opportunities, poor working conditions and practices)
- A variety of organisational and policy barriers to the take-up, and successful implementation, of telework schemes by employers.

Specific barriers identified in the SUSTEL cases included:

- Lack of knowledge amongst many employers about the full benefits and costs of sustainable telework
- Uncertainties on how to implement and manage sustainable teleworking schemes
- Management cultures which can’t comprehend new ways of working
- Tax and other Governmental barriers to the introduction or development of telework within member states
- ICT-related problems such as uneven penetration between regions and/or different groups in society, and concerns about data security and protection
- Negative ‘branding’ of telework which, in many countries and, for many people, remains synonymous with schemes which allow mothers to work at home for all or some of their time in order to balance child care and work.

The policy report therefore makes a number of specific policy recommendations, grouped in terms of three strategic objectives:

- Ensuring that telework is sustainable
- Measures to increase take-up by, and success of, teleworking schemes in organisations
- Increasing knowledge about the long term impacts of teleworking, such as medium-long term travel rebound effects.

Key targets for these recommendations are areas where telework is currently less developed - the public sector everywhere, and many other sectors in Eastern and Southern Europe - or where it has considerable potential, such as the creation of ‘virtual call centres’.
SUSTEL Cases

Summaries and full English versions of the cases can be viewed at www.sustel.org.

**Denmark**

ASK - Small public agency with most staff doing regular alternating telework.

Bank Data - Medium size IT co with most staff regular alternating teleworkers.

Danica - Alternating irregular telework at a Danish insurer.

DTI - Alternating irregular telework at a Danish research centre.

Excel Data - Small consultancy and IT business with a satellite telecentres.

Tele Denmark - Alternating irregular telework at the largest Danish telco.

**Germany**

BMW - Alternating regular telework at the Bavarian car producer.

Continentale - Home based and alternating regular telework at an insurance company.

Empirica - All forms of telework at an IT and research consultancy.

Hamburg - Alternating regular telework in a municipality.

LVM - Alternating regular telework at an insurance company.

SVI - Alternating and supplementary telework at a medium sized IT company.

**Italy**

Brodeur Imagetime - Small IT consultancy with satellite telecentres.

CedCamera - Alternating irregular telework at a Milan services company.

Emilia Romagna - Alternating regular telework at a regional authority.

Lombardia - Alternating regular telework at a regional authority.

Naples - Home based and mobile teleworking at a municipality.

Telecom Italia - Home-based teleworking at its call centres.

**Netherlands**

Annie Connect - Call company based on home-based disabled teleworkers.

IKMN - Alternate and mobile telework at a small health agency.

KPN - Alternating telework at the leading Dutch telco.

Ministry of Transport - Alternating regular telework in a central government agency.

Oracle - Mobile teleworking at a large IT company.

Solvision - A radical form of mobile teleworking at a medium sized IT services company.

**UK**

Acre - Small NGO supporting rural sustainability with two mobile teleworkers.

BAA Heathrow - Supplementary telework in the airport planning office.

Bradford MDC - Full time home-based telework in a local benefits office.

BT - A large mobile teleworking scheme at the leading British telco.

East Midlands Electricity - Alternating and supplementary telework at a utility.

Word Association - Mobile teleworking by everyone at a small digital media company.