WORKING ON DISTANCE – EXPERIENCES FROM SME TRAINEES WORKING WITH DISTANCE-SPANNING TECHNOLOGY

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ABSTRACT
This paper reports on the experiences drawn from a pilot project on telecommuting, involving university trainees and smaller firms in the northernmost part of Sweden. Building on previous research in telecommuting and social integration of new co-worker into organisations, the paper addresses two main issues: (1) May utilisation of modern ICT for telecommuting be a way to overcome problems in recruiting qualified staff, and (2) what are in these cases the specific challenges prevailing for absorbing new members into an existing organisation (here a smaller firm). The results from this exploratory case study indicate support for the idea of using ICT and telecommuting as a measure to overcome recruitment problems, but also specifically pinpoint the need for both technically and socially oriented preparation and introduction.

INTRODUCTION
To work at a distance detached from your normal workplace is a growing phenomenon facilitated by the continuous development of new information and communication technology (ICT). A familiar example of this is the establishment of different kinds of call-centres, often located into rural and peripheral regions. The new opportunities provided by modern ICT to a significant extent has also facilitated for highly qualified and often senior employees to work at least part-time from other locations than their host company or workplace premises. For senior consultants, university researchers and other categories of staff in knowledge-based branches of industries, the opportunity to work from home using ICT has thus become one measure for adding to the quality of life.

Modern ICT, however, also enables new categories of employees to work anywhere, regardless of distances. It is often a problem to recruit qualified labour to smaller companies located outside central regions and university towns. By using ICT, the workplace may today be located in, for example, university towns, regardless of the fact that the employer is located in another city or region. By offering work premises in, for example, a Science Park located close to a university, a peripheral firm may thus attract a young and qualified labour force that otherwise would not have considered working for the specific company.

This was the starting point for a pilot project where smaller firms located outside the central region of Norrbotten in northernmost Sweden were offered the opportunity to hire university graduates as trainees in their companies. Three SME Trainees and three host companies were recruited to the project, where the trainees were located in the University Science Park and expected to work for their host company by using modern distance-spanning ICT. Two researchers from the University of Technology were assigned to act as ongoing evaluators of the project. Firm managers and trainees were interviewed before, during and after the pilot
programme, spanning a five month period during the winter and spring of 2000/2001. In this paper we report the results from this pilot project. First, however, we will briefly relate issues addressed by this project to some previous research in the field, and specifically research related to telecommuting and trainees.

THEORETICAL BACKGROUND AND PURPOSE

By focusing on trainees who use distance-spanning technology in working for smaller firms, two different phenomena can be highlighted:

1. The use of distance-bridging ICT to perform work tasks and to communicate and interact with others
2. The socialisation process to absorb a potentially new employee (the trainee) into an existing organisation (the smaller firm)

The use of ICT for distance working has, in previous studies, often been referred to as ‘teleworking’, ‘remote working’ or ‘telecommuting’. Teleworking may be defined as “the use of telecommunication-related technology to conduct work” (Moktharian 1991), while remote working may be defined as “work done by an individual while at a different location than the person(s) directly supervising and/or paying for it” (ibid.). Both of these concepts are thus quite broad, and involve a range of different kinds of distance working, not necessarily (as with remote working) related to ICT. Telecommuting is, in this respect, a more precise concept, normally requiring travel substitution for commuting to work and the utilisation of ICT. Moktharian (1991) thus defines telecommuting as “working at home or at an alternative location and communicating with the usual place of work using electronic or other means, instead of physically travelling to a more distant work site”. Adopting this definition, we are interested in this study to investigate how trainees, recently graduated from a university and normally having their first experience of working life, may utilise telecommuting.

Previous research on telecommuting may, according to Rognes and Rogberg (1996), be distinguished by the specific study’s perspective, distinguishing between studies with an individual, organisational or a society perspective. Another categorisation may be made after the specific study’s main area of interest, where Rognes and Rogberg identify studies with a technical/IT focus, a social/organisational focus, a social/individual focus and a medical/ergonomic focus respectively. Following this categorisation, this study mainly employs an individual perspective to address social and organisational issues related to the specific work situation of trainees working at a distance from smaller host companies.

Building on this positioning, previous research relevant to this study is narrowed down considerably. Of specific interest here are studies addressing (1) different kinds of ICT and their strengths and weaknesses in communication, (2) work tasks relevant to telecommuting, and (3) the problem of how to integrate telecommuters into the host organisation. On the first issue, media richness theory suggests that there is a hierarchy of communication quality where face-to-face communication provides the best conditions for a mutually rewarding exchange and interaction - video plus audio communication (as in video conferences for example) comes in as ‘second best’, while communication built on exchanging only audio/sound (as with telephones) or only text/pictures (as with e-mail, fax or other media for sharing written information) is a ‘third best alternative’ (cfr. Daft and Lengel 1986, or Rognes 1999). The choice of media for communication is dependent on the content of the specific communicated message (Daft and Lengel 1986), but also on factors such as spatial distance.
(ibid.), the attitude of management and co-workers (Fulk 1993), or the symbolic meaning of a particular medium (Markus 1994). Different kinds of media for communication have been found to have their specific strengths and weaknesses that are related to the context and the purpose of communication. Communication is however much more than just transferring bundles of information. As Rognes (1999; p. 80) notices;

“Proponents of communication technology argue that ICT will substitute for face-to-face communication in many cases. The problem lies in the need for rich communication in problem-solving situations, involving cues, feedback and interaction (Nohria and Eccles, 1992). This leads to the conclusion that the use of electronically mediated communication is most relevant in situations where a traditional organisational form, such as a market or a hierarchical situation is quite effective. In a network form of organisation, face-to-face communication will play a vital role. A minimum of face-to-face communication seems to be required in any (known) form of social organisation”.

This leads us to assess the suitability of different work tasks for telecommuting. One common distinction found in the literature is to separate work tasks by their degree of complexity (cfr. Paavonen 1992). Telecommuting is, however, practised for both routine and low skill operations (such as call centres) and more complex and qualified tasks (such as specialist and professional problem solving). Telecommuting is hence suitable for both work tasks involving advanced problem solving as well as for simpler and routine-based work.¹ Instead of work task complexity per se being a criterion for telecommuting suitability, other factors have been found to be important. In determining the characteristics of work tasks suitable for telecommuting, references should be made to the required level of interaction with colleagues, equipment requirements, degree of self-control over work, degree of measurable work milestones and results, and the need for concentration to perform work tasks (Huws, Korte and Robinson 1990; Rognes 1999). Here specifically the level of interdependency with colleagues seems to be critical, since a high degree of interdependency “makes flexibility in time and space more difficult” (Rognes 1999, p. 33). Also the attitudes held by the organisation’s management are critical. A strong company culture and a management favouring flexibility and manifesting trust in telecommuting solutions have been found to be of vital importance (Van der Vielen et al, 1993). In companies lacking this kind of culture and management commitment, absence due to telecommuting or other reasons is often regarded as culturally unacceptable and therefore has negative effects on the employee’s personal career (Perin 1991).

Working at a distance means that people are detached from the host organisation and the ‘inner life’ that organisations develop over time. When Schein in 1985 published his often-cited Organizational Culture and Leadership, he drew our attention to the concept of organisational culture and to the importance of an organisation’s basic assumptions about its environment, its values and artefacts/manifestations. Schein defined organisational culture in the following way:

¹ Since telecommuting means that physical presence is substituted by people being ‘present at a distance’, management and co-ordination of the organisation also will have to change. As most of the more normative literature in the field claims (cfr. Handy 1995), management and co-ordination of organisations employing telecommuters will have to change towards more management by objectives and less of managing (physical) control.
“A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems” (Schein 1992, p. 12).

Newcomers entering an existing organisation thus face the challenge of not only ‘learning the trade’ but also of coping with, adapting to and/or assimilating an existing culture which signals ‘this is what we are’ and ‘this is how things are done here’. This is also the challenge facing newcomers such as university trainees leaving ‘their old family’ (the university) and entering a new one (the host organisation - in this case a smaller firm). The situation when newcomers enter an organisation and try to ‘make sense of it’ may be understood as an organisational socialisation process. Louis (1980, p. 232) describes this in the following way:

“When newcomers are ‘learning the ropes’ they are, in part, learning the culture. In organisations, as in societies at large, culture conveys important assumptions and norms governing membership, values, activities, and aims... The norms and assumptions are collectively shared and interactively emergent; they are enacted rather than spoken.”

Trainees in smaller companies have been investigated previously, e.g. by Westhead and Storey (1996), Lassinantti and Ylinenpää (1998), Ylinenpää and Lassinantti (1999), and Westhead, Storey and Martin (2001). None of these studies however refer to the specific situation where trainees are working at a distance for smaller firms utilising modern ICT, nor to the specific challenges for group/organisational socialisation inherent in these kinds of situations. Together with an interest in evaluating experiences from applying ICT for telecommuting in general, this paper also specifically devotes an interest in the socialisation process of SME trainees utilising ICT to bridge distances to their host companies.

CASE DESCRIPTION AND METHOD

Luleå University of Technology was the first university in Sweden to introduce a university graduate trainee programme in 1979. The purpose of the programme was to promote competence development and competence building in SMEs located in the region by stimulating smaller firms to test and employ university-trained staff, and thereby strengthen these firms’ ability for further development. Since 1979 the programme has involved more than 200 trainees and a somewhat lower number of SMEs. The SME Trainee Programme provides both trainees and SMEs with an opportunity to gain experience - from a firm’s perspective experience from utilising university-trained specialists and from a trainee’s perspective experience from working in a smaller firm. The programme originally spanned six months of practical work in the firm, under which the university or its development foundation CENTEK formally employed the trainee. Every trainee assignment was (and still is) based on one or several different development projects in which the trainee was expected to contribute. After the trainee period, the host firms were expected to have discovered whether the trainees’ competence motivated further employment by the firm or not. Similarly, the trainees were expected to have a better understanding of what working in a smaller firm means. During recent years the programme has developed by adding a more theoretical course/seminar programme preparing the trainees for ‘the realities of smaller businesses’; thus the total programme today takes 7.5 months.
In a previous study, Lassinantti and Ylinenpää (1998) reported that out of more than 200 trainees placed in smaller firms in the region, the vast majority continued as ‘real employees’ or, in some cases, got an offer to do so after the completed trainee period. Most trainees have accordingly, through the trainee programme, obtained the opportunity to acquire a job in a smaller firm in the region. Similarly, out of all SMEs receiving trainees and the opportunity to experience and discover the benefits of employing university trained staff, a majority have decided to continue to utilise this specific (and to many firms new) competence. In this specific respect, the programme is a success story and is generally regarded by the University and SMEs in the region as one of the most effective ways to transfer technology and knowledge between academia smaller firms.

Starting around 1999, the programme began to experience increasing difficulties in attracting trainees to smaller firms located outside the regional centre and its university town of Luleå. The number of companies interested in recruiting trainees by far outnumbered trainees willing to move to more peripheral parts of the region. This situation gave birth to the idea of locating trainees in the Aurorum Science Park close to the University of Luleå, and to use ICT to facilitate telecommuting between the Science Park and smaller, host companies located in more rural parts of the region. In November 2000, three host companies and three trainees were recruited to a pilot project with this specific purpose. Some basic data on the host companies and their trainees are given below:

<table>
<thead>
<tr>
<th>Host company</th>
<th>Trainee</th>
<th>Main task of trainee</th>
</tr>
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<tbody>
<tr>
<td>Stenudd AB (11 employees)</td>
<td>Graduate from Business Engineering company developing own mechanical products and working as a subcontractor</td>
<td>To build a customer club and to initiate marketing campaigns addressing new customer segments</td>
</tr>
<tr>
<td>KAMI AB (40 employees)</td>
<td>Graduate from Civil Engineering specialising in industrial design and production</td>
<td>To update a Quality Assurance System for the company’s production processes and to integrate this with an environmental protection programme</td>
</tr>
<tr>
<td>CoreXor Invest AB (10 empl)</td>
<td>Graduate from Business Administration specialising in marketing and E-commerce</td>
<td>To develop the company’s marketing, its web-pages and general E-business strategy</td>
</tr>
</tbody>
</table>

Table 1: Basic data on host companies and trainees participating in the pilot project

The selected host companies were all located in Kalix, a smaller rural city located 80 km north-east of the regional centre of Luleå. For different reasons, the company CoreXor, after approximately half the trainee period, was substituted by another company – ToolOne in Gällivare (250 km north of Luleå in Swedish Lapland), working with web-based applications and employing four persons.

Each trainee was equipped with a working space (office) and a computer, which was linked to computers in the host company with a system that allowed exchange of text and pictures through the telecom system. The original idea to utilise an advanced system for audio and video communication (the Marratech Pro System developed at Luleå University of
Technology) was not possible to implement for technical reasons. Instead the communication system available for this pilot project turned out to consist of more conventional systems for distance-spanning communication, such as phone contacts, electronic mail, fax communication and audio + video communication through Microsoft’s Netmeeting system.

During the trainee period (November 2000 – May 2001), we as researchers regularly met with the trainees at least once a month to collect data and experiences on how they perceived their situation and their relation to their host companies, facilitating an in-depth understanding of how trainees perceived this experiment during different phases of the pilot project. Similar, but less frequent interviews were also conducted with managers in each host company. Trainees moreover agreed to send in weekly diaries, reporting in brief on their main work tasks, their experiences from working with ICT-tools, and other experiences and perceptions related to their status as employees who were physically not present at their host companies. In a concluding video-conferencing seminar, in which both SME managers, trainees and the project management team from CENTEK participated, the experiences from the pilot project were summarised and discussed, thus validating and clarifying some of the observations that we as researchers and participating observers had noticed.

RESULTS AND IMPLICATIONS

Results referring to work tasks and ICT

In general, the principal idea of locating telecommuting trainees working for smaller firms was supported by the experiences from this pilot project. Although the project was not able to try out top-of-the-line applications in communication technology, in general both trainees and their host firms perceived the use of ICT as working tools for distance working as a feasible way to eliminate an important bottleneck for smaller firms in peripheral regions – the recruitment of labour with formal qualifications. It was also interesting to notice that when starting the pilot project, none of the trainees were considering accepting future employment at the firms’ specific locations. After the trainee period, two out of three trainees reported that they would be interested in working for the company on site. Even if this observation is founded on a very limited empirical base, this result should be encouraging for the future development of these kinds of arrangements.

The experiences referring to the utilisation of ICT per se however also revealed several lessons to be learnt for organisers of similar projects in the future. One obvious experience was the need for the introduction of trainees to their host firms and hands-on- training for both trainees and their host firms when starting the project. Due to circumstances and time-pressures, the introduction on utilising communication tools was in this case undertaken on an improvised ad hoc way, thus, to a large extent, leaving the trainees and companies to learn to communicate through experimentation and ‘trial and error’. Another experience was the need to sort out who is responsible for the technical support of the communication system. The ambiguous situation in this specific respect that characterised the pilot project often implied that the trainees themselves had to track down hardware and software suppliers, the support organisation of the Science Park, the project organiser CENTEK or someone in the host company to try to solve specific technical problems.

Perhaps as a result of insufficient introduction into the use of more advanced communication tools such as the Netmeeting system, experiences from the pilot project also revealed that
traditional and well-known tools such as phone, fax and e-mail were by far most frequent means of contact between trainees and companies. The possibility of using audio + video communication (‘videoconferencing’) was hence utilised very sparsely, and in one case not at all. Whether this was due to the actors involved perceiving a limited added-value from these more advanced forms of communication vehicles, or whether it was a result of an inadequate introduction and familiarity with the technique per se, was and still is a bit unclear. Referring to the often hectic situation present for most small business managers, we suspect, however, that the time and effort needed to try out and utilise a new and unfamiliar communication tool was an effective barrier to using the more advanced forms of communication media available during the project – especially when no practical introduction on its utilisation was offered at the beginning of the programme. This again underlines the importance of providing an appropriate introduction and training, and the need to recognise that such an introduction must also involve ‘the other end of the line’, i.e. the trainees’ host companies.

A final and self-evident experience that relates to technology itself is the need to test the communication system before starting the project. Due to the time limitations involved, this was done more or less on a ‘trial and error basis’ during the first weeks of the project itself, revealing problems related to fire walls and incompatibilities between different communication systems. Since failure to communicate due to technical reasons has an obvious impact on individuals’ confidence and interest in utilising a specific technology (and probably in this specific case had a negative effect on the actors’ interest to use more advanced communication tools further on in the programme), this is an aspect that should not be neglected.

Results referring to socialisation

As already noted, working at a distance means that people are detached from their host organisation and the ‘inner life’ that their organisations develops over time. Moreover for telecommuting SME trainees, the experience of working at a distance involves substituting one ‘family’ (the university) for another (a smaller firm). To obtain a better understanding of how the social integration into a new organisation or a new membership developed over time in a situation where the person to be integrated (the trainee) was mainly located far away from his/her new membership organisation (the host company), during the ongoing programme we continuously asked the trainees to value their degree of:

a) perceived enthusiasm towards work tasks
b) perceived degree of affiliation/belongingness to the host organisation.

Both these evaluations were scored on a five-point scale ranging from one (low) to five (high). At the end of the trainee period, a concluding ‘rich picture’ including, among other factors, the trainees’ perceived degree of work enthusiasm and affiliation was set up together with the trainees. The results, depicting three different paths of development that share both similarities and reveal some interesting differences, are reported in Figures 1-3.
Overall, figures 1 to 3 reveal a significant degree of correlation between enthusiasm towards work and trainees’ sense of affiliation with their host company. There are, however, several interesting differences between the trainees. Trainee 1, for example, started out with an exceptionally high degree of enthusiasm towards work (work tasks related to marketing), and during the first half of the trainee period developed an increasing degree of affiliation and sense of belongingness to the host company. During the last part of the trainee’s period in the company, both the degree of enthusiasm and the degree of affiliation dramatically decreased, ending up at the lowest level when the programme ended. From the diary and our regular interviews with the trainee, it was obvious that the trainee and the small firm manager had very close contacts during the first half of the period, involving the trainee visiting the host company once or twice a week and had practically daily contacts utilising ICT. During this period the trainee also perceived that there were prospects for a future and challenging job in the firm. During the second half of the period, however, the contacts between the CEO of the small firm and the trainee gradually turned to be more sporadic and this positive feeling gradually faded away.
Trainee No. 2 revealed, with the exception for an initial phase of enthusiasm towards work tasks, an almost opposite development path. Here both the degrees of enthusiasm and affiliation increased during the second half of the trainee period. This correlates with the intensity of the trainee’s project work (development of a Quality Assurance System for the company), which involved gradually developing additional contacts with more and more people in the firm. From being dependent on having to initiate her own communication and interaction with the firm’s manager, a more frequent physical presence in the company created a broader contact network inside the company (i.e. less dependency on the firm’s manager) and an increasing degree of both work enthusiasm and sense of affiliation with the host company.

Trainee No. 3 revealed a considerably more fuzzy and turbulent path of development. Due to circumstances inside the first host company (CoreXor), the first two thirds of the trainee period, after the first ‘pioneering’ feeling of experiencing something new, may best be described as a very frustrating and alienating experience. Apart from a few occasions when the trainee and the management of the company invested time and energy in the trainee project (construction of web pages and other related tasks), the trainee, due to management being diverted to deal with other critical duties, was left on her own. A dramatic change occurred when a new host company (ToolOne) was selected, whereupon the degree of both work enthusiasm and affiliation with the host company increased. This last phase also involved a considerable amount of time spent on site at the host firm’s location.

A lesson to be learned, from the experience of these three cases, is not to underestimate the importance of a proper introduction of new employees and co-workers into a new organisation. As humans, we are social beings, and normally dependent on getting an opportunity to relate to other people belonging to the same organisation in order to perform at our best. ICT, in this specific respect, provides us with poor soil to develop such social relations, especially if all or most contacts, as in our cases, are channelled through one specific interface (e.g., the firm’s manager). Also in order to ‘learn the ropes’ and the specific culture of a new organisation, the social integration of newcomers benefits from them being present locally and interacting with other members of the organisation. Modern ICT, at least in the form we know it today, does not substitute for our need to interact face-to-face with
others. In fact, an initial phase of face-to-face interaction may be regarded as a good investment in facilitating later ICT-based interaction. In this respect we hence agree with findings of Moktharian (1997) and Rognes (1999), that pure telecommuting in this respect is not a general and total solution. We therefore suggest that in projects such as the one studied here, there needs to be a substantial introductory phase spanning two to four weeks as a prelude to working at a distance. This introduction should aim at enabling the trainee to become familiar with the company, its members and the context in which his/her contribution should fit in, but also for other members of the organisation to become acquainted with the new co-worker. When a newcomer, besides offering professional qualifications, ‘becomes a person’, future contacts between a distance-working trainee and other members of the organisation will become more natural and will not be channelled only through a bottle-neck, often represented by a smaller firm’s CEO.

After an introductory period in-house in the host company, working at a distance should become a feasible alternative for qualified staff newly graduated from a university. Our case study data however also underline the importance of further face-to-face interaction with the host company. In this specific project, the original idea was to have the trainee working on site at the host company for, on average, one to two days a week and telecommuting for the rest of the week. As e.g. Nohria and Eccles (1992) point out, regular face-to-face communication is vital to create a sense of belonging, a common culture and a common understanding. To rely only on telecommuting thus involves the risk of decreasing such rich communication and of having a negative impact on work performance which is dependent on fully functioning teamwork (cfr. Rognes 1999). Experiences from the evaluation of this pilot project strongly support such an understanding.

Finally we offer a reflection related to our initial observation that senior consultants, university researchers and other categories of qualified staff in knowledge-based branches of industries today often seem to utilise the opportunity to work from home using the benefits of modern ICT. A conclusion which has emerged from our results is that there are significant differences when comparing the situation for university trainees who recently graduated from a university with that of part-time telecommuting by senior and well-experienced professionals. One important difference relates specifically to the different degrees by which these two categories are socially integrated into their host organisations. Another vital difference refers to the different degrees to which ‘seniors’ and ‘juniors’ may be self-managed. Although this study hopefully has contributed some support and experiences which will be important to take into account when conducting similar ‘junior programmes’ in the future, it also raises the question whether it could be even more rewarding to concentrate on more senior groups of staff for part-time telecommuting.

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