"Nothing Changes Overnight": The Diffusion and Acceptance of E-Business Experiences with New Ways of Working and Communication Processes

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Abstract

This paper deals with new work concepts, especially the so-called alternating telework. A close relationship between the introduction of E-Business and telework is assumed. This type of working can be interpreted as a technology push factor. A research project at the University of Trier (Trier Telework Study) investigated living and working conditions of 277 alternating teleworkers. The findings focus on the following research topics: reasons for participating in telework, workingtime arrangements and flexibility, organization of family obligations, ways of balancing work and leisure. Moreover, integration of telework into a traditional office environment (e.g. flow of information, tasks performed) is analyzed too. This includes reflections on the current etransformation processes. The analysis consider first results of an ongoing research project as well as evidences from further (empirical) studies in the field of E-Business. Consequences, requirements and conditions for implementing electronically supported work arrangements are discussed. It seems important to combine the new situation with the traditional settings and processes in an effective and social way. Furthermore the findings suggest a management of integration.

1. E-Business and telework: Definitions, types of telework and penetration

The increasing availability of modern information and communication technologies enables organizations to change their styles of operation, procedures of communication and the ways of cooperation. In this context E-Business concepts are becoming more and more incident. The term is still vague and covers several dimensions (e.g. dot-com companies, e-commerce). Within the scope of our research studies "E-Business" is defined as the sum of all processes in a firm that are supported by information technologies leading to a close integration of business, communication and transaction processes on a company and market level (see figure 1) [15] [11]. According to this frame of reference the organization and coordination of internal business processes is an important module. This includes different forms of electronically based work concepts (e.g. computer supported cooperative work, virtual teams),

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particularly several kinds of telework. In this context a close relationship between the introduction of E-Business and telework can be seen. For example, introducing this type of working is a suitable test for virtual structures.





Moreover telework can be interpreted as a technology push factor. Attained experiences offer valuable clues to current changes in companies (e.g. leadership, business reorganization). Nevertheless, within the recent years a growing number of people chose their home as a workplace while using modern communication networks to transfer work results. These work arrangements imply partly a shift of gainful employment into the domestic sphere. This ongoing process in working life as well implies that "The Joy of Flex" [3] is no longer a theoretical idea, it's rather an expectation that is proved more often in practice. According to results of a pan-European survey conducted between March and May 2002 13% of the EU workforce are practicing currently some form of telework [5]. In 1999 this share accounted for 6%. In contrast, about 25% of the U.S. labor force practice some form of telework in 2002. This suggests a considerably lack between the U.S. and the EU. But there are marked differences among the European countries as figure 2 illustrates. A north-south decline can be noticed. Scandinavian countries show leading positions in terms of highest telework diffusion rates. The Netherlands are still an exception. Here, political and public support programs as well as a great openness towards technological and organizational innovations among the population may have positive influence on the spread of

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telework. In addition, a sufficient technological infrastructure can be assumed in the leading areas. For example, in 1999 the Swedish government initiated regional growth agreements supporting the network ability within 15 areas (e.g. local/urban area networks) [9].

Telework solutions generally need a technological infrastructure (e.g. internet). This includes as well the use of modern communication technologies like e-mail, corporate databases and/or videoconferencing [7]. The introduction of telework takes (remote) access for granted. In regard to the acceptance of E-Business the use of modern technologies plays an important role too.



(in % of labor force 2002)

However, about 17% of the workforce in Germany (=6 million employees) are currently referred to as teleworkers. Figure 3 illustrates the 1999 and 2002 German diffusion rates according to different forms of organization. The results show a fast growing segment of supplementary home-based telework. Majority of occasionally teleworkers is male. However, this mode of working implies a mobilization of ideas off the job as well as employees' need for time flexibility. Obviously, the availability of modern technologies did not replace the traditional office workplace, but more and more employees want to benefit from spending a fraction of the working time at home. In other words: the organization of work in modern societies is still based on a clear distinction between residential and working area.

Alternating telework suggests blurring lines between living and working sphere, additionally organizational and personal challenges (e.g. leadership, culture, timemanagement) might be limiting factors for this form of work. This can be a reason for less acceptance of models with relative high amount of working days at home. Currently only about two percent (1,6%) of the German workforce spends at least one full working day per week at home. Since 1999 the number of these teleworkers has not grown much at all (+0,1%). In contrast about 58% of German labor force is interested in alternating telework. With regard to the introduction or extension of telework there are obviously various barriers. Some of them will be discussed in this paper. Nevertheless, home-based working is normally perceived as an unusual change as Maitland (with reference to a report in UK magazine Flexible Working) states: "[...] they began to feel their work identity was being challenged. Some went into the office when not required. Some found it difficult to cope with the blurring of boundaries between work and home. One felt it necessary to recreate his office at home, complete with flip-chart stand, photographs of his colleagues, and a name badge on his study door" [13].



Figure 3 Types of telework and penetration in % of German labor force (1999 and 2002)

2. Experiences with E-Business and alternating telework

Our outline of research results considers different variables determining the acceptance of E-Business. Figure 4 presents several dimensions that are discussed below.



Figure 4 Frame of research

Hence our research concentrates on employees who stay about two full working days a week at home. Furthermore these teleworkers are in salaried employment (only one employer) and use an online connection to company wide computer networks. Our definition excludes selfemployed workers, occasional business travelers as well as mobile field staff (mobile telework). Details on participants of the Trier Telework Study are presented in table 1.

Table 1 Demographic composition (Trier TeleworkStudy)

- sample size: n=277
- sex: women 68 %, men 32 %
- family status: 82 % married
- children: 76 % have at least 1 child at home
- age: 38 years (average)
- level of education: 37 % apprenticeship, 30 % university degree, 21% college of higher education, 9 % technician, 3 % other
- 48% official in charge, 32% expert, 14% staff function, 6% business management
- days per week at home: 3,1 (average)
- hours of work: 48 % full-time workers (approximately 20 hours per week at home), 52 % part-time workers (approximately 15 hours per week at home)
- telework experience: approximately 1 year
- job tenure: approximately 12 years

2.1 Setting up a project: Employers' objectives in E-Business and employees' motives for telework

Within the framework of an ongoing research study (socalled SPIRIT-project) we are currently investigating the E-Business introduction processes in 6 German and 3 U.S. American companies. The studies will likely be finished in the year 2004 [4]. First results indicate that market orientated objectives seem to be the most important reasons for implementing projects (e.g. speedup business processes, customers demand, lower costs, competitiveness). Companies make use of internal project teams or special task forces. In this context "high-level"champions (e.g. chief executive officers, management board) play an important role. They are responsible for developing a corporate E-Business strategy and the coordination of various projects. This might be a success factor while assigning priorities needs authority. Furthermore employees, business management, ICTand/or special business units are involved in the implementation process. Interestingly enough customers and suppliers seem to play more and more the role of driving forces. In our study we can observe an integration of "outsiders" in several activities within E-Business projects (e.g. participation in project teams). Networking often is still at the beginning but external forces can exert pressure on internal changes. Speeding-up rather seems to be a mega trend in companies as well as in modern

societies. Changes in market are an important push factor for internal reorganization processes. Electronically based co-operations between companies, customers and suppliers become more and more reality. In this regard it is quite unsurprising that procurement, customer relationship management and supply chain management applications are of top priority in many companies. The adoption of online procurement still varies significantly with establishments' size (e.g. in number of employees) or the turnover [8]. According to results of a study in four European countries and the U.S. (n=2321 companies) conducted in 2001 about the half of German establishments practiced online ordering of goods or similiar business transactions (e.g. maintenance, repair and organization goods). Especially small companies (e.g. < 9 employees) have less experiences than bigger ones (e.g. 200-499 employees) (for further details see table 2).

Employees										
	< 9		10-49		50-199		200-499		> 500	
Year State	' 99	' 01								
D	14,0	34,6	16,8	48,5	34,4	50,8	37,1	64,0	38,0	55,2
Fin	26,6	24,9	38,6	52,1	64,4	40,1	55,2	48,4	50,8	58,0
UK	23,0	26,7	27,5	30,7	38,4	41,6	42,0	47,8	42,,6	28,2
I	6,4	22,5	14,6	19,9	21,9	27,3	22,2	33,7	47,0	34,0
U.S.	29,3	34,9	22,8	44,0	19,4	47,6	45,6	61,1	41,9	64,7

Table 2 Online procurement according to companies'size in 1999 and 2001 (in % of respondents)

Results of this study suggest as well a varying intensity of online procurement. In the U.S. 58% of those companies who practice e-procurement at least ordered about 5% of the goods online. In Germany 43% reached this share. More generally, lacks of diffusion and use of modern technologies (e.g. internet, intranet, extranet) occur in the professional context. These phenomena are already known in terms of various "digital divides" (e.g. less well-educated, older people) [12]. In the context of E-Business unused or refused media opportunities might closely be related to these groups. There seem to be further, specific obstacles [1]: doubts of profitability, insufficient customization, lacking applicability of products, deficient usability and/or less acceptance by employees. Often supposed benefits are still not attuned (see chapter 3 for further obstacles to corporate E-Business).

However, market as well as customer demands are in the focus of E-Business efforts. This can be proved by the results of a recently conducted study: in 2001 about 81% of German CIO's (=Chief Information Officer, n=310) pursue the speeding-up of business processes as the most important target of E-Business projects [2]. Besides 63% reported to increase their flexibility (e.g. adaption to market changes). Figure 5 illustrates most important E-Business targets of German companies in 2001. Financial budgets will likely not be reduced in 2002. Quite the contrary might be done: majority of the interviewed companies (56%) stated to expand their investments. This is remarkable while about 30%-50% are current not satisfied with the results of ongoing projects. However, 68% attempt to increase their attraction for employees while restructuring their business processes.



Figure 5 Most important E-Business targets 2001 (in % of respondents, n=310 German Chief Information Officers)

Humanizing the workplace is a factor of increasing importance. Telework can be one step in this direction. Thus company programs are not only introduced on the basis of strategically expectations alone. The Trier Telework Study suggests a wide range of motives. Setting up a telework pilot is often initiated by employees themselves. Demand for telework can trigger a "bottomup"-process. Figure 6 illustrates motives for engaging in alternating telework for men and women. Decisions can differ significantly between men and women (e.g. parental leave, offer from employer). Considerations may individual preferences, be affected by private circumstances (e.g. children) and/or work-related aspects (e.g. career, coordination). For example, majority of female teleworkers (76%) use telework for balancing private and working life and are between 30 and 39 years old. In these cases parental leave is the main reason for working at home.

Correspondingly, employment switches to part-time. Here, the participation in alternating telework may be characterized as a "career break with time limit" (e.g. taking care of (preschool) children).



Figure 6 Reasons for telework in % of respondents (Trier Telework Study)

Legal regulations in Germany (until January 2001) did not allow to work more than 19 hours per week during parental leave. However, telework has the quality of a bridge to the labor market. After a certain period of time female employees might give up working at home and return to office-based work. This probably can be a factor for relative low diffusion rates of alternating telework in Germany and the EU in the last three years.

Nevertheless, majority of male workers (66%) chooses alternating telework to avoid commuting. This factor has been an origin in discussion of telework. Nilles together with co-editors Carlson, Gray and Hanneman [14] already examined in 1976 human as well as economic costs and benefits of reduced traveling while using communication links with the employer. Consequently, the dominating term in the U.S. has been "telecommuting". To avoid commuting problems is still an important reason.

However, our male teleworkers are usually full-time employees and only switch the work location for about two days per week. Executive staff (e.g. employees in managerial position) work usually about 15 hours at home. In contrast, officicals in charge stay the longest time outside the office (average: 3 days; 19 hours) (see figure 7). In some of these cases jobs and/or operations are made suitable for home-based working (e.g. less complex work routine). Particularly, younger men and/or male executives could anticipate disadvantages in getting ahead. Working largely outside the office might be perceived as an "out of sight, out of promotion"-situation. Just 30% of male teleworkers is between 30 and 39 years old. Here, professional career is at its beginning. That's why average age of male workers might be higher than of female teleworkers (men: 43 years vs. women: 36 years). Furthermore demands of work (e.g. tasks performed, consultations) certainly affect time arrangements.



Figure 7 Average hours of work time at home (Trier Telework Study)

For example, it is more difficult to coordinate work with colleagues if tasks entail a high level of communication and a high extent of spontaneous conversation (e.g. involvement in networks). However, private-familiar circumstances (e.g. children, age, attitude to telework) and supposed benefits for work life balance are important factors concerning time-arrangements.

2.2 Temporal flexibility, coordination and communication

The benefit of temporal flexibility cannot be granted. Self-organization and self-discipline favor a good work arrangement. Regulations and social factors (e.g. company demands, acceptance) may constrain temporal flexibility. For example, about 25% of the teleworkers have to work core hours at home, nearly 32% are obliged to regard contractual obligations and nearly 41% have to follow defined deadlines ("milestones"). Moreover teleworkers coordinate their activities with office staff and must be attainable at certain times. The necessity and the amount of coordination are influenced by several factors (e.g. position, job characteristics, full-/part-time, organizational skills). However, domestic life has its own rules and rhythms. Non-work and work has to be organized, teleworkers have to integrate different "time schedules" (e.g. kindergarten hours, business hours of spouse, family obligations, child care). The organization of working time varies with the availability of human resources. Especially in cases where children are present this often means working at unusual times (e.g. in the evening, at the weekend). For example, some female respondents work when their partners can look after the children, otherwise the assistance of a (paid) day mother is necessary. Therefore temporal flexibility is a matter of frames and situations. Additionally the telework experience is an important factor. There are significant differences in the working time arrangements between beginners and experienced teleworkers (for further details see figure 8).



Figure 8 Organization of working time at home (Trier Telework Study)

About the half (49%) of those who already work more than two years from home organize their working time totally or rather different. In contrast the majority (42%) of the beginners (<1 year telework experience) practice traditional labor rhythms. In other words: Teleworkers can profit form learning processes in the way how work is organized. Nonetheless, the majority of our participants report a growing potential of flexibility (e.g. shopping, authority matters). Especially, those who can organize home-based working time totally or rather different (compared to hours of work in the office) seem to gain from the new circumstances (see figure 9).



Figure 9 Flexibility of obligations and leisure time (in % of respondents) (Trier Telework Study)

In this context perception of traditional time and leisure arrangements have an impact on how work is organized. Many leisure activities are conducted in groups (e.g. sport club) and still take place in the evening or on the weekend. To work unsocial hours implies an exclusion from social events. In addition, societal landmarks and industrial organisation of labor are constraints of equal importance.

Modern technologies play a key role in the context of new forms of working. Therefore one might state: "To speak of organization is to speak of communication". There are marked changes in communication patterns while working at home (see figure 10). Electronically supported communication (e.g. telephone) increases significantly, face-to-face meetings, especially informal conversation with colleagues, decrease. E-Mail use is taken for granted: about 77% of teleworkers report a more frequent use in case of staying at home. In contrast typical opportunities (e.g. lunch, coffee break) occur less because of reduced presence at office. For example, majority of teleworkers (60%) perceive a decrease of informal conversation. Consequently, working outside the central office requires one's own initiative to be informed.



Figure 10 Media use and communication (in % of respondents) (Trier Telework Study)

It is important to keep efficient communication links. Furthermore a lack of media competence or "computer skills" leads to unexpected frustrations.

3. Organizational change: Perspectives for E-Business and alternating telework

Alternating telework is still an unusual mode of work. This applies to management, family as well as employees. Furthermore, know-how and new competencies (e.g. computer literacy, time-management, self-discipline) are critical factors (for further details see figure 11). Generally spoken: the acquisition of skills might be an important "bottleneck" within the scope of current organizational changes. New requirements for skills are arising continuously in the course of technological progress. Current problems (e.g. technology refuses ("refuseniks"), skills gap, diffusion lack) may intensify in furture. Therefore staff and the management developments as well as further trainings are particularly suitable. To avoid mismatches between offered and demanded qualifications private-public partnerships should be improved (e.g. schools and industry).

Difficulties in managing teleworkers, insufficient knowledge of management and problems in organizing communication are still dominant barriers to the introduction of telework. Management may as well has to learn new skills. Leadership implies electronically based relationship. This includes adaptions of methods for controling or ensuring a good flow of information. Reduced visibility in case of remote-work environments requires trust. In this context personal relationships as well as technological solutions are applied. For example, in 1999 data security problems ranked top as a constraining factor for telework. This has been a predominant barrier to telework for about 53% of German decision makers [6]. To ensure IT-security, data security and to raise confidence among users is an important condition in the course of E-Business (e.g. commercial transactions, payments sytems) too. Nonetheless, extension of telework is driven by acceptance of the social and work environment (e.g. managerial attitude, employee attitude, family).



Figure 11 Competencies and skills

The implementation of telework arrangements pushes the integration of technologies of interaction (see figure 12).



Figure 12 Telework experience and E-Business

For example, 26% of companies with telework experience have integrated Business-to-Business applications. The share for establishments without telework experience is accounted for 16%. This implies experiences with non-territorial offices (e.g. desksharing), flexi-time schedules or changes on corporate culture too. However, the speed of organizational transformation is accelerating with the influence of different groups (e.g. management, works council, employees, customers, suppliers) (see figure 13). The power of driving or restraining forces pushes or slow down the changes. Time can take up the role of a success factor.



Figure 13 Organizational change

For example, 47% of German CIO mentioned long periods of amortization (e.g. quantitative improvement) as a main barrier to implementation of E-Business [2]. Previous experiences indicate that the majority of companies (about 80%) is still at the beginning in the process of transformation [2]. Germany will probably not pass through an "electronic revolution". What is more likely to happen is an "evolutionary change" of traditional working practices: "Nothing changes overnight".

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