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Understanding Work in the Age of Information

Finland in Focus

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UNIVERSITY OF TAMPERE

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Preface

This book draws on material written between 2001 and 2005, although the idea of preparing an academic dissertation goes back a couple of years earlier, when I began my career as a sociologist. Soon after I had earned my master's degree in 1998, I decided to continue to the post-graduate level, but I felt uncertain what direction to take. As an undergraduate, I had focused on social theory and philosophy and for a while contemplated the possibility of following this path. However, one thing led to another and I ended up doing research on social and organizational change in the context of the Finnish information society.

Since 1999 I have had the privilege of working in three research projects funded by the Finnish Work Environment Fund (1999–2000) and the Academy of Finland (2000–2002 and 2003–2006). These projects have been carried out at the Department of Sociology and Social Psychology at the University of Tampere under Professor Raimo Blom's and Professor Harri Melin's supervision. These projects have resulted in a number of academic publications and conference papers, not to mention several newspaper pieces and other presentations aimed at the general public in Finland.

Now the time has come to draw together the fruits of this collaboration. In this book, I have compiled the main results of my work since the turn of the millennium. However, the present volume is not a mere compilation of previous publications. I have updated and rearranged all material with a view to improving further the accessibility of my ideas to the reader – it is my belief that social scientific writing in its essence is a gradual and iterative process. I also believe that a scholar specializing in interpretative sciences should strive to get his or her work published early on. This dissertation, inasmuch as it draws on my modest track record, is hence addressed not only to outside examiners (like many dissertations are), but has also been written with a wider readership

in mind. As a natural consequence, this treatise assumes the form of a book and the style of an extended essay rather than a research report.[1]

The sole purpose of the above remarks is to make the roots of my work explicit, not to suggest further reading. For a reader who is not familiar with my earlier publications, the present volume alone should suffice to give an adequate overview of my research interests. Although the process of preparing an academic dissertation on the basis of several independent writing projects has had its difficulties, editing this text has taught me a lot, and I believe it to be more than just the sum of its individual parts.

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[1] To cut a long story short, some earlier drafts of my argument have first been presented at various international conferences (e.g., at the meetings of the European Sociological Association) and later on refined for publication. The most important of these have included: Blom *et al*. 2001; 2002; Pyöriä 2003a; 2003b; 2003c; 2005a; 2005b; 2005d; 2005f; Pyöriä *et al*. 2005.

Acknowledgements

Chapter 1

Introduction

Setting the Scene

In 1973, in his influential yet controversial book *The Coming of Post-Industrial Society: A Venture in Social Forecasting*, Daniel Bell wrote that in the next thirty to fifty years, we would witness the emergence of what could be called a 'post-industrial society'. What Bell had in mind was a profound change in the structure of modern societies deriving from the changing nature of the economy, and from the new and decisive role of theoretical knowledge in determining social innovation and the direction of social change. Three decades have now passed since Bell's famous thesis, and there is more intense debate than ever on the idea of the centrality of knowledge to societal development.

In this book I take one aspect of this ongoing debate as my unit of analysis: knowledge work, a concept that was first approached empirically by the economist Fritz Machlup (1962) and that was subsequently popularized by the management visionary Peter Drucker (1969). Although knowledge work has attracted scholarly minds for several decades and the number of publications in this area has rapidly increased in recent years, several gaps still remain in the current literature. One of these is the lack of sociologically oriented analysis. The rise of knowledge work is not only an economic or managerial issue, even though the changing nature of business organizations lies at the heart of the phenomenon – knowledge work reflects a major social and cultural trans-

formation comparable to, yet at the same time very different from, the Industrial Revolution.[2]

Indeed, as Bell wrote three decades ago, we are living in a world that is increasingly dependent on knowledge and innovation for the future direction of our epoch. From the vantage point of work and organizations, we are witnessing the emergence of a high-skills economy, with knowledge workers as its vanguard. That is, the productive core of today's workforce is expected to be educated, computer literate and to possess creative talent through both formal training and practical experience in order to meet the ever more stringent demands of the transient labour market that characterizes the current phase of capitalist development in Finland and other advanced economies. Understanding and evaluating these developments is the motive of my analysis.

Knowledge Work – The Key Concept of the Study

Broadly defined, knowledge work is about manipulating symbols. Of course, all work, even the most routine manual labour, involves some symbolic content. In the research literature 'real' knowledge workers are often distinguished from other worker groups in terms of task structures and skill requirements that allow for the creative use, manipulation or extension of knowledge. In my understanding of the term, the use of modern information and communications technologies (ICTs), a relatively high level of formal education, and job autonomy are essential for knowledge workers. Yet knowledge work is not synonymous with solitude. Despite enjoying considerable autonomy, knowledge workers are often required to work in teams (Pyöriä 2002a).

Although the reader may find a detailed discussion on terminology in Chapter Three, I would like to make two things clear from the outset. First, there simply is no consensus how to best define knowledge work. I am therefore perfectly aware that the way I understand the key concept of my analysis is bound to attract critique. My usage of the term is, however, consistent with the bulk of the research literature struggling with similar problems. After reading through virtually every relevant source on the matter, I have arrived at the conclusion that knowledge work is best understood as an ideal-type, rather than empirically accurate description or mirror of reality. Although this in-

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[2] Of course, one could argue that there is little revolutionary in the development of industrialism for the simple reason that industrialism as a specific mode of capitalist production took some 150 years to mature. Obviously, the concept of the Industrial Revolution is an abstraction that should not be understood literally.

terpretation hardly is surprising, it nevertheless serves as an important reminder of conceptual difficulties inherent in sociology as well as in related fields of social scientific inquiry.

As I have argued elsewhere at some length, I share the post-positivistic belief that sociological concepts are of little help in producing formal propositions or laws, but they are best understood as heuristic tools, which help in asking the right questions and capturing essential features of a given social phenomenon (Pyöriä 1999b; 1999c; 2000a; 2000b). However, to avoid even the slightest possibility of misunderstanding, my position bears no affinity to the proponents of anti-foundationalism or post-structuralism (such as Jean Baudrillard, to name just one well-known example), who are against the notion of representation and empirical reference. This line of radical sociology, which according to Nicos Mouzelis (1995) could be collectively labelled post-modernism, 'scorns the idea that social theory could or should, directly or indirectly, represent a social reality existing "out there", a reality that is constituted and continues in time separately from, or irrespective of, theory' (pp. 48–49). Suffice it to say here that sociological concepts, even if they all were merely ideal-types, draw attention to essential features of social life that are very real and definitely more than self-referential texts or discourses.

Second, throughout the text I have decided to use the terms knowledge work and informational labour interchangeably to avoid wearisome repetition, although academic rigour would tell me to adhere to the latter exclusively. From the point of view of semantics, it would be more accurate to talk about informational rather than knowledge work, but the former option has proven too awkward to gain wide-scale acceptance. Let me elaborate this a little bit further. The attribute informational does not simply refer to activities that are information-based, because all intentional or purposeful human action and interaction is based on information processing. In analytical terms the difference between the concepts of industry and industrial clarifies the point: even if all forms of social activity are based on processes that mediate information, not all societies are informational no more than they are all industrial. Correspondingly, to some extent all work certainly depends on knowledge, yet not everyone is a knowledge worker.[3]

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[3] This is not to deny the fact that the boundaries between blue-collar and white-collar workers have become blurred. On the contrary, as should become clear towards the end of this volume, it is increasingly difficult to say who is a knowledge worker and who is not. However, this development has not rendered the distinction between traditional work and knowledge work meaningless like some scholars have argued. Kenneth Megill (2004) for example, goes on to say that *all work* is in the process of being transformed into knowledge work: 'The transition is not complete, but it is underway. … From ditch-diggers [*sic*] to military troops – from sales clerks

Thus, it would make perfect sense to draw an analytical distinction between industrial and informational labour. Unfortunately, however, the attribute informational is very rarely used in this context, with Manuel Castells being one of the few who talk explicitly about informational work and informational societies. Castells describes his position as follows:

> 'I should like to draw an analytical distinction between the notions of "information society" and "informational society" … The term information society emphasizes the role of information in society. But I argue that information, in its broadest sense, e.g. as communication of knowledge, has been critical in all societies … In contrast, the term informational indicates the attribute of a specific form of social organization in which information generation, processing, and transmission become the fundamental sources of productivity and power, because of new technological conditions emerging in this historical period. My terminology tries to establish a parallel with the distinction between industry and industrial.' (Castells 1996, 21, footnote 33)

As a final note to this preliminary excursion into terminological debate, it also seems that the third plausible and indeed recommendable alternative, information work, is less and less popular, although it would quite logically fit in with the larger framework of what is commonly called an information society. The usage of this concept is with few exceptions restricted to refer to the job of librarians and other information specialists, whereas the term information society is widely employed across disciplinary boundaries. Sadly though, the world of academic jargon does not always follow logic no more than it follows plain common sense. For good reason, most social scientists prefer to use the term information rather than knowledge society but, somewhat confusingly, the very same scholars prefer to talk about knowledge rather than information work.[4]

Bearing these conceptual problems in mind, I have made an uneasy decision to comply with the majority of votes and talk about knowledge work and knowledge workers, although this clearly means making a semantic compromise. The concept of knowledge is somewhat misleading in this context, because it distracts us from the fact

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to teachers – knowledge work is becoming the expected norm.' (p. 30). Clearly these kinds of arguments are far-fetched.

[4] In addition to academic scholars, policy makers across Europe adopted the use of the term 'information society' during the 1990s. 'With this terminological choice', Antti Kasvio (2005) writes, 'the European authorities wanted to stress the overall character of those changes that would take place as a consequence of the information technology revolution, whereas more technological terms – like 'information highway' – were preferred in North American discussions' (pp. 620–621).

that the creation of *genuinely* new knowledge may comprise a fairly small part of the knowledge work process. The point here is that creative problem-solving is not necessarily the same thing as producing something truly original. As Kit Sims Taylor (1998, 7), an American community college professor, quite aptly observes, the fate of most knowledge workers is to constantly reinvent knowledge that has already been created by others – that is, to produce goods and services that are new to us but not new to the society at large.

According to Sims, we may differentiate six distinct patterns of knowledge work, only one of which involves the creation of truly original knowledge:

–   Routine work that is hard to separate from knowledge work. Formatting an article, for example, is work that might be done by a typist, but would be done by the knowledge worker when that takes less time than preparing the document and formatting instructions for the typist.
–   Networking, promoting, socializing.
–   Finding the data needed to produce the knowledge.
–   Creating what others have probably already created when this would take less time than to search, find, and appropriate what has been produced by others.
–   Truly original knowledge work – creating what has not been created before.
–   Communicating what has been produced or learned. (Sims 1998, 7–8)

Intellectual labour in the academia, preparing an academic dissertation for instance, is a case in point. Although writing a doctoral thesis might be highly rewarding and challenging endeavour, reviewing the relevant research literature, sorting out the references, proofreading and editing the text, and finally communicating the results to other scholars actually consume much more time than composing the core research results themselves! As a consequence, it could be argued that in this case only a mere fraction of the whole work process is knowledge work in its purest form.

Yet, in spite of the above critical remarks, and for the sake of simplicity, I prefer to use the term knowledge work irrespective of possible accusations of intellectual heresy. There is one exception to this rule, though. When I refer to prior research in which the terms information or informational work are systematically employed, I have been loyal to the original source. This having been said, let me now outline the scope of my analysis.

The Argument

While Bell and many others have chosen to concentrate on the United States as the case *par excellence* of a post-industrial information society, my focus here is on the case of Finland. There are two reasons for this. Obviously, Finland is the country with which I am most familiar. However, another reason of equal importance is that since the economic disaster of the early 1990s, when Finland faced the most severe recession in the era of independence, the country has been at the centre of increasing international interest (see, e.g., Castells & Himanen 2002).

While the economic crisis of the 1990s was exceptionally deep, leaving certain parts of the population worse off than before, the recovery that followed was also dramatic – thanks in large part to the country's newly emerged high-technology sector, without which the rapid recovery would have been inconceivable. Especially in the latter half of the 1990s, the development of the electronics industry, spearheaded by Nokia, was extraordinary, not only important in its own right, but also contributing to the restructuring of the economy at large. In the process, as Dan Steinbock (2004b) concludes, 'knowledge replaced capital, raw materials, and energy as the dominant factors of production' (p. 37). At least as far as the most dynamic and competitive segments of the economy are concerned, it is reasonable to argue that Finland has become dependent on knowledge and innovation.

As a consequence of these changes, by the end of the 1990s Finland was ranked among the true forerunners of internationally competitive information societies – a social and cultural 'laboratory' for the design, production and implementation of new information and communications technologies (ICTs). Although this view of Finland has been the target of growing criticism ever since the turn of the millennium, both in the national and international media, Finland remains a trail-blazer in many areas of industrial production. This is illustrated by the fact that technology industries are by far the most important segment of the Finnish economy today, accounting for roughly half of the country's total industrial production, employment and exports.[5]

Although I certainly do not share the most optimistic accounts of the uniqueness of my country, as should become clear towards the end of Chapter Two, Finland does

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[5] Technology industries encompass the electronics and electrical products industry sector, mechanical engineering, and the metal industry, providing around 200,000 jobs in Finland and 170,000 jobs outside the country. Although these industries comprise a relatively diverse array of companies, most of them rely on extensive research and development. Technology industries are responsible for 80 per cent of all industrial R&D investments.

nonetheless provide interesting evidence with regard to the complex consequences of the rising importance of knowledge work. It is my contention that in this context Finland is a case in point. Not only is Finland known for Nokia's mobile phones, but the country has also been adept at competing with larger economies. Above all else, the Finnish case indicates how flexibility is one of the inherent strengths that a small state may possess over a larger one. In this respect, a solid educational base for a nation's adaptability to large-scale social changes is of particular relevance. Finland underwent urbanization less than five decades ago, but since then the country has rapidly caught up to the rest of the industrialized world; and, during the past decade, it has leapfrogged towards an innovation-driven stage of economic growth. This would not have been possible without a highly adaptable labour force. Surely technology is important, but it is far from a sufficient guarantee of competitiveness.

On these grounds, the main argument or 'proposition' I put forward here is thus simple:

1. Although technology is an inseparable part of an information society, the economic performance of a given society depends even more on the human and intellectual capital of its citizens and the ability of organizations to take advantage of this potential.

I also propose the following:

2. Understanding the basic laws of human behaviour not only remains the basis for well-designed workplaces, but proper human resource management is (or should be) today more pronounced than ever as organizations become increasingly dependent on the creative input of their core knowledge workers.

These arguments serve as my research problems. Hence the purpose of my study is to 'test' whether or not the chosen 'propositions' are valid.

The Structure of the Study

In other words, I contend that the economic performance, stability and cohesion of a society and its institutions depend on the educational level of its citizens and the ability of organizations to take advantage of this potential, rather than technology *per se*. This is the quintessential feature of innovation-driven economic growth and wealth, as I argue in Chapter Two. In this chapter I attempt to provide a tentative answer to the following

question: Why is it that a small state such as Finland has evolved into a highly competitive information economy? The chapter also defines the social structural context of my analysis including a brief but all the more necessary excursion into Finland's history. My thesis on the overvaluation of technology is then elaborated further in the chapters that follow.

In Chapter Three I consider a variety of methodological questions ranging from social theory to statistics. The aim of the chapter is to contrast my understanding of what knowledge work is with the existing research literature and set my position in the context of information society studies. Drawing on Bell's work, among many others, I argue that theoretical knowledge or abstract reasoning has become the most important quality possessed by informational labour. This is illustrated by the fact that managerial, professional and technical occupations have expanded at the expense of traditional manual work and routine clerical jobs, just as Bell forecast three decades ago. In Finland, following the example of the US, knowledge workers now comprise the largest and arguably the most important and productive segment of the workforce.

After providing a general characterization of new informational labour, I progress to discuss and analyse empirically two interrelated yet conflicting qualities often associated with contemporary work organizations: teamwork and distributed work. In Chapter Four I argue that despite the breakneck pace of technological development, there have been very few, if any, changes in the most basic social prerequisites for organizing work and building healthy and productive work environments. I maintain that as such, ICTs have little direct relevance to knowledge workers' performance – informal organizational culture still remains the foundation of well-designed workplaces. Rather than focusing too much on technology, knowledge-intensive organizations should emphasize the importance of teamwork; that is, building cooperation through trust and longevity in employee relations.

Although the value of teamwork, which presupposes physically close ties among peers, is universally recognized, there is also widespread interest in distributed work arrangements, for example telework. In the research literature work tasks that involve information processing are considered most suitable for distribution, both in terms of time and place. My analysis in Chapter Five, however, indicates that it has proved extraordinarily difficult even for new knowledge workers to escape temporal and spatial constraints. According to representative survey material at my disposal, no more than four per cent of Finnish wage earners regarded themselves as doing telework at the beginning of the millennium, the definition being work done at home under an employment

contract. Another four per cent had tried telework, but nonetheless more than nine employees in ten had no experience of telework at all. Thus, technical feasibility does not imply historical necessity: telework still has a long way to go even in the high-tech country that is Finland, often ranked in the league of the most advanced and competitive economies in the world.

Chapter Six sets out to elaborate further on the question of social contradictions in informational capitalism, spelling out some of the most pressing problems inherent in contemporary work organizations. In this chapter, which concludes my empirical analysis, I draw attention to the fact that the growing knowledge-intensiveness of work organizations has not made organizational hierarchies obsolete or empowered all employees equally. Considerable differences still exist between organizational types for example in terms of team formation, pay systems, recruitment and forms of control. The glamorous success stories coming out of the ICT sector are just the tip of the proverbial iceberg, and even in the ICT sector not all organizations are created equal. In reality, the most successful enterprises constitute a realm of their own, and the new knowledge workers they employ enjoy the benefits of belonging to a privileged class. Yet the world of knowledge work is not free from problems either. In informational capitalism, the price of being a successful individual is the psychological stress and emotional trauma of growing competitiveness.

Finally, Chapter Seven draws together the threads of my argument. In this chapter I summarize the main findings and present my tentative lessons from the Finnish experience. Some additional 'food for thought', such as the prospects of digital public services, is provided, too. If I should encapsulate the message of my analysis in just one sentence, it would be a plea for realism. It is my contention that a clear need exists for more criticism and less hyperbole on the emergence of the information society that not only takes into account social and technological changes but also continuities with the past. It is my belief that Finland among with other advanced economies is on the road to the information society, yet the new society in the making is built upon the long heritage of industrialism.[6]

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[6] In a similar vain, it has been argued that a pure type of an industrial society has never existed. For example, in *Industrialism and Industrial Man* Kerr *et al.* (1960, 33) wrote that even the most economically advanced countries today are to some degree and in some respects underdeveloped because they contain features derived from earlier stages of development which obscure the pure logic of the industrial process.

Research Methodology and Data

In addition to a systematic literature review, I base my analysis on the results of three empirical research projects conducted between 1999 and 2006.[7] The research group I have been working with the past several years has been monitoring the development of Finnish society on the strength of extensive and representative survey materials since 1981, and by now has access to cross-sectional data on the wage-earning adult population from 1981, 1988, 1994 and 2000 (for a detailed description of the data, see Blom *et al.* 2001, 224–230; Pyöriä 2001a).

However, because the survey as a method has its natural limitations, we have also extended our scope of analysis to the organizational level. Surveys alone will not produce an adequate picture of some of the most profound changes that have taken place in contempory working life in Finland during the last decade. Although the survey method has its undisputable advantages when the goal is to assess the prevalence of a given phenomenon, survey data in general is highly insensitive *vis-à-vis* the complexity of its real-life context. According to Robert Yin (1989, 23), one of the most renowned case study specialists, surveys can try to deal with phenomenon and context, but their ability to investigate the context remains limited. Therefore, the research group I have been working with has conducted qualitative interviews among private and public sector workers to augment and deepen our understanding. As I remarked in the preface, the main results of our research have been reported elsewhere, and the aim of this study is to synthesize and reflect upon these works and discuss the theoretical implications of the results.

Because my career as a project researcher has for the most part revolved around case study research, I have decided to concentrate here on qualitative analysis and keep the amount of statistics to the minimum. When appropriate, however, a reference is made to our research group's survey results. Moreover, I have also decided to set aside the interviews our team has conducted among public sector workers. In Chapters Two and Seven I do highlight some of the most important differences between the public and private sectors, but a systematic comparison is beyond the scope of this study. Therefore, in addition to the literature review and a few selected statistical tables and figures,

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[7] By systematic I refer to a thorough searching of major article databases (e.g., EBSCOhost, Emerald Fulltext, IngentaConnect and Elsevier Science Direct) as well as tracking down virtually every relevant English-language monograph on knowledge work.

the empirical evidence I present here is derived from seven small-scale case studies conducted between 2001 and 2003. These included:

- an R&D department at a global 'manufacturing enterprise' (10 interviews, conducted in 2001)
- a 'telemarketing firm' operating mostly in Finland (5 interviews, conducted in 2001)
- a 'construction planning office' operating in Finland (2 interviews, conducted in 2002)
- a modern 'wood-processing factory' operating in Finland (2 interviews, conducted in 2002)
- a small 'accounting office' operating in Finland (2 interviews, conducted in 2002)
- an international 'IT-consultancy' (6 interviews, conducted in 2003)
- an international 'telecom company' (5 interviews, conducted in 2003)

The data was collected via focused semi-structured interviews (see especially Hirsjärvi & Hurme 1995; see also Kvale 1996; Rubin & Rubin 2005). That is, all interviews followed a similar basic structure (themes), but depending on the situation, individual questions and the way the questions were asked varied. New questions were also formulated spontaneously within the limits of the given themes. This strategy allowed for carrying out the interviews in a flexible yet systematic way: the fact that a case study design can be altered and revised after the initial phases of a study does not mean that an investigator is free to change the purpose or theoretical objectives of the inquiry (Yin 1989, 59). The following themes were explored in the interviews:

1. teamwork and project coordination
2. telework
3. the use of information technology
4. educational needs and the recruitment of new employees
5. customer relations and collaborative networks
6. organizational changes
7. reward structures
8. work atmosphere

Another methodological guideline was to treat the interviewees as informants. At the beginning of each interview it was emphasized that the interviewer was not interested in obtaining any delicate personal information or company-specific business secrets; the

respondents were regarded as experts in their own field of proficiency. The interviewees, ranging from secretaries to managers, were chosen to represent different positions in their corresponding organizations. At the request of some of the interviewees, the identities of the organizations are not disclosed.

In all cases the informants were contacted through one key person, who acted as a mediator between the research group and the case organization. This allowed for the assessment of their suitability for the study. These key persons were critical to the smooth running of the study. Each interview, lasting between 60–120 minutes, was tape-recorded and transcribed. After the first round of analysis, written feedback was provided to those participating organizations that specifically requested it. In the case of the manufacturing enterprise, a short discussion session was also arranged. In addition to conducting formal interviews, the histories and public visibility of the case organizations were traced.

The first group of interviewees was comprised of highly educated engineers and sales executives working at a global manufacturing enterprise specializing in process automation and information management systems. For example, the company provides solutions for the control and automation of manufacturing processes in the pulp and paper and energy industries as well as in the hydrocarbon and minerals processing industries. As a whole, the company employs close to 30,000 people worldwide and has a significant number of subcontractors.

In this case ten employees from a site of nearly 1,000 people were selected. Seven of them worked in the R&D department, two interviewees were in the sales division and finally, in order to generate an overarching picture of the organization, the company's human resource manager was interviewed. Because of the size of the firm, the R&D department of around 70 employees was selected as the main focus of interest.

The second case was a small but fast-growing telemarketing firm employing mainly salespersons from very different educational and occupational backgrounds. In addition to conventional white pages, yellow pages and local directories, the firm focuses on business-to-business information services, both in print and electronic versions. The main product of the firm is an Internet-based business-to-business directory that includes contact information and other relevant data on practically every enterprise in the private and public sector. At the time of the interviews, close to 100 people worked in the company, but a mere year later the number of personnel had almost doubled and new agencies had been opened.

In this case just five interviews yielded enough relevant information about the organization and its core processes. Two of the interviewees were full-time salespersons (or 'sales negotiators', as they were called), two worked in a supervisory position, and the last interviewee was an administrative secretary.

Together, the first two cases represent a distinct organizational culture based on subcontracting and strategic partnerships, controlled growth and project-centred teamwork. They both also try to convey a dynamic and modern image of themselves in order to attract qualified employees, new customers, and in the case of the manufacturing enterprise, new investors.

The interviews at the manufacturing enterprise and telemarketing firm were conducted in the first half of 2001. After these first two cases were analysed, it became apparent that a more balanced account of different organizations was needed. In 2002 it was decided that more conservative and less visible examples of knowledge-driven enterprises should be sought out.

However, it is worth a brief note here that cases are not sampling units and therefore they cannot be used to produce statistical generalizations; rather, the case study method can be used to produce analytical generalizations, in which a previously developed theory is used as a template with which to compare the empirical results (Yin 1989, 38). In my analysis I use ideas inspired by Elton Mayo's classic contribution to organization studies as my 'platform' of investigation, although Mayo's works admittedly do not constitute a 'sociological theory proper' (Mouzelis 1995) in any strict sense of the word.

This having been clarified, the new cases included a construction planning office employing around 100 people, a ten-person timber purchase department at a highly automated wood-processing factory employing about 500 personnel, and a small accounting office of less than 20 employees. In each case just one manager and one worker were interviewed. Thus no more than six interviews in three organizations were conducted in the first part of 2002.

This amount of data proved to be sufficient because responses to the main research questions were surprisingly similar compared to the first two cases. It would probably have been uneconomical to continue the interviews. One of the most common mistakes in qualitative research is to collect more data than one person or a research group can reasonably analyse (Alasuutari 1995). Before the fieldwork phase a calculated decision was made to rely on interview material, and to leave more in-depth methods such as participant observation for further research.

In the final phase of my fieldwork in 2003, two additional organizations were selected. These included an international IT-consultancy (six interviews) and an international telecom operator (five interviews). Both companies employ several thousand persons in a number of countries. At first, conducting additional interviews appeared to add little value to my understanding, but a closer look at the data led me to think otherwise. Both cases revealed some important problems inherent in contemporary working life that had remained hidden in the rest of my interview material.[8]

The IT-consultancy, which markets itself as one of the leading builders of the information society, specializes in the development and implementation of computer infrastructure. In this case I focused on a unit employing about 20 software architects. The unit concerned concentrates on developing information systems for the health care sector. First the unit's leader was interviewed, after which follow-up informants were selected. These included four project managers, one programmer and the person in charge of the company's occupational health and safety. In these interviews the question of project management was emphasized at the expense of other themes.

At the telecom operator, the unit concerned was called the 'voice switching team', which is in charge of the repair and maintenance of nation-wide telephone and data network. As I explain in greater detail in Chapter Six, this case illustrates how former blue-collar workers have become knowledge workers due to rapid technological change, namely the digitalization of telecommunications. In this case four 'switch system specialists' and their supervisor were interviewed. As a whole, the voice switching team employs around 20 persons.

The first five case organizations were located close to the Tampere region, which is not only one of the most dynamic growth centres of the Finnish economy, but also one of the European leaders in technology, thus making a suitable focus for my study (Castells & Himanen 2002; Kasvio & Anttiroiko Eds. 2005).[9] The remaining two cases,

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[8] Originally, these cases were chosen with a view to establishing long-term cooperation between the research group and the participating organizations and to deepen the empirical setting by using ethnographic methods (Hammersley & Atkinson 1995). However, this plan did not prove to be possible and I had to settle for conducting conventional semi-structured interviews. According to my original plan, I was supposed to follow a complete work or customer project from the beginning to the end in each of the new cases. Unfortunately, to my disappointment, the telecom operator turned out to be an unsuitable object for this kind of a study and, in spite of their sincere enthusiasm, my informants at the IT-consultancy failed to find sufficient time for long-term collaboration.

[9] For example, Tampere has earned an international reputation for its 'e-Tampere programme', which was a joint project by the local government and enterprises aimed at fostering the development of the regional economy as well as creating innovative public services (see Castells & Himanen 2002, 124–126). The five-year e-Tampere information society programme, conducted

in contrast, were geographically distributed across several locations. The employees interviewed at the IT-consultancy were distributed among three major city areas, whereas the telecom operator's voice switching team had employees in half a dozen locations.

All case organizations included here represent better than average or even leading expertise in very different business realms, from manufacturing to business-to-business services. Despite the differences, one common denominator is that to a significant degree, these organizations employ knowledge workers whose work requires a high skill level and problem-solving abilities. Another common factor is that the cases are not representative of the supposedly Internet-driven 'new economy', which is yet to fulfil its promise. It has to be stressed that the firms under scrutiny are very modern, but also conscious of the traditions prevalent in their respective fields.

To summarize, 32 interviews were conducted in seven distinct business organizations. The data from 2001 and 2002 are analysed in Chapters Four and Five. To recapitulate, these chapters focus on teamwork and telework. In Chapter Six, which concentrates on problems inherent to the knowledge work process, I continue my analysis further and also introduce the remaining two cases from 2003 to the reader. The reason for this progression is as much practical as it is substantial. Before I began the final phase of my fieldwork in 2003, I had already written the first versions of Chapters Four and Five. However, the last two cases also proved to be quite different from the rest of my data, so I decided to discuss them no earlier than in Chapter Six.

As I have described above, in conducting the interviews, the common guidelines of case study research were followed. This strategy was not selected because of the popularity of the method or because conducting a case study is often supposed to be easy – which in fact could not be further from the truth – but because the case study may be the most appropriate method for understanding and interpreting complex organizational phenomena in the contemporary workplace.[10] If conducted properly, the case

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between 2001 and 2005, focused on three objectives. These included: developing public online services and making them available to all residents; strengthening the knowledge base of research and training; and generating new business related to the information society (for more details, see Kasvio & Anttiroiko Eds. 2005). Although the evaluation of the programme remains a task to be left for future research, my educated guess is that the project failed to meet its most ambitious objectives. This is partly explained by the crash in IT equity prices following the turn of the millennium that made investors overly cautious. Nevertheless, Tampere represents a successful example of a transformation from traditional manufacturing towards knowledge-based economic activities (for an historical overview of Tampere's past and present, see Haapala 2005; Hietala & Kaarinen 2005).

[10] Doing a case study is not as easy as many social scientists believe. Yin (1989) goes so far as to say that the skills required for collecting case study data are much more demanding than in experiments and surveys, because the data collection procedures are not routinized: 'In case

study method allows the researcher to generalize to broader processes, to discover causes, and explain and understand a phenomenon (Rubin & Rubin 2005, 7).

In more precise terms, the case study has two main advantages, as Yin (1989) describes. First, the case study's unique strength is its ability to deal with a full variety of evidence. In a single case study, documents, artefacts and interviews as well as non-participant and participant observation can often be combined. Second, we can identify some situations in which a specific strategy has a distinct advantage. For the case study this is when 'a "how" or "why" question is being asked about a contemporary set of events, over which the investigator has little or no control' (p. 20). According to Yin's more formal definition, a case study is an empirical inquiry that:

– investigates a contemporary phenomenon within its real-life context; when
– the boundaries between phenomenon and context are not clearly evident; and in which
– multiple sources of evidence are used. (Yin 1989, 23)

In my research setting, I investigated knowledge work within its social and organizational context. In addition to Mayo's work, various theories of post-industrialization and informationalization provide the general interpretative context for my analysis. Again, I refer to theory in a weak sense of the word: there is no such thing as a theory of an information society proper no more than there are any clear-cut boundaries between work, society and organizations. Although the term information society is widely used across disciplinary boundaries, there is no established social scientific research tradition that seems to have taken up this societal form as its specific object of study (Kasvio 2001, 19; Pyöriä 1999a; *cf*. Duff 2000).

To give a simple example, especially in the context of knowledge work it is often difficult to draw a line between paid work and leisure time. Knowledge workers routinely carry work home or work on the road. In contemporary capitalism even the boundaries between competing organizations can be fuzzy when strategic alliances or partnerships are formed. Therefore, understanding knowledge work, or any other complex social phenomenon for that matter, requires that different perspectives are heard and different empirical approaches are used. It is my belief that empirically oriented so-

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studies, there is little room for the traditional research assistant. Rather, a well-trained and experienced investigator is needed to conduct a high-quality case study because of the continuous interaction between the theoretical issues being studied and the data being collected. During data collection, only a more experienced investigator will be able to take advantage of unexpected opportunities rather than being trapped by them – and also to exercise sufficient care against potentially biased procedures.' (p. 62)

ciology should not be treated as a mechanistic endeavour, but it should always be accompanied by logical thinking – with 'sociological imagination' thrown in for good measure.

I also believe that sociological imagination is especially important when analysing case study data because, unlike statistical analysis, there are few fixed formulas or cookbook recipes to guide the novice; instead, much depends on an investigator's own style of presenting the evidence and drawing conclusions from it (Yin 1989, 105). In other words, conducting and analysing qualitative interviews does not follow content- and context-free rules of method, but rests on the judgement of a qualified researcher (Kvale 1996, 105). Indeed, as C. Wright Mills put his advice to the novice in his classic methodological treatise *The Sociological Imagination*, social science is the practice of a craft, a continuous construction of one's character, which has as its core the qualities of the good workman:

> 'What this [sociological imagination] means is that you must learn to use your life experience in your intellectual work: continually to examine and interpret it. In this sense craftsmanship is the centre of yourself and you are personally involved in every intellectual product upon which you may work. To say that you can "have experience", means, for one thing, that your past plays into and affects your present, and that it defines your capacity for future experience. As a social scientist, you have to control this rather elaborate interplay, to capture what you experience and sort it out; only in this way can you hope to use it to guide and test your reflection, and in the process shape yourself as an intellectual craftsman.' (Mills 1959, 216)

As a final methodological note, it is worth emphasizing that the centrality of knowledge to societal development is such a broad and contested topic that one study by a novice 'craftsman' merely scratches the surface. I am perfectly aware that this volume is far from being comprehensive. The modest purpose of my dissertation simply is to shed light on one neglected aspect in this ongoing discussion: the lack of sociologically oriented analyses on the social and cultural consequences of knowledge work. I sincerely hope that the outcome of my research will serve this purpose by provoking further debate and thus help pave the way for more detailed research.

Chapter 2

The Finnish Information Society

In this chapter I pose the following question: Why is it that a small state such as Finland has evolved into a highly competitive information economy? The chapter also defines the social structural context of my analysis including a brief but all the more necessary excursion into Finland's history.

The Problem of a Small State

The post-war period of relatively stable and predictable economic growth, lasting roughly from 1945 to the first oil crisis of 1973, has often been labelled the 'Golden Era' of contemporary capitalism (see, e.g., Brown & Lauder 2001; Hobsbawm 1994; Maddison 1982). Politically, these decades were dominated by the arms race and the Cold War between the superpowers of the United States and the former Soviet Union. Economically, this period was the heyday of the bureaucratic corporation, national protectionism, and investment-driven growth. According to the politics of the Golden Era, a strong independent economy was the backbone of every nation. Simply put, the rules of competition were in favour of large markets that could support and protect the interests of domestic manufacturing. From the point of view of individuals, relatively secure employment and career advancement were realistic possibilities, even without extensive education.

In this environment small states such as Finland faced a paradox. A diversified and independent production structure was an important political concern; yet overall

economic development required organizational growth and specialization in order to fuel robust export industries, which are of vital importance in any country whose home market is too small to sustain these industries. However, Finland was also considered too small to support companies of true international significance. As S.N. Eisenstadt (1985, 44–45) has pointed out, the most common problem of small states has been, and still is, how to create and maintain a general standard of living which equals the one prevailing in the respective international system, i.e. *vis-à-vis* those international markets on which small states are dependent (see also Katzenstein 1985). In Finland and elsewhere criticism abounded, resembling the tone of the recent debate on globalization, as the following cry of concern by one astute commentator serves to illustrate:

> 'Here we see before us a difficult contradiction of opinion: we should create a large, preferably diversified industry so that Finland can exist as an independent nation in the future, but at the same time modern economic development seems to demand of us both the removal of boundaries and the merging of small firms into still bigger ones!' (Hustich 1966, 15; original translation corrected)[11]

Now, in the early years of the new millennium, the situation looks very different, both from a world political as well as an economic point of view, but the quest for competitiveness persists. Economic protectionism has largely been replaced by the deregulation of financial markets and the opening up of national borders for international competition. Although the US still maintains the privilege of being the 'engine' of the world economy, a number of small states have found a competitive edge in some very unlikely quarters of production.[12] The Finnish economy will probably never become truly diversified in comparison to larger ones, but it has indeed proved to be competitive. In this respect the joint forces of globalization and rapid development in ICTs are the key to understanding the change. As a general long-term trend, in spite of the recent bursting of the well-publicized 'dotcom bubble', the industrialized world is going through a tran-

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[11] The quote is taken from the fifth *Finland in Focus* conference arranged at the Helsinki School of Economics and Business Administration (HSEBA) on 16–17 April, 1966. The lectures, given by top scholarly authorities, were aimed at an international audience and later on published by Finland's leading media company in the hope of creating and maintaining 'mutual international understanding, faith and good will', as the organizing committee of the conference described their purpose. Väinö Ilmari Hustich did his life work as a professor of economic geography.

[12] However, this is not to deny the fact that the US economy has many serious problems. Most importantly, the US economy suffers from an alarming double deficit. This refers to a situation where both the trade balance and current account show deficit. Especially the level of current account deficit is worrying. As of 2004, it was estimated that the deficit is running in excess of 600 milliard dollars annually, representing 5.5 per cent of the US GDP and over one per cent of global GDP. At this writing, it seems that the deficit will only grow larger in the near future.

sitional phase to a new mode of production, which is at the same time increasingly indifferent to national boundaries and yet dependent on local innovation, know-how and the creative use of technology.

Thus in the ongoing race for economic and technological advantage, the US and other large domestic markets have clearly been the forerunners, but their lead is now being reduced. As a consequence of growing world integration, all advanced economies have had to come to terms with the new realities of competition that involve a shift away from economic nationalism towards extending and intensifying foreign competition. The world of business is far from borderless – there are still vast differences among countries, regions and organizations in terms of the availability and exploitation of social and economic capital – but at least in principle any company may see a formidable challenge arise from virtually any direction, close to home or from the other side of the globe, especially in the dynamic high technology sector. For example, countries such as Finland, Ireland and Singapore are all considered to be highly competitive ICT producers, even though the success of these economies is borne out of completely different cultures and political systems. What makes Finland, the case I highlight in this book, stand out is the unique way in which the wealth created by high technology and the principles of the universal welfare state are blended. Although Finland has in some respects lagged behind the other Nordic countries, it has also earned its reputation as a humane alternative to Silicon Valley, where material values have shadowed egalitarianism (*cf.* Benner 2002; Carnoy 2000; Castells & Himanen 2002).

However, I wish to emphasize from the outset that the change is not being driven deterministically by technology, globalization, or any other single factor; rather, they are all forces that enable and guide the development of contemporary capitalism, for better or for worse, depending on the context. What my case indicates is that the information society and its 'new economy' may assume various guises depending on the rate of implementing ICTs, on how users react to and interact with these technologies, and on how supportive the social, political and organizational climate of the change is. The simple notion of technological change as having deterministic social effects, which can then be controlled by appropriate policies, has proved untenable (Ducatel *et al.* 2000; Mansell & Steinmueller 2000). In short, technology is not an autonomous force that determines social and cultural development – new technology is as much a social construction as the shape of society is constructed by technology.

On the other hand, as I shall argue in more detail in the chapters that follow, Finland no more than any other country should be perceived as a model example of an

information society. First, it is highly questionable whether or not success at the level of a national economy can be repeated in a different social context. Variations in historical, cultural and political settings simply produce diverse and unpredictable outcomes. Second, no country qualifies as a benchmark case except in selected areas. As much as I would like to argue otherwise, Finland is not a 'high-tech wonderland' devoid of social problems, unemployment, and challenges at the level of the workplace. The following quote from an official strategy paper commissioned by the Finnish government portrays quite truthfully the ambivalence of Finland's current strengths and weaknesses:

> 'In terms of international comparison, Finland is in the absolute forefront of information society development. Finland is investing heavily in education, training, research and development. Information and communications technology (ICT) products have significantly contributed to the growth of Finnish exports. At the same time, the ageing of the population, high unemployment rates and the hectic pace of working life, together with shortages of competent workers in some fields, are an everyday reality in Finland.' (Finnish National Fund for Research and Development 1998, 6; original translation corrected)

The paragraph above reflects the fact that the political premium has shifted from developing a diversified and independent production structure to finding the right market niches, deregulating the economy and promoting network relations across national and organizational borders. The role of ICTs (or, more precisely, the electronics and electrical products industry sector) is considered particularly vital for Finland's future success. The current political consensus has it that specialization in high-value production is the only way to sustain and improve the national economy's global competitiveness. Indeed, Nokia has become a world player due to its strict specialization in wireless communication. For most of its history, however, the company relied on economies of scale rather than scope. Upon its founding in 1865, Nokia was a small forestry start-up, but shortly before its recent change of focus in the early 1990s, it had diversified into a producer of paper, rubber, electrical cables and electronics, just to name the major parts of the conglomerate. Today, as is well known, Nokia is all about mobile phones and network infrastructure.[13]

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[13] More precisely, the year 1992 marked the most decisive watershed in Nokia's history. Jorma Ollila was appointed CEO and under his leadership the company opted for a successful global focus strategy. Nokia concentrated on perfecting its vision according to which the future of telecommunications is mobile and digital, while divesting all non-core operations.

Nevertheless the basic problem of a small state persists: the stronger it becomes in a particular market niche, the more damage any future failure will cause. In Eisenstadt's (1985) words, 'one of the great problems of small states is that they may become so attuned to one type of international market that they collapse entirely if this market changes' (p. 45).

From Tranquillity to Creative Destruction – A Glance at Finland's History[14]

Is it the fate of a small state to drift helplessly, at the mercy of the shifting currents of global capitalism? Has globalization replaced the anomalies posed by economic protectionism with less transparent yet equally coercive rules of international competition? Not necessarily: compared to the big players, a small economy may find its strength in greater flexibility and a better ability to adapt to continuous change.

Late but Rapid Modernization

A little history is in order here. Finland became an industrialized wage-working society much later than other European countries, but the process, once it got under way, was much more rapid and far more dramatic than elsewhere in Europe. In this respect Finland truly is a unique case. Writing in the late 1980s, David Arter, a British political historian, says:

> 'In no other European democracy has the progression from an essentially agrarian
> society through a period of accelerated industrialisation to a predominantly service
> economy been compressed into a mere four decades. Finland, it seems, has become

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[14] There are several recommendable introductions to Finland's history available in English. To name a few examples, probably the best-known text is Fred Singleton's *A Short History of Finland* (1998). Among the works by Finnish scholars, *Dynamic Finland: The Political System and the Welfare State* (2002) by Pertti Pesonen and Olavi Riihinen provides a recent source worth mentioning. Those who are interested in learning more about Finland's recent development towards an information society should find publications by Statistics Finland (www.stat.fi) particularly worthwhile (see especially Statistics Finland 2004; for a comparison between the Nordic countries, see *Nordic Information Society Statistics 2005* available on-line). Recommendable sources also include publications by the National Technology Agency (www.tekes.fi) and the Finnish National Fund for Research and Development (www.sitra.fi). Reliable on-line sources include the websites *Virtual Finland* (virtual.finland.fi) and *e-Finland* (e.finland.fi) hosted by the Ministry for Foreign Affairs of Finland and *The Finnish Research Portal* (www.research.fi) jointly provided by different science and technology authorities.

a typical post-industrial state in the lifetime of many Winter War veterans.' (Arter 1989, 227; italics added)

Although it is somewhat misleading to conclude that Finland today can be conveniently slotted into some typical class of capitalist societies, there is no denying the extraordinary speed with which the change has happened. Especially from the point of view of paid labour, the 20th century in Finland was one continuous struggle to adapt to a succession of unfolding social structural changes. The first half of the 20th century was dominated by political turmoil and war. The latter half of the century up to the present has been no less destructive, although this time the destruction has been of a more creative kind – a revolution in the original Latin meaning of the word *revolve,* implying cyclical change. Indeed, Finland's post-war development can be encapsulated in Joseph Schumpeter's concept of 'creative destruction'. In *Capitalism, Socialism and Democracy*, published in 1942, Schumpeter observed that technological development continuously makes old products and production methods obsolete, paving the way for new and more innovative alternatives in a perpetual cycle of crisis and renewal.

Initially the process of modernization in Finland gained impetus from the Second World War and the payment of war reparations to the former Soviet Union. Two wars with the Soviets, the Winter War of 1939–1940 and the Continuation War of 1941–1944, in which Finland had joined the German attack on the USSR, cost Finland more than one-tenth of its pre-war territory and considerable human and monetary losses. The years following the armistice with the Soviet Union were marked by a political anxiety that was to last, at least to some extent, until the breakdown of the communist regime.[15] However – and this is crucial to understanding the present – this did not stop Finland from building a strong foundation for future welfare and economic growth. Despite the Soviet influence and a shared borderline stretching over 1,000 kilometres, Finland was left to decide on its own how to organize its political and economic life. From a legal standpoint Finland remained a neutral country.

There was, however, a high price to be paid for neutrality. After the two countries signed a pact on friendship, cooperation and mutual assistance in 1948, Finland had no choice but to assume a policy of cautious *realpolitik*. 'Acknowledging the facts is the beginning of wisdom' was how President J.K. Paasikivi defined the primary concern of

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[15] For example, during a visit to Finland in late 1989, President Mikhail Gorbachev put an end to the decades-long duel between Finland and the soon-to-collapse Soviet Union concerning Finland's policy of neutrality: 'In his speech at Finlandia Hall and in various pronouncements during his visit, President Gorbachev unequivocally recognized Finland as a neutral country. These statements produced feelings of relief in Finland.' (Häikiö 1992, 129)

Finland's foreign policy. For example, due to political tensions, Finland could neither accept Marshall Plan aid, provided by the US to regenerate economies torn by the war, nor participate fully in the European integration process. On the other hand, once the atmosphere of trust with the Soviets was established, Finland could engage in economic cooperation with the rest of Europe. Some of the most important memberships and agreements for the Finnish economy during the Cold War era included: International Monetary Fund (IMF) in 1948; General Agreement on Tariffs and Trade (GATT) in 1950; European Free Trade Association (EFTA) in 1961; Organisation for Economic Co-operation and Development (OECD) in 1969; and European Economic Community (EEC) in 1973.[16]

In these tumultuous circumstances the process of modernization began to accelerate. After the war, as the historian Norman Davis (1996) describes Finland's ambivalent position between East and West, 'the economy boomed, and Helsinki became one of Europe's most elegant and expensive cities – a western showpiece on the doorstep of Leningrad' (p. 1088). Of course, the image conveyed above merely scratches the surface. To understand the uniqueness of Finland, it is necessary to delve a little bit deeper into the country's history.

World War II as an Historical Watershed

Finland's post-war development is remarkable indeed when we recall that in the 19th century Finland was still one of the poorest and most agrarian areas in Europe, with limited geopolitical significance. After Swedish rule, from 1809 onwards, when the country held an autonomous status as a Grand Duchy within the Russian Empire, 'Finland was characterized by nearly complete social tranquillity and a very conservative political system' (Alapuro 1988, 12).

Although Finland's autonomous position permitted the Grand Duchy to evolve into a modern society with a centralized government administration, a legal structure based on equality before the law and other public institutions (e.g., central bank, a postal system, customs, etc.) required of a functioning society, the market economy remained underdeveloped (Häikiö 1992, 11–12). With the notable exception of the emerging forest industry (Myllyntaus 1990), the word retarded perhaps best expresses the

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[16] Finland acquired an associate membership in EFTA in 1961 and a full membership in 1986. EEC is today known as the European Community (EC). The word 'economic' was dropped in 1992 by the signing of the Maastricht treaty. Most importantly, the Maastricht Treaty created the European Union (EU).

state of the overall economic situation. As one Finnish sociologist has put it: 'The famine in 1867–1868, which can be considered the last great famine in Europe, revealed the backward character not only of Finnish agriculture but of the whole of the economy as well' (Alestalo 1986, 17). The Finns, however, did not rise to revolt. Instead of revolting, masses of people left for the US, Russia, Sweden and elsewhere in search of a better living. The mass emigration alleviated the potential for political and social unrest.

The dawn of the 20th century marked the end of tranquillity. Following New Zealand, Finland was the second country in the world to hold democratic elections based on universal and equal suffrage in 1906; on the sixth of December 1917 Finland declared its independence; and at the beginning of 1918 the country was torn apart by a bloody revolution (see especially Alapuro 1988). The war of 1918 had two facets. On the one hand, it was a war of liberation securing the country's independent status, on the other it was a civil war that arose out of the poverty and inequality that existed between the landless and the landowners. Politically, however, the significance of the war lay in the fact that Finland did not follow Russia's path but instead adopted parliamentary principles (Klinge 1997, 123). It was during these formative years that Finland experienced the entrance of the masses onto the political scene, with far-reaching consequences. Most important of all, a modern multi-party political system, which still characterizes Finnish and Nordic parliamentarism today, was born. This was the most decisive political choice guiding the future of the country, a choice that was defended at a heavy price in the Second World War.

Along with the development of parliamentary principles, trade unions also gained a strong position in the Nordic political decision-making arena; ever since, they have played a key role in regulating the distribution of income and the protection of workers' rights.[17] In the Nordic countries in general the principles of the market economy prevail, but socio-political considerations have traditionally received much attention when fundamental decisions are made. For example, major economic actions are usually taken after consultations among the government, trade unions, political parties and the business world (Allardt 1989, 215; see also Katzenstein 1985). An illuminating fact in this respect is that trade unions cover some 70 per cent of the Finnish workforce, although

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[17] As I have briefly remarked earlier, Finland has in some respects lagged behind the other Nordic countries in the making of the welfare state. This is also true of the development of workers' rights. Finnish trade unions have followed the path opened up by their Nordic counterparts. The point here is that Finland has adopted similar democratic principles than the rest of the Nordic countries. The discussion of possible differences is beyond the scope of this study.

the proportion that are members has been on the decline in recent years.[18] In short, a comprehensive collective bargaining system has been and remains the key mechanism in the Nordic labour market policy.

As I have already pointed out above, the Second World War was a turning point in Finland's economic modernization. By the end of the war the national economy was seriously crippled, but the standard of living soon began to catch up with the richer countries. The forest industry had already established itself as an international force well before the war, and after the peace settlement the payment of reparations began to stimulate or, perhaps more appropriately, forced the development of a more diversified production structure. Most importantly, Finland had to modernize its metal-based industries. According to the agreement made with the Soviet Union, two thirds of all reparation deliveries were to be made in industrial goods; Nokia, for example, supplied electrical cables to the Soviets. This period also saw the two countries form close bilateral trade relations. Although the payment of war reparations put the economy under great strain, with a strict timetable for deliveries and heavy penalties for non-compliance, Finland recovered from the war very quickly – by the mid-1950s the country was ready to meet the challenge of survival in the post-war world (see, e.g., Singleton 1986).

The major challenge facing Finland in the post-war era was the sheer size of its agricultural sector. Finland maintained an exceptionally large agrarian population until the 1960s, but then the country was effectively urbanized within the next 15 years, as masses of people moved from the countryside to take on new jobs in urban centres. The reason why agriculture remained important for so long was just as much political as it was economic. After the Second World War some 100,000 new farms were created in order to resettle ex-service men as well as immigrants mainly from Karelia, an eastern part of the country that was partly lost to the Soviet Union in the peace settlement. As a whole the territory ceded contained over one tenth of the country's population, or 420,000 people. This resettlement policy meant that Finland was transformed into a country of independent small farmers, and agriculture and forestry assumed even greater importance than before. Unfortunately, though, the newly created smallholdings

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[18] There are three major trade union confederations in Finland: The Central Organization of Finnish Trade Unions (SAK), The Finnish Confederation of Salaried Employees (STTK) and The Confederation of Unions for Academic Professionals in Finland (AKAVA). According to the Finnish Ministry of Labour (www.mol.fi), trade unions had a total of 2,082 000 members at the end of 2001. Of these, however, 447,000 or 21.5 per cent can be classified as exclusive of actual trusteeship. This includes retired persons, students, non-paying members and entrepreneurs. The number of members covered by trusteeship totalled 1,635 000 or 71.2 per cent at the end of 2001. In 1994 the corresponding figure was 78.5 per cent, the degree of organization having thus dropped by 7.3 percentage points.

proved to be unproductive and unable to provide a sufficient standard of living without heavy agricultural subsidies. On the positive side of the coin, the land allocation policy helped to support the social and political *status quo*, because the subsidies continued to keep the level of unemployment low thus contributing to the nation's rebuilding after the war.

In the 1960s technological change finally rendered the small farms economically unviable, necessitating a political rationalization programme. These developments led to a thorough economic and regional restructuring in the country. The greatest change in the occupational structure was due to the expansion of the service sector, fuelled by the needs of the growing cities and government administration. The main flow of the labour migration was from northern to southern Finland and also to Sweden, whose own population could not supply enough labour for its expanding industry. Within the space of a mere 15 years, Finland was completely transformed. Sociologists in Finland call this period from 1960 through to 1975 the 'Great Migration' – with good reason. The change in the occupational structure was more rapid than anywhere else in Europe: in 1960 almost one third of the population still received its livelihood from agriculture and forestry, by 1975 the proportion had declined to 12 per cent, and by 1980 to nine per cent. As a consequence, between 1960 and 1975, Finland finally became an industrialized society with a social structure resembling that of the other Nordic countries (Allardt 1989, 219; *cf.* Alestalo 1986).

This move from rural to urban areas was very much facilitated by the development of the modern welfare state, especially the expansion and reform in education, health and social services. The years of the Great Migration saw a considerable increase in tax revenues and government consumption due to extensive social reforms that required an unforeseen growth in the number of civil servants and governmental bureaucracy (Morawski & Seppänen 1978, 36). Consequently, the growing public sector created plenty of new job opportunities for a labour force that was increasingly better qualified. More importantly, social mobility increased significantly and Finland became known as an egalitarian welfare society often grouped together with the other Nordic countries – although more detailed analyses have revealed some important divergent features (see, e.g., Kautto 2001).

From the Era of Overwhelming Optimism to the Recession

In Finland the overall standard of living and welfare benefits continued to grow during the 1970s and 1980s, in spite of the 1973 oil crisis that marked the end of the Golden

Era. Although the 1970s and 1980s were a troubled period of economic restructuring and socio-political readjustment in all industrial states (the most dramatic changes including the return of mass employment, high inflation and volatile exchange rates, reflecting the problems inherent in investment-driven policies which were about to become exhausted), Finland managed to sustain a somewhat faster rate of economic growth than was the average for Europe as a whole, and a high level of employment.

Between 1950 and 1980, as measured by GDP per capita, Finland became one of the most affluent societies in the world, surpassing, among others, the United Kingdom. During this period annual GDP growth rates above five per cent were common, even though economic growth was by no means steady or predictable (in Finland annual GDP growth rates fluctuated more heavily than in most other European countries). Industrial production also showed strong growth: it decreased only momentarily, in 1975, the worst year of the oil crisis. Things looked good. During the 1980s, it seemed that nothing could stop Finland from becoming the most affluent nation in the world. Stock and real estate values were high, business was thriving and policy makers had no qualms about increasing public spending, but in the process the national economy and individuals became seriously indebted. A deceptive notion of Finland as the 'Nordic Japan' was born.

This period of overwhelming optimism, somewhat misleadingly labelled the 'casino economy', came to an abrupt end at the beginning of the 1990s.[19] In 1990 economic growth dropped back to zero, in 1991 GDP declined by 6.3 per cent, and the fall continued for another two years (–3.3 % in 1992 and –1.1 % in 1993). As a consequence, thousands of jobs were lost practically overnight and perceived job insecurity exceeded the OECD average (Kinnunen *et al.* 1999; OECD 1997). According to figures from Statistics Finland, unemployment skyrocketed from 3.2 per cent in 1990 to 16.6 per cent in 1994.[20] In light of these numbers, Finland faced a recession that was more severe than in any other European country. Only Sweden's situation resembled the plight of Finland. The 1990s was the decade that in all likelihood will prove to have been the most significant since the Second World War in Finland's independent history

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[19] Strictly defined, as Dan Steinbock (1998, 3) has remarked, in the 1980s the Finnish economy had none of the characteristics of a true wealth-driven 'casino economy', such as decentralized market forces, *laissez-faire* economic policies, global finance, and industry globalization. This misuse of terms was born out of popular writings depicting the failures of financial deregulation.

[20] OECD statistics produce an even darker picture: the rate of unemployment peaked at almost 22 per cent in 1994.

– although it is obviously very difficult to compare completely different historical events in this way.

While economists and other social scientists remain in disagreement on the exact causes of the recession (e.g., Kalela *et al*. 2001; Koistinen & Sengenberger Eds. 2002), it is safe to say that the collapse of Soviet trade and the sudden introduction of unregulated financial markets were among the main disruptive forces. The Soviet Union's share of Finland's total foreign trade declined from nearly 20 per cent of Finland's total exports in the mid-1980s to 15 per cent in 1988, and to less than 10 per cent in early 1991 (Häikiö 1992, 117). At the same time, Finland's foreign investment laws were liberalized and due to the process of European integration, Finland also had to open up its own markets to global capital. Unfortunately, rapid deregulation resulted in an overheating of the economy and this, in turn, led to the recession. Bankruptcies, the loss of jobs and deep cuts in public spending soared to record levels. The recession culminated in a banking crisis that cost the taxpayers some eight milliard euros worth public support, which according to some estimates exceeded the value of war reparations more than two-fold.

Moreover, as the European Community evolved into the European Union, protectionist trade barriers were gradually removed and stringent monetary rules imposed among the original EU member states as well as prospective newcomers. Before the recession, roughly speaking, Finland had yet to become a fully interconnected node in the global network of trade and finance, and occasional devaluations of the former Finnish currency (*markka*) had comprised the main means with which to adjust the economy to external fluctuations. By the time of Finland's EU membership, everything was different. With the collapse of communism and the breakdown of the Soviet Union, Finland was finally free to opt for full participation in European integration, and Finland indeed did seize the opportunity.

Once again the word unique perhaps best captures Finland's ambivalent position. Finland never was a satellite of the Soviet Union and thus cannot be identified with the post-socialist transition economies. But under Soviet influence, Finland was not able to join its European rivals either, at least in so far as cooperation implied political or military convergence in Europe. For four decades the country was torn between the two systems. So, only after the breakdown of the Soviet Union in 1991, amid the deepest recession in the era of independence, was Finland free to prepare its economic institutions to meet the demands for applying for membership in the EU, a goal that was met already in 1995. Having joined the EU, Finland became a member of the Economic and Mone-

tary Union (EMU) in 1999, and subsequently adopted the European single currency, the euro, as of the beginning of 2002. Today, the prospects of joining the North Atlantic Treaty Organization (NATO) and the military convergence of Europe are among the most heated political topics in the country.

Like many times before in its history, Finland was forced to adapt to a large-scale social structural transformation – a painful yet necessary process of the type that Schumpeter called creative destruction. Instead of investment-driven growth and nationally protected bureaucracies, or cartels as some commentators have preferred to call them (e.g., Steinbock 1998), this time the change was driven by the new rules of competition favouring nations that are able to support global corporations, innovativeness and a highly skilled and flexible labour force. In retrospect, the transformation can be deemed quite successful. Although the recession left certain parts of the population worse off than before, by the turn of the millennium Finland had one of the most competitive and dynamic economies in the world.

Towards a Global Information Society – Deregulation and Liberalization

> 'Wherever two or three Norwegians, Swedes, Danes, or Finns are congregated, you
> may be certain that they always, in addition to a church and a school, will construct
> a telephone switchboard.' (A.R. Bennett 1895; *ref*. Steinbock 2003, 113)[21]

While the situation in Finland today is very different from the years of rapid industrialization, the pace of change is still showing no signs of slowing down. As I have emphasized, the transitional phase from industrial to post-industrial society was exceptionally short-lived, so much so that it could be said that Finland bypassed the 'machine age' altogether. After the war, Finland caught up with the rest of the industrial world in a quantum leap from primary production to services. At the beginning of the 1990s, creative destruction began to gather momentum again across the Nordic countries, and Finland rose from the ashes of recession to the frontline of emerging information socie-

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[21] Despite the Finnish economy remained underdeveloped until the post-war era, the Finns have always been eager to adopt new technologies and innovations, such as telephone systems and electricity in the late 19th century. For example, Scandinavia's first electric light was lit in Tampere at the Finlayson factory in 1882 (see Myllyntaus 1991). The quote above is taken from Bennett's *The Telephone Systems of the Continent of Europe*. Alfred Rosling Bennett (1850–1928) was a British scholar, electrician and engineer who had an instrumental role in the development of early telecommunications systems.

ties. In this process the country became less dependent on resource-based manufacturing, particularly on forestry and metal-using industries, the traditional cornerstones of the economy. According to a common interpretation, it is precisely because of the lack of abundant natural resources to sustain industry that Finland was forced to make the changes that led to the creation of an information economy inclined to services (Shifflet 2001).

Especially in terms of the occupational structure, the pace of change has been extraordinarily rapid, perhaps even unprecedented in international comparison. As I remarked above, Finland maintained an exceptionally large agrarian population until very recently. Now, however, the service sector is the single largest employer in the country and knowledge workers the most important part of the labour force. In 2001, services accounted for 73.3 per cent of total employment, while the figures for employment in industry and construction were 21 per cent and for agriculture, forestry and fishing 5.7 per cent, respectively (OECD 2003c, 5). More importantly, the demand for a highly skilled and educated labour force has increased significantly. The rise of knowledge work – a theme I shall explore in Chapter Three – has played a decisive role in Finland's recent development towards a global information society. What makes the Finnish case unique and interesting is the exceptional speed with which the economy and the labour market have informationalized. According to Blom *et al.* (2000; 2001; 2002), for example, the number of knowledge workers has more than tripled from 12 per cent in 1988 to 39 per cent in 2000 (see Chapter Three, Table 3.3).

A National Innovation System

This is all quite astonishing in view of the fact that in the mid-1990s, shortly before it joined the European Union, Finland was still reeling in the aftermath of a severe economic recession. Despite the severity of the crisis, by the turn of the millennium the country was well and truly back on its feet again. This would hardly have been possible without systematic specialization in high technology products and services and a heavy investment in research and development.[22] Economic deregulation has also contributed

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[22] The two Nordic countries that resemble each other most closely with respect to the production of ICTs, are Finland and Sweden. ICT goods, and telecommunications equipment in particular, play a major role in both Finland and Sweden: 'In 2000, the proportion of ICT goods of total manufacturing production was 12–16 per cent in Sweden and Finland, as compared to 3–5 per cent in Norway and Denmark. The same is reflected in exports, as in 2001 the proportions of ICT goods of total exports were 22 per cent in Finland and 13 per cent in Sweden. However, the world-wide setbacks of the ICT industry are clearly visible in a downturn in trade in 2000–

to this process. Facilitated by the early liberalization of the telecommunications market, the latter half of the 1990s saw the aggressive growth of ICTs as a new engine of foreign trade, economic growth and welfare. By the end of the decade, ICT production comprised the largest proportion of export revenues, exceeding the significance of the traditional paper and metal-producing industries.

Policy choices have been crucial in this context, in two complementary ways. On the one hand, there has been exceptionally broad cooperation in the country among business enterprises, publicly funded research institutes and policy makers. In the 1980s, Finland arguably became the first country in the world to embrace the concept of a national innovation system as the foundation of its science and technology policy (Steinbock 2004b, 92; see also Nieminen 2005). This concept encompasses education, science and R&D as well as internationalization and various public institutions in charge of these activities. For example, since 1986 the Science and Technology Policy Council of Finland, chaired by the Prime Minister, has had a prominent position in shaping, coordinating and resourcing science and technology policy. Comprising government, industry, science and labour market representatives, it is a truly exceptional body in terms of its scope (Paija 2001). Other important events of the 1980s included the establishment of the National Technology Agency (Tekes) in 1983 and the Finnish Competition Authority (FCA) five years later. While the former has become the most important source of public technology funding in Finland, the establishment of the latter institution signalled a conscious move towards a truly competitive economy, away from regulative and restrictive policies.[23]

On the other hand, the development of welfare state mechanisms since the 1960s has provided the social cohesion necessary for the nation's adaptation to rapidly following changes. In particular, systematic investment in education has made it possible to meet the demands of the changing industrial environment. At the turn of the 1960s–1970s the 9-year-long comprehensive school system was implemented, with a view to abolish educational inequality, then upper secondary education was expanded to cover the whole population, and today the government seems to have no qualms about expanding training at universities and polytechnics. Consequently, by international standards, the level of education, from comprehensive schools through to universities, is

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2001, for in the year 2000 these proportions were 25 per cent in Finland and 20 per cent in Sweden.' (*Nordic Information Society Statistics 2002*, 8)

[23] For more details, see www.minedu.fi/tiede_ja_teknologianeuvosto/vttn.html; www.tekes.fi; www.kilpailuvirasto.fi.

high and differences between educational institutions rather moderate (albeit growing), not to mention the fact that tuition fees are minimal.[24]

Education is also a highly valued asset in Finnish society. Today, roughly half of each age cohort takes the matriculation examination, providing the necessary qualifications to progress to university level studies.[25] Although prospective university students must pass an entrance examination, the possibilities to acquire higher education abound. According to Statistics Finland, the aggregate intake in higher education institutions (universities and polytechnics combined) corresponds to around 70 per cent of each age cohort. At the same time, however, graduation takes a relatively long time (an average of six years to complete a master's degree), perhaps reflecting a less than optimal use of Finland's most important asset, i.e. its intellectual capital. Nonetheless Finland has managed to recruit enough competent labour in the production of high-value goods and services so that it is able to stand out in the global competition. As a consequence, Finland has become an internationalized, innovation-based economy (see, e.g., Hernesniemi *et al*. 1996; Kuusi Ed. 1996; Steinbock 1998).

The Most Competitive Nation in the World?

Indeed, in recent years Finland has often been heralded as a model example of the 'new economy' based on technological know-how and a highly educated workforce. It is suggested that Finland has made excellent use of its innovative R&D and intellectual capital. According to Richard Florida and Irene Tinagli (2004), who have compared Europe and the United States in terms of their creative potential, the US is losing ground to the 'creative crescent' of northern European countries. The top five countries in the Euro-Creativity Index compiled by Florida and Tinagli are Sweden, the US, Finland, Netherlands and Denmark. Florida and Tinagli looked at values and attitudes research arriving at the conclusion that Nordic countries such as Finland and Sweden do well as open and tolerant societies, although they are not ethnically diverse:

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[24] However, the emphasis on education is nothing new. The Finnish philosopher and statesman J.V. Snellman stated unambiguously as early as the mid-19th century that the power of a small nation lies in education (Pesonen & Riihinen 2002, 238). Although Snellman, an advocate of the German-born ideal of *Bildung* (i.e., valuing knowledge and learning as such), would hardly accept the current discourse on global competitiveness, he should be quite pleased to see the abundance of educational opportunities: until 1920 the University of Helsinki, founded in 1640, bore the sole responsibility for higher education but now, at the beginning of the 21st century, there are twenty universities and thirty polytechnics in the country.

[25] The matriculation examination is roughly equivalent to a high school diploma in the US (although it is academically more rigorous and comparable to the 'gymnasium' elsewhere in Europe).

'Our analysis suggests that the competitive epicenter of Europe is shifting from the traditional powers, like France, Germany, and the UK, to a cluster of Scandinavian and northern European countries. Sweden is the top performer on the Euro-Creativity Index, outperforming not only all of the other European countries but the United States as well. Finland and the Netherlands also do exceptionally well, with competitiveness levels comparable to the United States. Finland in particular appears to be well-positioned to compete in the Creative Age with a high level of overall creative competitiveness and rapid growth in its creative capabilities.' (Florida & Tinagli 2004, 40)

Interestingly, in the above analysis Finland seems to be less clannish or introverted region as it is often made out to be. Yet, as I will argue later on, it is quite clear that Finland could benefit from developing a more welcoming attitude towards immigrants as well as developing its overall tolerance. The fact is that Finland's population is very homogenous, which hardly is the most fruitful ground for developing a creative and economically flourishing social milieu. According to Florida (2002; 2005), the key to understanding regional differences in prosperity lies in what he calls the 3 T's of economic development: *Technology*, *Talent* and *Tolerance*. To attract and retain creative people across the social spectrum and to spur innovation and economic growth, a place must have all three, Florida argues. Finland certainly has technological edge as well as talent, but as far as tolerance is concerned (defined by Florida as openness, inclusiveness, and diversity to all ethnicities, races and walks of life) there surely is room for improvement. The following quote from Charles Landry's *The Creative City* (2000), one of the decade's most influential texts on urban planning, illustrates the point:

'As an interviewee in Helsinki noted: "A networking culture is not easy in Finland – it may sound like a cliché, but it is the stubbornness, envy and independence". Or: "You must remember that everybody knows each other and until recently everybody lived near the rural forests and was defensive".' (Landry 2000, 128)

Despite the problem of the homogenous population, other recent statistics support the view that Finland has one of the most dynamic economies worldwide. An important symbolic event in this respect was the nomination of Finland in 2001 as the world's most competitive economy: this was the first time ever that a European country came out on top on the list published by the World Economic Forum (WEF), which in earlier years had always been topped by the United States or one of the 'Asian tigers'. In 2002 Finland placed second after the US, but in the following year it regained its top slot,

while the US moved down to second place, Singapore came in at number three and Sweden took fourth. In 2005 Finland topped the WEF's list for the third year running forcing the US to settle for second position (Table 2.1). These achievements have prompted the WEF to label Finland one of the world's most remarkable success cases over the last decade.

Table 2.1. The World Competitiveness Country Rankings 2001–2005.

Country	WEF					IMD				
	01	02	03	04	05	01	02	03	04	05
Finland	1	2	1	1	1	5	3	3	8	6
USA	2	1	2	2	2	1	1	1	1	1
Taiwan	7	3	5	4	5	16	20	17	12	11
Singapore	4	4	6	7	6	3	8	4	2	3
Sweden	9	5	4	3	3	11	12	12	11	14
Switzerland	15	6	7	8	9	8	5	9	14	8
Australia	5	7	10	14	10	12	10	7	4	9
Canada	3	8	12	15	14	9	7	6	3	5
Norway	6	9	9	6	9	19	14	15	17	15
Denmark	14	10	4	5	4	15	6	5	7	7
UK	12	11	15	11	13	17	16	19	22	22
Iceland	16	12	8	10	7	10	11	8	5	4
Japan	21	13	11	9	12	23	27	25	23	21
Germany	17	14	13	13	15	13	17	20	21	23
The Netherlands	8	15	12	12	11	6	4	13	15	13

Source: WEF; IMD.

Finland has also fared quite well in other ranking lists compiled by the IMD (International Institute for Management Development) and Unice (Union of Industrial and Employers' Confederations of Europe).[26] Somewhat surprisingly, however, many prominent Finnish economists have called into question the meaningfulness of these kinds of contests, instead of celebrating Finland's success. Among other things value judgements involved have been criticised (Rouvinen 2001). That is, according to the critics, the comparisons are only partially based on 'hard' economic data, whereas too much emphasis is placed on 'soft' data such as corporate leaders' interviews. Moreover, economists have pointed out that only a weak correlation exists between competitiveness ranking and growth in GDP per capita, a typical indicator of economic welfare, although common sense would suggest otherwise (Vartia & Nikinmaa 2004). Yet another problem is that current rankings have very little if any value in predicting the future.

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[26] For more details, see www.weforum.org; www02.imd.ch; www.unice.org. Although the WEF and IMD rank countries slightly differently, there is a clear correlation between the two rankings of a given country, the correlation coefficient being 0.88 (Vartia & Nikinmaa 2004, 74).

However, this is not to say that competitiveness indices are worthless. As Pentti Vartia and Timo Nikinmaa (2004) conclude, they are an indicator of risk: 'basic Nordic strengths, such as a developed infrastructure, a stable society, lack of bureaucracy, non-existent corruption, low crime, etc., receive much weight in the indices' (p. 75). Whatever the shortcomings in these rankings, the fact remains that Finland's competitiveness has skyrocketed since the early 1990s.

Current international comparisons also suggest that the technological infrastructure in Finland is well developed. A report published by the United Nations Development Program (UNDP) in July 2001 rated Finland's technological infrastructure as the most advanced in a comparison of 72 countries. In yet another comparison, the Information Society Index (ISI), Finland, along with the other Nordic countries, has also done well in recent years.[27] This view is supported by official statistics. The Nordic countries today have the highest level of ICT penetration in the OECD family. As of 2004, virtually all Nordic citizens had access to a mobile phone, about four-fifths to a PC and two-thirds had an Internet connection at home (see *Nordic Information Society Statistics 2005*).[28]

Although the figures for ICT penetration in homes are somewhat lower in Finland than in the other Nordic countries, Finland has been a true pioneer in the development of mobile telecommunications and related value-added services, equalled perhaps only by Japan. In Finland the wireless success story of Nokia and its subcontractors has had a particularly significant impact, providing a tremendous boost to the economy since the early 1990s (see especially Häikiö 2002; Steinbock 2001). An illuminating fact is that in 1990, the only EU country with a significantly weaker balance of trade in information

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[27] For more details, see www.undp.org; www.worldpaper.com.

[28] In addition to the rankings referred to above, Finland has earned reputation in important international comparisons measuring general social well-being. For example, according to the Transparency International (www.transparency.org), Finland is one of the world's least corrupted countries. Moreover, in 2004 the International Labour Organization (www.ilo.org) rated Sweden as the world's best country for wage earners, with Finland a close second (followed by Norway, Denmark and the Netherlands). According to the ILO's report *Economic Security for a Better World*, which includes estimates for countries representing more than 85 per cent of the world's population, economic security – coupled with democracy and government spending on social security – promotes economic growth and social stability. The report contends that rising income level has little effect on national happiness as wealthy countries grow wealthier; rather, the key factor is the extent of income security, measured in terms of income protection and a low degree of income inequality. In this respect Finland, along with the other Nordic countries, clearly is a pacesetter. Furthermore, in line with the view advocated in this book, the ILO survey indicates that Finnish employees have better than average opportunities to affect the content of their work and develop their professional skills, which also contribute to personal well-being. The report was based on household and workplace surveys covering over 48,000 workers and more than 10,000 workplaces worldwide.

technology products than that recorded by Finland was Spain. However, by the end of the decade Finland's export/import ratio was the highest in the EU (Statistics Finland 2001, 120). Today the production of electronics is the most important branch of Finnish export industries exceeding the value of traditional manufacturing by a wide margin. For example, while pulp and paper, the original cornerstone of the Finnish economy, accounted for almost one third of all exports in 1980, their share had decreased to one-fifth in 2003. In the same period, the share of electronic and electrical industries grew from four per cent to one-third of all exports – thanks in large part to Nokia (see OECD 2005b, 100).

This development has not gone unnoticed in the international press. Since the early 1990s Nokia has enjoyed continuous exposure from *Business Week* to *The Wall Street Journal*. For example, in September 1999 *Wired*, the semi-official voice of new economy advocates, devoted a 15-page cover story to the company. Earlier in the same year *Newsweek* had proclaimed that since Finland has a national knack for mobile communications and information technology, and a vision for combining the two, 'the future is Finnish'. More recently, in February 2002 *The New York Times* went on to write that due to Nokia's impact, Finland has become technologically the most inter-connected nation in the world and, within the space of just a decade, successfully adjusted its economy to global competition.[29] In addition to Nokia, Linux, an open-source computer operating system invented by the Finnish programmer Linus Torvalds, has made the headlines as a potential alternative to Microsoft's hegemony. These and other less glorified yet important success stories, ranging from the world's first walking forestry machine to the design of new materials and production processes, point to a profound change in the structure of the Finnish economy towards a high-tech focus.[30]

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[29] To give just one more example, two journalists, Robert G. Kaiser and Lucian Perkins from the *Washington Post*, toured Finland in the summer of 2005 and wrote an extensive travel diary for their newspaper. They focused not only on technology but also on Finland's culture and educational system. As a consequence of their experience, they went on to write that Finland just might be the world's most interesting country that Americans know least about: 'It has the best school system in the world, some of the most liberated women (the president is female), more cell phones per capita than anyone else, one of the world's best high-tech companies (Nokia), remarkable information technology of many kinds, great music from rock and jazz to classical. The Finns are proud of their generous welfare state, which provides, among much else, free health care and free education at every level.' Finally, the two journalists ended up asking: Should the United States be learning something from Finland's welfare state? (see http://blogs.washingtonpost.com/finlanddiary).

[30] For an overview of Finnish technology-centred enterprises see, e.g., *High Technology Finland 2006*, *ICT Cluster Finland Review 2005* and *Views on Finnish Technology 2006*.

Indeed, as Michael Porter, one of the leading architects behind the WEF's global competitiveness list, argued in his important book *The Competitive Advantage of Nations* (1990), successful firms are seldom alone. Rather, as industrial economies have evolved towards innovation-driven growth, competitiveness increasingly stems from a cluster of firms supporting each other.[31] This has clearly been the case with Finland. According to Porter's model, there are four distinct yet overlapping stages that industrial production passes through, as Figure 2.1 illustrates. The first three stages are associated with progressively rising economic prosperity, while the fourth stage is one of drift and ultimately decline.

Figure 2.1. Four Stages of National Competitive Development.[32]
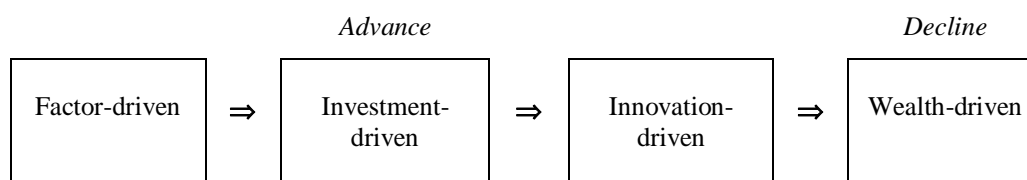
Source: Porter 1990, 546; see also Hernesniemi *et al.* 1996.

Roughly from the mid-1800s to the era of war reparations, the Finnish economy relied on two of the most basic factors of production, i.e. land and labour (the first stage in Porter's model). As I remarked in the previous section, Finland's main economic engine was forestry. In this stage, Finland was predominantly a raw material exporting country and it had to import technology as well as managerial know-how. Concurrently, the economy was highly sensitive to external fluctuations and competitive advantage was dictated primarily on the basis of price. After the Second World War up to the 1980s, Finland turned in its search for further growth to investment-driven policies. In this

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[31] According to a formal definition: 'A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The geographic scope of a cluster can range from a single city or state to a country or even a network of neighboring countries.' (Steinbock 2004a, 28)

[32] Porter's theory of the competitive advantage of nations has inspired subsequent studies in nearly all industrialized countries. In Finland Porter's work served as the catalyst of one of the largest public research projects ever. The aim of the 'Competitive Advantage of Finland' project was to identify the main industrial clusters and future growth prospects of the Finnish economy. In the final project report it was forecast that the three fastest growing clusters of telecommunications, well-being and the environment would reach the size of the traditional forest and metal clusters by the year 2010 (Hernesniemi *et al.* 1996). However, the ICT cluster alone outperformed the forest and metal clusters by the end of the 1990s! Ever since his book on the competitive advantage of nations was published, Porter has been keen on following Finland's progression towards an innovation-driven economy. He has lectured in Finland on several occasions and also been personally involved in various cluster studies (e.g., Steinbock 1998).

stage firms sought competitive advantage from economies of scale. Strong public interventions were also made in order to channel capital to support export industries. In the 1980s, however, this route came to an end: in an increasingly global economy national policies as well as firm-level strategies relying on traditional factors of production (including capital) were proving less and less effective. For a while Finland drifted into the wealth-driven stage, which is characterized by declining investments, loss of entrepreneurial dynamism, increasing consumption, and ultimately the stagnation of growth. At the same time, though, creative destruction was building up and due to the emergence of a strong ICT cluster, spearheaded by Nokia, the country leapfrogged towards an innovation-driven stage, in which 'firms not only appropriate and improve technology and methods from other nations but *create* them' (Porter 1990, 554; italics in original).

Research and Development

Arguably, one of the main reasons behind Finland's rapid turnaround has been the sharp increase in its spending on research and development, especially in the private sector. According to figures compiled by Statistics Finland (2001, 127–128; 2004, 98–100), there was hardly any change at all during the 1990s in levels of R&D intensity in the major industrial countries. In Finland, however, the R&D input steadily increased throughout the decade: the GDP share of R&D expenditure rose from 2.0 per cent in 1991 to 3.2 by the end of the decade.

According to the latest information available, R&D expenditure in Finland reached 3.5 per cent in 2002 but then, due to the global economic downturn, the growth levelled off (Table 2.2). Nevertheless the development has been impressive by any standards: since the early 1970s the volume of R&D in Finland has grown ten-fold. The only EU country spending more on R&D is Sweden, where the GDP share of R&D in 2001 was 4.3 per cent, compared to an average annual of some 1.9 per cent in other EU countries. The highest figure of all, however, is recorded in Israel at close to five per cent of GDP.[33]

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[33] Spending on R&D clearly has paid off. According to WEF's global information technology reports, published annually since 2002, Finland not only is one the most technologically interconnected nations in the world, but the country also outranks some of the larger European economies in terms of the number of US patents registered per million inhabitants, a frequently used indicator of a nation's innovation record.

Table 2.2. Research and Development Expenditure in 1993–2004 (according to Statistics Finland).

	1993	1995	1997	1999	2000	2001	2002	2003	2004
€million									
Business enterprises	1 049	1 373	1 917	2 644	3 136	3 284	3 375	3 528	3 434
Public sector *	380	374	409	470	497	501	530	515	504
University sector **	368	425	580	765	789	834	926	962	1 017
Total	1 796	2 172	2 905	3 879	4 423	4 619	4 830	5 005	4 955
As % of GDP	2,2	2,3	2,7	3,2	3,4	3,4	3,5	3,5	3,3
%									
Business enterprises	58,7	63,2	66,0	68,2	70,9	71,1	69,9	70,5	69,3
Public sector *	21,1	17,2	14,1	12,1	11,2	10,8	11,0	10,3	10,2
University sector **	20,5	19,6	20,0	19,7	17,8	18,1	19,2	19,2	20,5
Total	100	100	100	100	100	100	100	100	100

Source: Statistics Finland, Science and Technology Statistics. http://www.stat.fi → Finland in figures (Accessed 11.1.2006). Figures for 2003 and 2004 are based on preliminary data.

* Including private non-profit sector.

** Including central university hospitals since 1997 and polytechnics since 1999.

The rapprochement between academic basic research and the business world has also contributed to this process, even though public R&D spending remains modest in comparison to the private sector. According to Statistics Finland, privately funded research accounted for 71 per cent of total R&D expenditure at the turn of the millennium, whereas a decade earlier the figure was 57 per cent. This imbalance is partly due to Nokia's impact. Nokia alone accounts for more than one-third of the country's total R&D input. Although Nokia's own research expenditure exceeds government subsidies by a wide margin, it has clearly benefited from its close cooperation with universities. Nokia's success is as much a result of good business sense as national technology policy, which has emphasized the importance of R&D and higher education as well as the liberalization, deregulation and privatization of telecommunications. It is the interdependence of technological innovation and systematic investment aimed at the development of know-how combined with a liberal and highly competitive telecom market that largely explains the recent success of the Finnish ICT industry.

In this context, the role of deregulation deserves special mention. In Finland the telecommunications sector was opened to competition earlier than in most other countries. In fact, the origins of free competition date back to the late 1880s, when the Finnish Senate granted several private licences to engage in telecommunications that circumvented Russian telegraph regulations (Paija 2001, 51). More recently, in the early 1980s the now outdated analogue NMT (Nordic Mobile Telephone) network paved the

way for the ongoing digital revolution. Whereas closed national standards failed, the path adopted by the Nordic countries quickly created a mass market of wireless communications that in turn provided impetus for the equipment industry. The pan-Nordic network was important because it was based more on market needs than technical parameters, and as such it provided concrete proof of the potential mass appeal of mobile car phones and handsets.

Initially, however, mobile telecom services were a state privilege, although a number of regional telephone companies had a century-long tradition in providing wired connections. A decisive break took place in 1988 when privately owned operators established a joint venture, which subsequently received a licence to launch GSM (Global System for Mobile Communications) services.[34] On July 1, 1991, this venture resulted in the opening of the world's first commercial GSM network provided by Nokia – years ahead of America and many other countries. Early deregulation allowed Nokia to exploit its home turf as a test laboratory for an emerging 'mobile life style' (Kasesniemi 2003; Kopomaa 2000).

It is no exaggeration to say that the rest is history. By 2000, Nokia had become one of the world's most valuable brands and the ICT sector the most important branch of the Finnish economy.

So Far, so Good ... A New Crisis on the Horizon?

On these grounds, Finland's recent development towards a global information society has been at the centre of increasing international interest. Finland is considered to be not only one of the most advanced economies in the world, but also an exceptionally egalitarian society, virtually free from corruption and other large-scale social disparities. For example, in the academic world none other than Manuel Castells has showed a great deal of interest in the Finnish case:

'No need to look into future: just look around at courageous efforts such as those

taking place in Finland. The Finns have quietly established themselves as the first

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[34] Originally, the acronym GSM referred to *Groupe Spécial Mobile*, which was a working group established by the European Conference of Postal and Telecommunications Administrations (CEPT) in 1982. The objective of the group was to create a standard for second-generation (2G) mobile telecommunications, i.e. the now conventional GSM handsets and networks, with NMT representing the first generation (1G). The most comprehensive studies on the development of mobile communications I am aware of are provided by Steinbock in *Wireless Horizon* (2003) and *The Mobile Revolution* (2005).

true information society, with one website per person, Internet access in 100 per cent of schools, a computer literacy campaign for adults, the largest diffusion of computer power and mobile telephony in the world, and a globally competitive information technology industry, spearheaded by Nokia. At the same time they have kept in place, with some fine-tuning, the welfare state.' (Castells 2000, 72)[35]

Can Pioneering Continue?

There is no denying that Castells' words are more than flattering for Finland. Yet there are a number of critical points I feel obliged to address when evaluating the Finnish ICT miracle – there are worrying signs that Finland might be losing its competitive edge. First and foremost, in the year that the quotation above was published, the hype surrounding ICTs reached its peak with well-publicized results. After a sustained economic boom, the stock market bubble burst and 'irrational exuberance', to borrow Alan Greenspan's now famous phrase, turned to bitter pessimism and uncertainty.[36] Soon after the US economy plummeted, the growth of Finland's GDP came to a grinding halt, dropping from a staggering seven per cent in 2000 to 1.2 per cent in 2001. Between 1994 and 2000, average annual GDP growth had been around five per cent, a respectable figure for any advanced economy. Although for the time being Finland has endured the global downturn with less damage than the euro area as a whole, the medium-term outlook remains bleaker, as we shall see below.

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[35] More recently, Castells has devoted a whole book to the case of Finland. In *The Information Society and the Welfare State: The Finnish Model* (2002) written together with Pekka Himanen, Castells provides a succinct overview of Finland's recent developments. A Finnish translation of the book was published in September 2001, one year before the international edition. In Finland the book aroused immediate controversy both in the mainstream media and academic circles. While the media highlighted the authors' appraisal of the egalitarian yet globally competitive character of the Finnish information society, most academics, including the author of this volume, criticized the analysis for its overly selective scope and lack of empirical and historical realism one might expect to see in sociology (Pyöriä 2001c). For example, Castells and Himanen go on to argue that 'today, the Winter War and the reconstruction of Finland after the devastation of World War II have been replaced as a collective project by the building of the information society, which developed into a key theme in the context of surviving the recession of the early 1990s' (p. 131). Suffice it to say here that drawing a parallel between two completely different historical situations runs counter to plain common sense. Although the analysis provided by Castells and Himanen makes an important contribution and the authors recognize Finland's current weaknesses and future challenges, they tend to see Finland through the eyes of a tourist rather than an anthropologist who attempts to capture the lived experience of ordinary people.

[36] Greenspan, an American economist and former Chairman of the Board of Governors of the Federal Reserve of the United States (FED), made the expression 'irrational exuberance' famous in his speech at the American Enterprise Institute in December 1996. In his speech Greenspan warned that overly optimistic market sentiment has unduly escalated asset values. Later on Greenspan's phrase became synonymous with the stock market bubble of the late 1990s.

In Finland and elsewhere, the ICT sector suffered from an even sharper downturn than the economy as a whole. Although Nokia has almost consistently outperformed its competitors, especially with regard to its profitability, the Finnish ICT sector nonetheless experienced a drop from double-digit growth in 2001 to around two per cent in the following year. At the time of this writing, the global economy seemed to be recovering rather slowly and economic indicators point at mixed directions – the word perplexed perhaps best characterizes the prevailing market sentiment. It also seems that Nokia's growth has come to a halt and the lead it has enjoyed is now being reduced. Consequently, in the foreseeable future there is very little hope of the Finnish economy being able to recover to the growth levels that it was accustomed to seeing in the latter half of the 1990s. Unrealistic hopes placed on steady economic growth as well as overt technological optimism are once again *passé,* as has been seen on numerous occasions before in history.

It also seems that Finland has been slipping from its top slot among the elite of information societies. Against the backdrop of a turbulent world economy, the rapid growth in R&D input appears to have peaked, which in turn is likely to slow down the potential for further innovation-based growth. In this respect, Finland's dependency on the provision of ICTs is considered particularly problematic. Operating in a highly uncertain business terrain, Nokia as well as other vendors in the ICT sector depend largely upon future promises and technologies yet to be commercially deployed. For example, the move towards third generation (3G) mobile handsets and networks, or the Universal Mobile Telecommunications System (UMTS), has been a much slower process than anticipated, not to mention the prospect of 4G platforms enabling broadband data transmission and ultimately the seamless integration of all modes of wireless communication from radio and television broadcasting to the Internet (see Steinbock 2003, 51–61).

What will happen to the Finnish telecom industry if mobile multimedia, i.e. 3G and subsequent developments, prove either economically or technologically untenable, or if for some other reason they fail to generate mass-market appeal? Would such alternatives as wireless wide and local area networks (WAN, WLAN) or broadband wireless access technology (WIMAX) provide sufficient impetus for growth and, most importantly, could the Finnish ICT cluster adjust to such a change? According to Nokia's vision, the evolution of mobile phones is progressing from voice to data transmission, towards a multimedia cellular. Nokia's major US-based rivals, Microsoft and Intel, see it

the other way around. Their view is that laptop and palm computers (equipped, for example, with a WLAN link) will seize the market.[37]

For the time being, only one thing is certain: the competition is set to intensify considerably. Between 1991 and 2001, Finland did indeed reap the benefits of being at a forefront in the initial phase of the mobile digital revolution, but only the future will tell if the country can translate this benefit into sustainable competitive advantage. As Steinbock (2004a) has concluded, being a pioneer in a certain field of technology has many benefits, such as favourable access to 'raw' materials and good reputation, yet it does not automatically guarantee competitive edge.

Unemployment and Other Social Problems

From a broader societal perspective, it is also worth stressing that a high level of technology hardly makes a country more 'advanced' than others. The success of Nokia is not the whole story of Finland. In economic and technological terms the 1990s may have appeared to be an exceptionally triumphant decade for the Finns, but if we look at the mundane reality of working life and society at large, a more complicated picture emerges. Consider the following:

– The level of unemployment has stabilized at close to eight per cent, which is below the EU average but still far from healthy figure.
– Contingent or precarious employment has become more common than before.
– Those who are employed and economically active, knowledge workers in particular, are suffering from considerable work-related stress symptoms.
– Income differentials are wider than during the period of industrialization (although still quite reasonable by international comparison).
– The ageing of the population, reflecting the retirement of the baby boom generation combined with increasing life expectancy, is likely to become a serious burden for future taxpayers.

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[37] At this writing, Nokia continues to have faith in the future success of 3G, but the company also invests in alternative technologies. For example, in 2004 Nokia introduced a new version of its flagship product, the Communicator, now equipped with a WLAN link. Together with such companies as Intel and Motorola Nokia also plays an important role in the development of WIMAX technology, which according to some commentators could become a cost-effective alternative to 3G. The acronym WIMAX refers to Worldwide Interoperability for Micro Wave Access Forum. More recently, as of February 2005, Nokia surprised market analysts by publicizing its plans to cooperate with Microsoft, perhaps indicating that technological convergence will progress from the realm of PCs to the wireless world. Yet another recent turn in Nokia's strategy has been the company's decision to manufacture cell phones for telecom operators, following their specifications.

Apart from these new challenges, the question of migration has once again resurfaced. During the recession of the early 1990s the movement from rural areas to urban centres began to escalate; by the turn of the millennium it had reached the same sort of magnitude as was experienced during the Great Migration in 1960–1975. Although Finland's internal migration has calmed down and become more balanced in recent years, at present regional differences in employment opportunities and in the quality of public services constitute a major social problem, and it seems there is no force that could bring work and economic regeneration back to depressed regions. For example telework, which I will discuss in Chapter Five, has failed to live up to its promises and allow for a geographically even distribution of employment. Knowledge workers in particular tend to concentrate in and around a few major cities – namely in the regions of Helsinki, Tampere and Oulu – creating an attractive environment for the development of further economic prosperity (Blom *et al*. 2001, 49–51).

On the positive side, Finland's 'brain drain', i.e. the loss of intellectual capital to foreign countries, is virtually non-existent in comparison to less developed countries such as India (Khadria 1999). Even though Finland's high level of taxation has often been the target of scathing criticisms by corporate leaders, for example by Nokia's former CEO Jorma Ollila, and lay persons alike, universal welfare benefits and practically free education up to university level balance the account. In fact, the vast majority of people in Finland appreciate tax-funded services in spite of the costs. In an opinion poll carried out by the Centre for Finnish Business and Policy Studies (EVA) in 2000, 85 per cent of the respondents agreed with the statement that 'although good social protection and other public services are very expensive to maintain, the Finnish welfare state is worth its cost' (Ekholm 2001, 83).[38] This consensus is remarkable in view of the fact that a middle-income wage earner making no more than 30,000 euros a year faces a marginal tax rate of about 45 per cent, with the maximum tax rate on personal income being 60 per cent and the average about 30 per cent.

A bigger and more pressing issue than public opinion in Finland is the country's appeal (or the lack of it) in the eyes of highly skilled foreign professionals and international enterprises seeking new partnerships. The competition for top knowledge workers' expertise has gone global, yet the number of foreign professionals in Finland has remained modest indeed. Today, foreign nationals account for around two per cent of

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[38] The Centre for Finnish Business and Policy Studies (EVA) is a think tank that was founded in 1974 as a counterweight to Soviet influence. Today the think tank continues as an open forum for liberal politicians and business leaders (see www.eva.fi).

the population in Finland. Despite its chronically high unemployment level, Finland will not be able to maintain its competitiveness on its own in an increasingly interdependent and heterogeneous world. According to some experts, not only professionals but people from all walks of life should be welcomed to Finland. It is feared that the present rate of immigration is not enough to compensate for the impeding shortage of labour expected when members of the post-war baby boom generation retire. Of course, this is not to suggest that Finland or any other country should use any means available to exploit foreign expertise, but the fact is that global success requires global cooperation. A sustainable solution should involve a long-term exchange of expertise between different areas and countries – the future of knowledge work is increasingly cosmopolitan and multicultural.

In short then, Finland's current socio-economic situation can be characterized as contradictory. On the one hand, there is intense and continuous public criticism of structural unemployment and other social problems, but the same goes for the financing of the public sector, in spite of its conduciveness to social equality. On the other hand, it is feared that the ageing of the population and the shortage of skilled foreign labour will hamper the future development of those high-tech enterprises that are striving for global success. These are the main challenges that Finnish policy makers must address over the next decade. The Finnish information society may appear to be exceptionally advanced by international comparison, but there is still much room for improvement on many fronts.

Chapter 3

The Rise of Knowledge Work

In this chapter I elaborate the concept of knowledge work. The aim of the chapter is to contrast my understanding of what knowledge work is with the existing research literature and set my position in the context of information society studies. After considering a variety of methodological questions ranging from social theory to statistics, I outline my working definition of knowledge work upon which the remainder of this volume will rest.

A New Breed of Labour

When one flips through the pages of popular business magazines or mainstream management books, it is easy to get the impression that the notion of knowledge work is new. However, Fritz Machlup established knowledge-based activities as a legitimate field of empirical research in economics as early as 1962. Peter Drucker (1969) and Daniel Bell (1973) then popularized the idea beyond academic circles.[39] Simultaneously, yet independently of their American counterparts, Japanese researchers foresaw the coming of an information society (*johoka shakai*) and also developed a distinctive methodology for quantifying the consumption of information flows cascading across

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[39] The late Drucker, often labelled 'the father of modern management', has given himself the credit of coining the terms 'knowledge work' and 'knowledge worker' (see Drucker 1993, 6). However, it is likely he picked up the idea from Machlup. Although it remains unclear who really was the first academic to employ the concept, it cannot be denied that Drucker was the first to popularize the term.

society's communication channels (see Dordick & Wang 1993; Duff 2000; Ito 1981; Pool *et al*. 1984).[40]

Although these early 'traditions' of information society studies represented completely different schools of thought, their conclusions were quite similar. On the one hand, if we look at the latter half of the 20th century, we can see a significant increase in the production and consumption of information goods and services. Communication systems constitute one of the fastest growing and most important components in the economies of most nations – for good reason, it is often said that the volume of information at our disposal is now doubling every couple of years. On the other hand, we can also witness the rise of knowledge work as a major trend in Western labour markets, a key factor that distinguishes globally competitive economies from their weaker rivals (Aoyama & Castells 2002; Frenkel *et al*. 1999; Soete 2001). It is perfectly justifiable to make the generalization that innovative and creative potential ultimately determines the success of individual actors as well as the organizations surrounding them. Since Porter published his theory of competitive advantage, consensus has it that the wealth of a nation depends neither on abundant natural resources nor capital, but rather on firm-level knowledge, i.e. the intellectual capability of individual workers and the skills with which organizations harness and develop this asset (Baumol 2002; Boisot 1998; Burton-Jones 1999; Nonaka & Takeuchi 1995).

The growing importance of knowledge as an economic resource reflects the fact that, as economies and production technologies develop, they become ever more complex and specialized, leading to increasing coordination costs. In the language of information (or communication) economics, 'the organizational or informational task of coordinating the diverse steps in the productive chain grows, as the number of transactions within and among productive units increases' (Joncher 1983, 15). Logically, the increasingly complex economy must also generate more information flows (Robinson 1986, 186). In other words, the more complex and differentiated the production system becomes, the more communicative effort is required to manage organizational processes. In keeping with this trend, the demand for informational labour that is capable of handling, synthesizing and creating new knowledge has grown, while space for traditional manual work, susceptible to be replaced by automation and mechanization, has been reduced.

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[40] According to Youichi Ito (1981), the term *johoka shakai* was coined in Japan in the late 1960s and was meant to be closely analogous to *kogyoka shakai* or industrial society: 'In Japanese, *johoka* means "informationalization" or "informationalized" and *shakai* means "society". Thus, *johoka shakai* means literally "informationalized society".' (p. 671)

Does this imply that a new economic regime or social order is emerging out of the growing complexity of society? Are we witnessing a qualitatively new phase of capitalism alongside the changing labour markets and organizations? Although it is far too early to offer any conclusive answer to questions of this magnitude, my educated guess at this point is a tentative 'yes'. When I talk about an information society, or specifically about Finland, I refer to the emergence of a global high-skills economy, which is characterized by de-standardization and flexibility of work, growing educational demands and all-pervasive effects of technology in organizations and society at large. This development, to quote a vivid passage by Phillip Brown and Hugh Lauder (2001), 'signals the terminal demise of industrial man, typified by the Fordist worker who has become a minor player in the overall pattern of economic life' (p. 159).

This is the point where knowledge workers enter the scene. Following the demise of 'industrial man' (Kerr *et al*. 1960), a new breed of labour has risen to prominence. Pick up any major newspaper today and look at its appointments section, and you will get an idea of just how marginal the number of jobs in the manufacture of material goods (not to mention primary production) is in comparison to professional and service occupations that involve working with knowledge or people. What is in demand now is a high level of education and skills that add value to the goods and services produced. Business success no longer relies merely on improving efficiency, but essentially on an unbroken flow of human capability to innovate and embody new ideas and knowledge throughout the economy. As a consequence, knowledge work – especially managerial, professional and technical occupations – has expanded. Although part of this 'up-skilling' might be illusory, explained for example by the growth of credentialism, i.e. the re-labelling of old occupational titles and the invention of seemingly novel ones, there is a substantial body of research evidence on how education and rapid learning in particular have become the key qualities of labour upon which future economic growth and welfare is built – or, to put it differently, a high level of education is necessary to avoid competitive disadvantage, even though education alone does not guarantee success (see, e.g., Archibugi & Lundvall Eds. 2001; Cooke 2002).

Any grand generalization implying a shift in the mode of production or the birth of a new division of labour is of course bound to attract objection. The emergence of a post-industrial information society as well as its various components should not be taken for granted but examined as a problematic, as David Lyon (1988, 8–9), one of the most sober-minded commentators, argued some 15 years ago, questioning whether the evidence available really amounts to a shift beyond industrial capitalism. In a similar

vein, Krishan Kumar (1978) has rejected much of what the proponents of post-industrialism have envisioned as largely wishful thinking, and remarking that there is no natural path from agriculture to manufacturing to services. According to Kumar the theory of post-industrialism, exemplified by Bell's work, is plausible only because there is a widespread misconception of what 'classic' industrial society was all about: in no other country except England did industrial workers come to constitute a majority of the workforce, at any time in the course of industrialization, Kumar reminds (p. 202). In a more recent work Kumar (1995) continues his criticism, albeit somewhat less vociferously, writing that 'those who too readily announce the end of industrialism are perhaps seeing no more than the latest period of travail, the most recent of the cycles of renewal and decay that have been characteristic of industrialism throughout its still relatively short history' (p. 84).

Critics like Lyon and Kumar are more than right in rejecting the simplistic view according to which Western societies have followed a neat evolutionary sequence from agriculture to industrialism and, more recently, towards post-industrialism. The rise of services, professionalism and white-collar work – the kernel of the post-industrial theory and more recent perspectives on information society – has implicitly been an important part of the industrial economy since its very origins. Long before the computer age, the administrative needs of large bureaucracies catalysed the first wave of growth of civil servants, engineers, line managers and other 'early knowledge workers' (*cf*. Gouldner 1979). Yet, I must disagree with the critics quoted above. Equally convincing is the evidence pointing towards an irreversible shift away from industrial capitalism, especially with regard to the recent development of ICTs, globalization and the centrality of knowledge to societal development. What is today commonly called an information society is without any doubt built upon a social and technological foundation originating from the industrial era but, as I hope to demonstrate in what follows, there also are important divergent features indicating that a new society is in the making.

Such is the nature of debate between the critics and the advocates of information society. These observations bring us to the outline of the present chapter. Due to the sheer size of the task, I cannot venture out upon a thorough criticism of the information society thesis; i.e., how to identify the critical threshold after which a nation has acquired the status of an information society. The aim and scope of my analysis is less ambitious than that. On the one hand, I wish to provide an ideal-typical profile of informational labour with an emphasis on recent changes in the economy and work organizations; and, on the other hand, I wish to provide evidence on the growing impor-

tance and size of this category of workers. I am well aware that a precise and unambiguous definition of knowledge work is hard to come by, and it would certainly be rash to claim that I can put an end to this debate. Because of the lack of conceptual conformity, different studies produce different results about the historical trajectory and current significance of informational labour, and my interpretation is no exception. It appears that the information age is still not mature enough fully to define the role of the core of its workforce (Elliott & Jacobson 2002, 74).

Yet, as attempts to characterize informational labour have evolved, certain themes, such as a high level of education and skills and the use of information technology as an integral part of the informational labour process, have become increasingly common to both the empirical and theoretical literature – with some variation depending on the interpreter, of course (see, e.g., articles in Cortada Ed. 1998). It is to these recurring themes I adhere in my account. Thus, the aim of the following analysis is not to end the debate, but rather to provide a succinct overview of the ongoing discussion. In addition to reviewing relevant research, I shall proceed to elaborate an ideal-typical definition of knowledge work upon which the remainder of this volume will rest.

Knowledge as an Asset

'All human activities, including the so-called manual ones, have a mental component, but in the case of intellectual work this component predominates. Furthermore, in order to perform intellectual work – as distinct from spontaneous or free mental activity – the mind must first be trained, by dint of protracted study, to deal with abstract ideas.' (Cuvillier 1974, 292–293)

The Rise of Knowledge Work Spearheaded by the US

It is hardly coincidental that the first scholarly authors on knowledge work – including Machlup, Drucker and Bell – chose to concentrate on the United States, and the Japanese *johoka shakai* researchers also used the US as their benchmark case. According to Machlup and his successors, most notably Marc Porat and Michael Rubin, the US has led the way towards the informationalization of social structures (Machlup 1962; 1980; Martin 1998; Porat 1977; Rubin 1983; Rubin & Huber 1986; Rubin & Taylor 1981; Schement & Curtis 1995). Compared to other OECD countries just a few decades ago only Canada was on a par with the US in terms of the size of the information sector and its employment effects. By the beginning of the 1970s around 40 per cent of the work-

ing population in the US and Canada were classified to the information sector, whereas in most other OECD countries the figures were still considerably lower. In Finland, for example, just above one-fifth of the workforce was categorized as informational in 1970 (Table 3.1).

These early comparative statistics were premised on the well-attested observation that occupations in primary production and manufacturing were giving way to a growing percentage of service and white-collar work. Following the example set by Machlup and Porat, the OECD contended that conventional statistics actually hide from view a profound structural change which relates to the role of the activities of generating, processing and distributing information as well as the goods and services that these activities absorb. Based on a survey of nine OECD member states, it was projected that the occupations involved primarily in informational activities represent an important and rapidly growing segment of the labour force. Today, we may conclude that this has indeed happened: knowledge workers have risen to prominence both in numbers and especially in terms of their significance for national economies.

Table 3.1. Number of Information Workers in Nine OECD Countries in the 1970s (%).

Country	Year	%
Austria	1971	28.0
Canada	1971	39.9
Finland	1970	22.1
France	1975	32.1
Germany	1978	32.2
Japan	1975	29.6
Sweden	1975	34.9
United Kingdom	1971	35.6
United States	1970	41.1

Source: OECD 1981, 26–27. Figures for Finland are derived from sources that use a somewhat narrower definition of information work than other countries. Although the figures are not fully comparable, the lead enjoyed by the US and Canada remains substantial and thus is of interest here.

A New Mode of Capitalist Production

The growth of knowledge work reflects a sea change in the mode of capitalist production. In this context, as I have already remarked above, one of the most basic theoretical distinctions is usually made between traditional industrial production based on cheap labour and energy and heavy material investments as the primary sources of economic productivity; and, on the other hand, the use information or knowledge as a new source of wealth creation in post-industrial societies. In the former mode of production the

economic system was closely tied to physically tangible assets, whereas in the latter knowledge has become the most important asset individual and collective actors can possess. Indeed, as Finland's recent transition from traditional manufacturing towards innovation-driven industries has shown, even a small economy that is relatively disadvantaged in natural resources but skilled in the production and exploitation of knowledge can outperform larger rivals that have abundant natural resources but that are lacking in such skills.

In information economics (e.g., Joncher 1983; Nass 1988) a similar distinction to that mentioned above is usually made between work activities with material (matter/energy) and immaterial (information/knowledge) outputs. From the point of view of work and organizational processes, this dualism serves an important analytical purpose. The point is that unlike the traditional industrial worker, the knowledge worker processes and manipulates information as an end in itself which means it is the informational content of the job that defines the task, the product, and ultimately the worker (Schement 1990, 453). For most knowledge workers, then, the real substance of work is not the product, but the process.

In the high technology sector, for example, an iterative and comprehensive product testing protocol is an inseparable part of the value chain. In demanding R&D work it is possible that up to half of project resources are allocated to testing ahead of the launch of the product. In fact, this was exactly the case with the R&D engineers I interviewed in a global manufacturing enterprise (see also Chapter Four). The high level of expertise of R&D staff and the complexity of the software they design are among the reasons why it is impossible to depict their work process as a straightforward sequence of individual tasks from the customer assignment to a finalized product. Indeed, as Machlup (1980) has correctly observed, 'for most parts of the production of knowledge no possible measure of output can be conceived that would be logically separate from a measure of inputs' (p. 225).

In more practical terms, the increasing knowledge-intensity of work and organizational processes may assume two primary forms. First, the rising educational level of the workforce is a well-documented trend reflecting a growing demand for symbolic and interactive skills at the expense of manual skills. Second, scientific and technical knowledge has become an integral part of the development of new products and services, and this trend looks set to intensify. Anticipating the growing importance of these currents, Bell went so far as to interpret the increasing symbolic and interactive content of work as the *fundamental* fact about work in a post-industrial society. Bell, however,

was not content simply to observe the present. He also postulated that theoretical or abstract knowledge is the *axial* principle of an emerging social, political and cultural logic marking the end of industrialism.

In *The Coming of Post-Industrial Society* (1973) Bell distinguished five dimensions that he said were characteristic of the changing nature of capitalism:

1. Economic sector: the change from a goods-producing to a service economy;
2. Occupational distribution: the pre-eminence of the professional and technical class;
3. Axial principle: the centrality of theoretical knowledge as the source of innovation and of policy formulation for the society;
4. Future orientation: the control of technology and technological assessment;
5. Decision-making: the creation of a new 'intellectual technology'. (Bell 1973, 14)[41]

According to Bell an industrial society was based on the coordination of machines and men for the production of goods, whereas a post-industrial society is organized around knowledge for the purpose of social control. In Bell's words: 'What has become decisive for the organization of decisions and the direction of change is the centrality of *theoretical* knowledge – the primacy of theory over empiricism and the codification of knowledge into abstract systems of symbols that, as in any axiomatic system, can be used to illuminate the many different and varied areas of experience' (p. 20; italics in original). It is this aspect of Bell's account that has proved to have the most lasting value, although the novelty of his idea can be questioned. That is, long before Bell Karl Marx maintained that in modern industry science is turned into a productive force dis-

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[41] Bell presented his original formulation of the concept of the post-industrial society at a forum on technology and social change in Boston in 1962. However, as Bell subsequently found out, David Riesman had already employed the term in his essay 'Leisure and Work in Post-Industrial Society' printed in *Mass Leisure* in 1958. Riesman used the term to connote leisure as opposed to work. Bell also cites an early work by Arthur J. Penty, *Old Worlds for New: A Study of the Post-Industrial State*, published in 1917. According to Bell (1973): 'Penty, a well-known Guild Socialist of the time and a follower of William Morris and John Ruskin, denounced the "Leisure State" as collectivist and associated with the Servile State, and called for a return to the decentralized, small workshop artisan society, ennobling work, which he called the "post-industrial state"! (p. 37). Armand Mattelart (2003), Professor of information and communication sciences at the Université de Haute-Bretagne (Paris), goes even further in his discussion of the issue and remarks that as early as 1913 Ananda K. Coomaraswamy used the word post-industrial. Coomaraswamy, a reputed scholar on Indian art and culture, used the term to refer to the collapse of industrial civilization leading to the return of a decentralized society.

tinct from labour and pressed into the service of capital (May 2002, 39).[42] Yet there is no denying Bell's influence. As we will see later on, it is hardly a coincidence that there are close similarities between Bell's theory and more recent perspectives on the centrality of knowledge as a distinct factor of production.

Is There a New Class Society in the Making?

Bell also discussed changes in class and stratification structures. To cut a long story short, Bell not only judged the role of the working class to be on the wane, but he maintained that post-industrialization will be accompanied by the emergence of the 'professional-technological class' whose power is based on education and knowledge rather than on property:

> 'From all this, three crucial sociological problems emerge; first, since the scientific and technological revolution cannot be led by the working class, what, then, is the role of the working class in the future society; second, the stratification system of the new society inevitably will emphasize the dominance of the professional and technical classes; and third, if the production and maintenance of the scientific mastery of the future society requires the presence of a highly trained research elite, supported by a large technical staff, does not all this define the attributes of a new potential ruling class?' (Bell 1973, 109)

Bell, however, was overtly optimistic in the possibility of extending scientific and technological rationality into political decision-making for the good of humankind. Bell maintained that this could be achieved with the help of progressing 'intellectual technology', i.e. the application of social and material innovations in the management of so-

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[42] In general terms the idea of knowledge as a form of capital has been around since at least the days of Adam Smith. For example, Smith made a comparison between the costs of education and capitalists' investment in machines. However, opinions differ as to who should be regarded as the 'inventor' of modern information economics as an autonomous branch of academic inquiry. According to some commentators (e.g., Poirier 1990) J.H. Knight was the first to recognize the importance of knowledge as a distinct economic product and activity in his *Risk, Uncertainty and Profit*, published in 1921. Michael Perelman (1998, 46) goes even further and says that the iconoclastic Thorstein Veblen, writing in the late 19th century, may have been the first major economist to suggest that information was the key to the effective use of capital. Others (e.g., Hull 2000) have contended that it was Nobel prize winner F.A. von Hayek who first introduced the problem of knowledge as an *independent* unit of analysis into economics, and later on his colleague Machlup took up this idea for further elaboration. Nobel laureates' Kenneth Arrow and Herbert Simon are also renowned as the pioneers of the field. However, Machlup's distinct contribution was to inspire a whole generation of prominent economists to investigate the issue on an empirical level (see, e.g., articles in Jussawalla & Ebenfield Eds. 1984; Lamberton Ed. 1971; Lamberton & Jussawalla Eds. 1982).

cial systems. But, as for example Jonathan Gershuny (1978, 25) has pointed out, the argument leaves us with two problems: granted that the knowledge elite is increasingly important to the wealth of an increasingly technologically oriented society, but why should it become politically dominant, and even if they were thus to predominate, why should they be any less materialist and profit-oriented than any other group of decision-makers?

Perhaps needles to add, one is hard put to find proof of man's ability to harness technology for humanity or, more simply, of man's ability to learn from the mistakes of past generations. On these grounds, hardly surprisingly, Bell's vision of the emerging technocratic society led by the enlightened few has been deemed utopian. This is the focal point of most of the criticism levelled against Bell: market forces and political and military goals rather than purely scientific reasons have been the main guiding force in the application of scientific knowledge. To put it bluntly, as Bell's opponents seem to think, greed and violence continue to dominate our existence, however rationally we may pursue these interests.

In this respect Alain Touraine's somewhat pessimistic Marxist variant of post-industrialism appears more convincing than Bell's, although the two authors do share an almost identical starting point for their analyses. In *The Post-Industrial Society: Tomorrow's Social History* (1969), Touraine wrote that economic growth depends much more directly than ever before on knowledge, and hence on the capacity of society to call forth creativity:

> 'All the domains of social life – education, consumption, information, etc. – are being more and more integrated into what used to be called production factors. This is true of scientific and technical research, professional training, the ability to program change and regulate its elements, the management of organizations with multiple social relationships, and the communication of attitudes that favor the mobilization and continual transformation of all these production factors.' (Touraine 1969/1974, 5–6)

It is the perceived outcome of the social transformation that most clearly separates Touraine from Bell. Although Touraine takes into account the same socio-economic trends as those isolated by Bell, he views the post-industrial society as a somewhat less harmonious product of them, challenging the bland assumption that class struggle is a thing of the past (Lyon 1986, 579). Touraine's vision of a post-industrial society is one fraught with alienation, not because it reduces people to misery or because it imposes

police restriction, but because it seduces, manipulates, and enforces conformism (p. 9). In Touraine's view a post-industrial society is *programmed*, because the increasing knowledge-intensity of production requires new mechanisms for governing human beings. Whereas Bell envisioned a positive utopia of the future management of social systems, Touraine anticipated increasing indoctrination. In *Critique of Modernity*, first published in 1992, Touraine rephrases his original argument as follows:

> 'Why "programmed"? Because in this society, managerial power consists in predicting and modifying opinions, attitudes and modes of behaviour, and in moulding personalities and cultures. Rather than remaining in the realm of utility, it is therefore directly involved in the world of "values". … To invert the traditional formula, we might say that the transition from an industrial society to a programmed society is a transition from the administration of things to the government of men.' (Touraine 1992/1995, 244)

Even though the above views are quite obviously at sharp variance with each other, it is interesting to note that both Bell and Touraine unequivocally assumed human intellect and creativity to be the force that has come to dominate economic action at the expense of traditional factors of production. If this is true, then those individuals, organizations and geographical regions who can attract and retain human capital, will prosper. This is the essence of post-industrial thought: innovative ideas have a tendency to accumulate and their creators to concentrate.

From Post-industrialization to the Information Age

As Manuel Castells, drawing on Bell and Touraine among others, has convincingly argued in his highly acclaimed *The Information Age* (1996–1998), it is precisely this independent and yet intrinsic role of knowledge that is one of the most distinctive features of all successful economies and organizations. Echoing Bell's ideas, Castells does not stress the role of information or knowledge in general, but the application of Weberian rationalization to the production of knowledge itself (Garnham 2001). According to Castells it is the virtuous cycle of knowledge accumulation that is the key to prosperity:

> 'In the new, informational mode of development the source of productivity lies in the technology of knowledge creation, information processing, and symbol communication. To be sure, knowledge and information are critical elements in all modes of development, since the process of production is always based on some level of knowledge and in the processing of information. However, *what is specific*

to the informational mode of development is the action of knowledge upon knowledge itself as the main source of productivity.' (Castells 1996, 17; italics added)

Of course, as Castells implies, all forms of society and all cultures are ultimately based on the distinctively human capacity to process symbols. No matter how routine an activity is, it always requires some measure of intelligence and an ability to process and manipulate information. In this sense Western culture cannot be regarded as unique, but the importance that is attached by our society to knowledge as an economic resource certainly sets us apart. One might go as far as to say that the real novelty of the information economy is not the informational content of our society at all, but our consciousness of the informational aspects of work (Perelman 1998, 19). F.W. Taylor's (1911) principles of scientific management provide a well-known example. In order to organize work as productively as possible information is needed prior to the execution of work tasks. Or, as information economists would say, 'why, what and how have to be resolved before physical labour makes economic sense' (Eliasson *et al*. 1990, 57).

In a sense, as we will see later on, it can be argued that the birth of knowledge work dates back to the heyday of industrial manufacturing. Before the legendary Henry Ford, for example, car production was a craft, not a branch of industrial manufacturing (Womack *et al*. 1990). Although Ford did not invent the conveyor belt, which was already in use in various branches of the economy ranging from the textile industry to the production of military equipment, he nevertheless perfected its use to such extend that his name became almost synonymous with the 20th century capitalism. Ford built some of the largest and most productive factories of his time. To cut a long story short, the point is that technological development, underpinned by major corporations like the Ford Motor Company, resulted in larger and larger production units. At the same time, however, organizations became far more complicated, the amount of paper work and the planning of production processes increased, and new managerial structures had to be implemented to handle the increasing complexity.[43]

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[43] Before Ford's era, roughly speaking, management and ownership were often personified in one and the same owner-manager: 'The capitalist who owned the factory was to a large extent also responsible for its management. Only in the biggest factories would the owner have a few hired foremen to take care of supervision on the shopfloor, or alternatively an independent contractor who would be responsible for certain parts of the production process and at the same time for supervision of these workers. … In the early 20th century the expansion of industrial production, the considerable growth of company size, and economic monopolization finally put an end to the system of combined ownership and management. In all large companies the organization of production and the supervision of labour was now the responsibility of hired managers. The manager-owner withdrew from the actual production process into the role of owner.' (Melin 1990, 211–213)

In addition to management's role in handling organizational complexity, it is equally important to emphasize that the skill of abstract thinking acquired in formal education has never been more pronounced than it is in contemporary organizations; it is a route that must be taken before informal learning can take place. It is for this reason that Castells discusses *informational* work and its processes, arguing that we are now on the threshold of a new era with regard to both occupational and other key structures in society. In analytical terms the difference is the same as between the concepts of industry and industrial: even if all forms of social activity are based on processes that mediate information, not all societies are informational no more than they are all industrial. Similarly, virtually all organizations today are dependent on modern information technology, yet only few organizations are thoroughly technology-driven.

I must therefore take a critical position against the line of argumentation which claims that the diffusion of ICTs and the informationalization of work and organizational processes develop in tandem by some logical necessity. My argument below is that in contrast to what is sometimes suggested, the use of information technology is not in itself a sufficient criterion for classifying work as informational. It is also necessary to take into account qualitative changes in work and organizations. However, before proceeding to a more precise definition of knowledge work, it is instructive to review the research literature a little bit further.

Measuring Knowledge Work

My analysis above should suffice to make it clear that the theoretical and conceptual background of the debate on knowledge work remains highly abstract and vague. The paradox of the information age is that the more information there is, and the more knowledge is created and accumulated, the more difficult it is to measure what is going on (Engelbrecht 2001, 339). It is therefore hardly surprising that even the most ambitious attempts to measure knowledge work have met with a mixed reception, from whole-hearted appraisal to virtually complete rejection. This is exemplified by Machlup's seminal work, which adopted a very broad and controversial notion of knowledge.

Machlup

In *The Production and Distribution of Knowledge in the United States* (1962), Machlup was the first to assess empirically the extent to which the US economy was dependent on activities related to knowledge. Machlup identified over 50 distinct areas of knowledge production, ranging from education to entertainment, that he aggregated into five main groups: education, research and development, the media of communication, information machines, and information services. Then, he determined the economic significance of each individual area of knowledge production, arriving at the result that these activities accounted for 29 per cent of the US GDP in 1958. Although Machlup had to rely on often incomplete and inaccurate data, he had no hesitation in arguing that 'even if questionable items were stricken out, or omitted items included, the total would not be substantially affected; the ratio would not be much different from the 29 per cent calculated on the basis of our figures' (p. 362). Machlup's data also indicated a steady growth of knowledge work throughout the 20th century: all knowledge-producing occupations comprised 31.6 per cent of the US workforce in 1959, a three-fold increase since 1900.

However, it is hard to find a precise and succinct definition of what exactly Machlup means by knowledge work. He defined knowledge work as comprising any activity whose primary output is knowledge in one form or another. To complicate things further, he made no analytical distinction between information and knowledge. Thus, the result was an all-encompassing conception of knowledge-related activities. The point is well illustrated by the quote below:

> 'In this context, disclosure, dissemination, transmission, and communication are considered knowledge-producing activities; thus, producing knowledge refers not only to discovering, inventing, designing, and planning, but also to disseminating and communication information as well. Workers engaged in any such activity perform "knowledge-producing" labor.' (Machlup & Kronwinkler 1975, 753)

Although Machlup continued to refine and update his ideas until his untimely death in 1983, he never produced a substantially improved analytical scheme to classify knowledge work. On the contrary, some of Machlup's closest associates have implied that he had no intention of making any substantial alterations to his original classification, in spite of his plans to devote a whole volume to knowledge occupations (Rubin & Huber 1986). The problem that remained was thus that of a hopelessly broad definition of knowledge. To take a few telling examples, Machlup's conception of the knowledge

sector includes not only formal education but also education in the church and home. The category of information machines also includes some rather odd choices, such as the production of musical instruments. His discussion on the media of communication quite reasonably begins with printed matter, but then progresses to religious and political conventions, and so forth. Some commentators have gone so far as to claim that Machlup even counted strip-tease dancers as knowledge workers (Newman & Newman 1985, 498)! However, in Maclup's defence, this is simply a false accusation or, if intended as a pun, reflects a rather dubious sense of humour hardly appropriate for scholarly writers.

However, in spite of the arbitrariness about Machlup's approach, his work still serves as an important reminder of the changing nature of advanced economies. Most importantly, *The Production and Distribution of Knowledge in the United States* was a wake-up call for academics and policy-makers alike, catalysing a number of subsequent attempts to understand the economic basis of the coming information society.

Porat

In the succession of such studies, Porat's *The Information Economy* (1977), commissioned by the US government, was the second major effort to measure the importance of the information sector of the economy.[44] Although Porat used different methods compared to Machlup and talked not of 'knowledge' but 'information' workers (Martin 1998, 1053), he nevertheless shared the same fundamental assumptions with his precursor. Following Machlup, Porat operationalized the informational labour process as a heterogeneous entity that includes such diverse activities as research and development, managerial decision-making, writing letters, filing invoices, data processing, telephone communication, and producing a host of memos, forms, reports and control mechanisms. His analysis was grounded in the following definition:

> 'Information is data that have been organized and communicated. The information activity includes all the resources consumed in *producing, processing and distributing* information goods and services.' (Porat 1977, 2; italics added)

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[44] Porat's work is probably the most often cited account on the growth of the information sector and information occupations in the US. Originally, *The Information Economy* was Porat's doctoral dissertation that he completed at Stanford University in 1977. An expanded version, written with assistance from Michael Rubin, was published as a nine-volume report series in the same year by the Office of Telecommunications of the US Department of Commerce. Interestingly, Machlup remained unaware of Porat's project until it was nearly complete. A concise summary of both of these authors' work is provided by Martin (1998).

On this basis, Porat made a distinction between market and non-market activities by dividing information activity into two major groups: 'one in the primary information sector where information is exchanged as commodity, and one in the secondary information sector where information is embedded in some other good or service and not explicitly exchanged' (p. 4). This was Porat's major procedural innovation, as Machlup himself acknowledged, although Machlup did not did not systematically compare his approach with that of Porat. Using this framework, Porat calculated that in 1967 one-quarter or 25.1 per cent of the US GDP could be attributed to the primary information sector and an additional 21.1 per cent to the secondary information sector. Furthermore, Porat divided information occupations into five categories: knowledge producers, knowledge distributors, market search and coordination specialists, information processors, and information machine workers (a categorization that was later adopted by the OECD, for instance). According to Porat, the information sector had by 1955 become the predominant employer, rising from a low 15 per cent of the US workforce in 1910 to over 40 per cent in 1970.

However, Porat could not avoid the pitfalls already present in Machlup's work. Both Machlup and Porat struggled with the problem of arbitrariness in their selection of who belongs to informational labour and who does not. Both divided certain occupations between different sectors of the economy – which, as their critics point out, only complicated things further. For example, Machlup and Porat reasoned that the job of a medical doctor involves a manual component (physical treatment) as well as a mental component (diagnosing a disease). Therefore, they regarded the medical profession as only half informational. The obvious paradox is that no matter how carefully a researcher tries to justify his or her decisions, there are bound to be accusations of statistical heresy.

Mills, Drucker and Bell

It is also worth reminding that while the findings of Machlup and Porat were not unimportant, they certainly were unsurprising. For example, C. Wright Mills had already observed in *White Collar* (1951) that there was a trend whereby 'fewer individuals manipulate *things*, more handle *people* and *symbols*' (p. 65; italics in original). Mills was here depicting a change from manual labour towards service and office work, a white-collar revolution that was later re-labelled by Bell and others as post-industrialization.

Drucker, for example, advanced a similar argument in *The Age of Discontinuity* (1969). Clearly influenced by Machlup's vocabulary, Drucker boldly forecast that 'the

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demand for knowledge workers in the future seems insatiable' (p. 250). More precisely, he argued that knowledge as systematic organization of information and concepts is becoming the foundation of work-related skills and that the demand for such skills is apparently unlimited; and, therefore, 'the knowledge worker everywhere works increasingly longer [*sic*] hours' (p. 251). Although Drucker's prognosis was based on his intuition rather than science, one cannot but marvel at his sharp sense of *zeitgeist*. Today, we may conclude that especially the latter part of his prediction was spot-on. As numerous studies including my research indicate, not only the pace of work but the overall rhythm of daily life has become ever more hectic in Western countries. Knowledge workers in particular seem to be under constant pressure to prove their worth (see Chapter Six).

In contrast to Drucker, Bell's arguments regarding the growth of knowledge work were much more moderate. This is somewhat surprising in view of his romantic vision of an emerging technocratic society that I criticized above. Contrary to a common misconception, Bell did not equate post-industrialism with the knowledge economy as Drucker or Machlup defined it. Bell (1973) explicitly stated that in contrast to Machlup's estimate, according to which almost one-third of the US GDP is derived from knowledge-producing activities, 'any meaningful figure about the "knowledge society" would be much smaller' (p. 212). When Bell refers to the 'knowledge class' or 'knowledge society', he talks neither about routine services that have come to dominate the US economy in numbers nor about semi-skilled work, but strictly about professional and technical occupations (teachers, engineers, engineering and service technicians and scientists). Bell simply ignored the possibility that workers outside the knowledge class might be engaged in the production of new knowledge (Schement 1990, 451). Based on his strict reading of OECD statistics, Bell estimated that professional and technical occupations with a scientific elite at its core comprised no more than 12.2 per cent of total US employment in 1963.[45]

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[45] As Bell probably was aware of, even according to his narrow definition of the concept, knowledge workers are too heterogeneous a category to constitute a social class proper. In this respect the term white-collar work resembles that of knowledge work. In the context of class research we have to bear in mind that the term white-collar worker is a highly general statistical category and in itself it does not imply anything about class location (Blom *et al*. 1992, 80). Interestingly, in class analysis the role of knowledge has seldom been exposed in explicit terms, although especially from the point of view of Weberian thinking it would make perfect sense to do so (notable exceptions in which the relation of knowledge and class have been considered include Gouldner 1979; Perelman 1998; Resnick & Wolff 1987; Whutnow & Shrum 1983; Wright 1997). Weber, in contrast to Marx, made a distinction not only between the privileged classes and the working population, but he also identified a separate category in the educated class as well as criticizing Marx's economic determinism. Surely Marx did not underplay the

It was only after Porat's *The Information Economy* that Bell (1979) expanded his original thesis and argued that post-industrialization in effect reflects the rapid growth of informational labour. Furthermore, supporting Porat's position, Bell maintained that these trends are complemented by advances in information technology. This idea soon acquired the status of common knowledge, implicitly accepted by the majority of scholars. According to this view the rise of American informational labour is a phenomenon that bears a close affinity to the computer revolution. In Porat's analysis information workers reached parity with industrial workers in the mid-1950s, i.e. at a time when the first mainframe computers were being launched. Quite understandably, Porat and others saw a close connection between these developments. However, this might be at least partially a misunderstanding.

Knowledge Work and the Computer Revolution

Jorge Schement has drawn attention to the fact that Porat's classification was biased towards the industrial sector. For example, departing from common statistical conventions, Porat chose to redefine some service occupations (e.g., plumbers and glaziers) as industrial, reasoning that, since these workers manipulated physical objects, their occupations should be considered industrial (Schement & Curtis 1995, 76; see also Schement 1990). Although Porat's reshuffling of occupational categories made sense within the context of his research objectives, this created the basis for a popular misunderstanding, Schement continues. In order to correct this bias, Schement re-classified Porat's scheme, and arrived at the result that the most crucial decades for the emergence of the US information workforce seem to be 1920–1940, rather than the 1950s:

> 'In this period, the United States passed the threshold into a workforce where information workers formed the single largest group. At the same time, service workers reached near parity with industrial workers, and farm workers finally fell below the other major groups. Throughout the post World War II era, the industrial work sector placed third and diminished steadily. Information workers surpassed 50% after 1980, becoming the majority of the workforce.' (Schement & Curtis 1995, 83)

The conclusion of Schement's analysis is instructive: although the post-war boom in information technology has certainly affected the expansion of the information workforce,

role of knowledge in societal development, but it was Weber who stressed that there are important social divisions that cannot be reduced to the logic of capitalistic accumulation.

it cannot be considered its primary cause (p. 84). The roots of the transformation lie deeper in the history than the relatively brief era of the computer. The original growth peak of American informational labour coincides with the expansion of corporate bureaucracies.[46] Therefore, the information society must be understood within the broader framework of social change as a succession of the forces that created industrialism, Schement suggests. The development of the US information workforce as compared to other sectors is described in Table 3.2.

Table 3.2. The United States Workforce by Sector in 1900–1986 (%).

Year	Agriculture	Industry	Service	Information
1900	37.5	20.9	25.3	16.4
1910	31.1	26.4	22.5	20.0
1920	26.9	29.6	19.5	24.0
1930	22.4	27.1	21.9	28.6
1940	17.3	27.6	25.9	29.1
1950	12.2	23.0	28.1	36.7
1960	6.6	23.1	27.9	42.4
1972	3.7	21.5	28.0	46.8
1980	2.8	20.2	27.1	50.0
1986	2.9	15.2	29.3	52.6

Source: Schement & Curtis 1995, 85.

It is also interesting that the growth of the US information sector has not followed as steady a curve as one might have expected on the basis of Machlup's and Porat's work. For example, Machlup assumed that the share of knowledge workers would exceed half of the workforce by 1980. In contrast, Rubin and Huber (1986), in their update of Machlup's original scheme, found that informational labour comprised no more than 41 per cent of the US workforce by 1980. Even more surprisingly, in a similar update of Porat's study, Rubin and Taylor (1981) revealed that the primary information sector's share of total production did not increase but actually slightly declined between 1967 and 1972. More recent data lend partial support to these findings. According to Martin (1998), the US information sector continued to grow until the mid-1990s, although considerably slower than one might have expected in the light of prior research.

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[46] In Finland the closest equivalent to this stage of development was the formation of welfare state mechanisms in the 1960s and 1970s that required a growing number of civil servants and governmental bureaucracy; although, as we will see later on, knowledge workers did not rise to prominence until the time of the rapid diffusion of PCs in the 1980s and 1990s. Nevertheless, it is logical to conclude that the wealth created by industrialization not only facilitated the development of welfare mechanisms, but also resulted in the first growth peak of knowledge workers some 30–40 years ago.

Despite all the criticism levelled against Machlup and Porat, the weight of their contributions cannot be denied. Even though their results remain contested, the two authors inspired the formation of a whole school of thinking. Once Porat had completed his efforts to update and ultimately replace Machlup's seminal work, it did not take long before a number of important studies were produced, providing comparative cross-national data as well as further methodological improvements (see especially Jussawalla *et al*. Eds. 1988; Katz 1986). However, by the mid-1980s the enthusiasm in Machlup's and Porat's work began to wane, which is reflected in the fact that more recent studies have mostly been restricted to national contexts. Yet, at the same time as interest in dissecting the economic sectors by their informational content has somewhat receded, empirically less ambitious albeit equally important views on the rise of knowledge work have emerged.

Knowledge Work in the 21st Century

The 1990s saw some important and well-publicized accounts on knowledge work, most of them reminiscent of Bell's work. One thing has not changed, however: definitions of knowledge work still abound. There are nonetheless certain recurring themes that have become increasingly common to the research literature. For example, in *The Work of Nations* (1991) Robert Reich, a professor of political science and a former Secretary of Labour during Bill Clinton's first term in the White House, sketched a portrait of an elite of workers he calls symbolic analysts, explaining that this category refers to design tasks and expert jobs that require creativity and innovativeness *par excellence*. In Reich's analysis, the workforce in the US as well as elsewhere is divided into three distinct groups (the rest of the workforce comprise a residual category, as explained below):

1. *Routine production services* entail repetitive tasks guided by standard procedures and codified rules. Although routine producers must be able to read and to perform simple computations, their cardinal virtues are reliability, loyalty and the capacity to take direction. This category comprises traditional blue-collar jobs, but also routine supervisory jobs as well as routine information processing. By 1990, routine production work comprised about one-quarter of the US workforce, and the number was declining.

2. *In-person services* also entail simple and repetitive tasks. The big difference between in-person and routine production services is that the former must be

provided person-to-person and thus are not sold worldwide. Another difference is that many in-person servers need to have a pleasant and discreet demeanour. Traditionally most in-person servers have been women, typical jobs including retail sales workers, cashiers, hairdressers, secretaries, etc. By 1990, in-person services accounted for about 30 per cent of the US workforce, and their numbers were growing rapidly.

3. *Symbolic-analytical services* entail all the problem-solving, problem-identifying and strategic brokering activities that are non-standardized. These services can be traded worldwide and thus are susceptible to global competition. Symbolic analysts often work in teams. Since neither problems nor solutions can be defined in advance, frequent and informal conversations help ensure that insights and discoveries are put to their best uses and subjected to quick, critical evaluation. Symbolic analysis currently accounts for no more than 20 per cent of American jobs. (Reich 1991, 174–180)

In Reich's view, these three groups cover about three out of four American jobs. Among the remainder are farmers, miners and other extractors of natural resources, comprising less than five per cent of the US labour force. The rest are mainly government employees or government-financed workers, almost all of whom are sheltered from global competition. Unfortunately, Reich does not reveal how he has arrived at these estimates.

Nevertheless, an interesting point here is that in Reich's usage, knowledge work refers strictly to expert labour whose resources are pooled from increasingly international external labour markets and whose competitive edge lies in solving, identifying and brokering new problems. The category of symbolic analysts includes such professionals as lawyers, investment bankers, management consultants, research scientists, and so forth. From this point of view, the routine communication of information, as understood by Machlup and Porat, is not yet considered a type of work distinctive of the new information economy. However, what Reich shares in common with the majority of other scholars, is the view that the proportion of workers engaged in symbolic analysis has increased substantially since the mid-20th century, although his estimate of their current prevalence is rather moderate.

Another well-known critic of the information society is Jeremy Rifkin, who in his scientifically controversial yet certainly thought-provoking book, *The End of Work* (1995), states explicitly that it is unlikely any of the most important occupational groups of the future will be very large:

'The few good jobs that are becoming available in the new high-tech global economy are in the knowledge sector. It is naïve to believe that large numbers of unskilled and skilled blue collar and white collar workers will be retrained to be physicists, computer scientists, high-level technicians, molecular biologists, business consultants, lawyers, accountants, and the like.' (Rifkin 1995, 36)

Although the relationship between technology and employment is beyond the scope of this study, it should be pointed out that according to the view represented by Rifkin, technological development spells pure Schumpeterian destruction for the ideal of full employment, involving no element of creative renewal of the economy whatsoever – at least if work is defined narrowly in the traditional sense of wage labour. The brave new world of knowledge work, according to Rifkin, is a zero-sum game, in which one party's gain is another's loss. In an interview in *Government Technology* (September 1997), Rifkin boldly stated that 'if you are a secretary or file clerk, if you work in the mail room, or as a middle manager, bank teller or librarian, if you are in many sectors of retail or wholesale, chances are your job will not be here five years from now' (*ref*. Cardinali 1998, 156). Following the same line of argumentation, Ulrich Beck (1999) has claimed that 'the promise of full employment is an historical relic, a "zombie category" much in the same way as social class, because they are dead but somehow go on living, making us blind to the realities of our lives' (p. 25). Suffice it to note here that I do not believe the accounts by Messrs Rifkin and Beck do full justice to the depth and complexity of the phenomena concerned.

The Nature of Knowledge Work

Despite my criticism an important implication of the above views is that individual creativity and innovativeness comprise the scarcest and arguably the most valuable resource in an information society. According to Reich and others who emphasize the symbolic aspects of knowledge work above all else, the key to the new work processes lies not in the homogenous social collective but in the cooperative and flexible individual as well as in the ability of that individual to act as an interface between new technology and human interaction.

The key here is flexibility, interdisciplinary cooperation and rapid learning. Knowledge workers are defined primarily by the nature of their work, which is relatively unstructured and organizationally contingent, and which reflects the changing demands of organizations more than occupationally defined norms and practices (Scar-

brough 1999). As Reich implies, clinging to an existing body of knowledge does not suffice; an ideal-typical knowledge worker is expected to use knowledge creatively. Thus, the category of knowledge workers may include but is not restricted to traditional professionals who have mastered a particular domain of knowledge (*cf*. Fincham Ed. 1996). Computer programmers, for example, as practitioners of a relatively young and rapidly evolving discipline, do not share a common code of ethics, attachment to credentials or involvement in professional organizations such as medical doctors, teachers or lawyers do.

All this is by no means to deny the importance of education and formal qualifications in knowledge work. In addition to the unstructured nature of work tasks, another common baseline assumption emerging from the recent literature is that extensive formal expertise is required of informational labour. For example, according to Paul Thompson *et al*. (2000), 'the implicit model of the traditional knowledge worker is someone who has access to, learns and is qualified to practice a body of knowledge that is formal, complex and abstract' (p. 126). In a similar vein, to take just one more example from the burgeoning research literature, Stephen Frenkel *et al*. (1995) say that knowledge workers 'rely predominantly on theoretical knowledge, and their work requires a high level of creativity for which they mainly use intellective skills' (p. 780). In other words, the most important criteria for knowledge work, as they emerge from recent studies, are centred on the symbolic content of task structures that, according to the authors cited above, allow for creative application, manipulation or extension of knowledge in organizationally contingent settings (see also Blackler 1995; Despres & Hiltrop 1995; Kelloway & Barling 2000).

Of course, these and any other sets of criteria are problematic and highly controversial. Let me first consider the role of information technology, which has implicitly been attached to the concept of knowledge work since at least Porat. To give a few examples, the job of a writer, a freelance journalist or a university lecturer does not necessarily require the use of information technology, but in practice the typewriter has been replaced by the PC and the telephone has been all but replaced by e-mail as a means of communication among people whose job involves producing and manipulating symbols. Although problematic, this presumption is justified because the number of cases that fit in with the general idea of knowledge work but that involve no use of information technology is so small that it is impossible to draw any relevant generalizations, even with extensive statistical materials. Therefore, it is reasonable to include IT use in the definition of knowledge work.

However, it must be pointed out that if knowledge work is approached as an integrated process, then we might be able to identify a number of stages that are not directly bound up with the use of technology. If it is thought that creativity is emphasized in knowledge work at the expense of routines, then the most decisive and knowledge-intensive part of the job description may refer to cognitive processes that are independent of time, place and the tools used. An innovative idea may emerge during leisure time just as well as on the job. Furthermore, a major technical innovation based on a simple abstract idea or theoretical model may well be finalized using paper and pencil just as well as sophisticated software. After all, it is not as though the pre-computer world had no technological aids in the processing of information: only an arrogance or ignorance under the spell of the modern 'cult' of information technology could contest this fact (Duff 2000, 47).

On the other hand, in some jobs a PC, computer terminal or a programmable machining tool may be comparable to the conveyor belt, serving as tools with which the operator can repeat routines or control the production process without any creative input whatsoever. Although the jury is still out to decide whether or not the work of telephone operators, for instance, is knowledge-intensive (Mueller *et al*. 1995; Taylor *et al*. 2002), there is no doubt that information technology has helped in the automation of many office routines, thereby creating more space for non-routine activities and enriching many traditional white-collar jobs (see also Chapters Four and Six). In other words, IT use alone does not serve as a sufficient criterion for knowledge work, even though in practice they are often connected.

It is clear, then, that we need more specific determinants for a useful definition of knowledge work. In addition to the use of information technology, a second criterion applied here is formal education, which is characteristic of all advanced information societies. Much in the same way as IT use, this is a somewhat problematic criterion in that an academic degree is neither an absolute condition for, nor an obstacle to, employment in a job that requires creative problem solving or designing key aspects of the job. For example, the reality that many individuals without extensive formal education are employed in IT professions reflects the importance of an often-neglected route to skill development by informal learning on the job (Hilton 2001, 42). In practice, however, it is more and more difficult to get a job without formal qualifications. Education also functions as a buffer to unemployment. When recession hits the economy, lack of educational capital entails a higher than average risk of redundancy. As will become clear in

the course of the remainder of this volume, a high level of education might indeed be described as the most decisive feature of an information society.

Finally, the autonomous and non-routine nature of work should be considered, although this criterion is no less problematic than either IT use or education. For example, it has been argued that it is a gross simplification to equate knowledge work with non-routine tasks, because even scientists perform mundane and highly repetitive routine activities such as tabulations, data collection, lab experiments, and so on (Purser & Montuori 1995, 122). Indeed, as I remarked in Chapter One referring to K.S. Taylor (1998), preparing an academic study is a mixture of both routine and non-routine work. However, the view I advocate here is that non-routine problem-solving is the core of knowledge work that together with the education criterion allows us to distinguish knowledge workers from routine IT users and other wage earners on the basis of the design component involved in the job. These two additional criteria avoid the problem of excessive technological determinism and also underline the cognitive side of knowledge work without presenting it in too elitist a light. Therefore I suggest that while the theoretical starting points of Machlup and Porat are too broad and Reich's concept of a symbolic analyst too narrow, the criteria proposed here lead to a rational compromise between these extremes.

Thomas Choi and Glenn Varney (1995) have arrived at a similar conclusion in saying that the category of knowledge workers should include all people who are well educated, perform non-routine work, and are required to think and make decisions. Similarly, Joanne Sulek and Ann Marucheck (1994) have argued that the term knowledge worker should be used to refer to those workers who possess high levels of education, experience and organizational status, and thus are allowed to exercise considerable autonomy and discretion in performing their work. Closely following Reich's reasoning, Sulek and Marucheck continue that knowledge workers include, but are not limited to, professionals such as academics, doctors, lawyers, engineers, and scientists whose work tends to be intangible in nature: 'Hence, knowledge work involves cognitive skills (e.g., typical tasks include planning, problem solving, decision-making) and many frequently require innovation or creativity on the part of the worker' (p. 5).

Who, then, is a knowledge worker and who is not? In contrast to Machlup's and Porat's approach, more recent studies do not attempt to place knowledge workers in any particular industry or occupational category. As Charles Winslow and William Bramer (1994) conclude, a knowledge worker simply is 'someone who interprets and applies information to create and provide value-adding solutions, and to make informed recom-

mendations' (p. 14). Indeed, in recent studies such diverse jobs as classical scholarship (Ruhleder 1995), international policing (Sheptycki 1998) and investment banking (Royal & Althauser 2003) have been analysed under the heading of knowledge work. However, the themes that appear most frequently in the literature are the use of IT, education and the non-routine nature of work.

Following this line of research, Blom *et al.* (2001; 2002) have defined knowledge workers as wage earners whose jobs meet the following three criteria: (1) the use of IT (a microcomputer, computer terminal or work station); (2) at least upper intermediate vocational training (a college degree); (3) and independent design of important aspects of the job. As categories distinct from knowledge workers, the authors distinguish IT users and traditional workers (or, for brevity, others). IT users are defined as wage earners whose jobs do not meet one or the other or either of the latter two criteria above, while traditional workers are those who do not use information technology in their jobs at all.

Knowledge Work in the Context of Finland

Although the empirical operationalization referred to above is as susceptible to criticism as other possible options, it is in line with the majority of recent theoretical literature, in which an individual's education and the autonomous nature of work are emphasized along with skills related to information technology. Thus, it is clear that with this choice of criteria the definition of knowledge work includes not only many white-collar and professional jobs, but also some high-tech blue-collar jobs. On the other hand, the definition excludes the jobs of those blue-collar and service workers who mostly perform repetitive tasks requiring a low level of formal qualifications.

Table 3.3. Number of Knowledge Workers, IT Users and Traditional Workers in 1988–2000 (% of Finnish wage labour).

Finnish wage labour	1988	1994	2000
Knowledge workers	12	25	39
IT users	15	22	30
Others	72	53	31
Total	100	100	100
N	1512	702	1775

Source: Blom *et al.* 2000, 423; see also Blom *et al.* 2001; 2002.

According to Blom *et al*. (2001; 2002) this relatively simple classification allows us to draw a rough yet realistic picture of the category of knowledge workers in Finland. As I will argue below, the criteria used here have some important advantages over the criteria employed, for example, by the OECD or Statistics Finland, both influenced by Porat's work. However, the overall picture is roughly the same regardless of the criteria applied: *the share of knowledge work in Finland has increased significantly from the 1980s up to the present day.* Table 3.3 shows that the share of knowledge workers has more than tripled and the number of IT users doubled from 1988 to 2000. At the same time, the number of traditional workers who do not use information technology has declined very sharply. In other words, there has been a clear shift in the division of labour towards jobs which require IT skills: by now over two-thirds of all pay earners are in these kinds of jobs. According to the most recent estimates, about 75 per cent of all employed persons use a computer in their work, i.e. a PC in most cases (Lehto & Sutela 2004).

Figure 3.1. The Proportion of Persons Employed in Information Occupations in 1980–2004 (%, according to Statistics Finland).
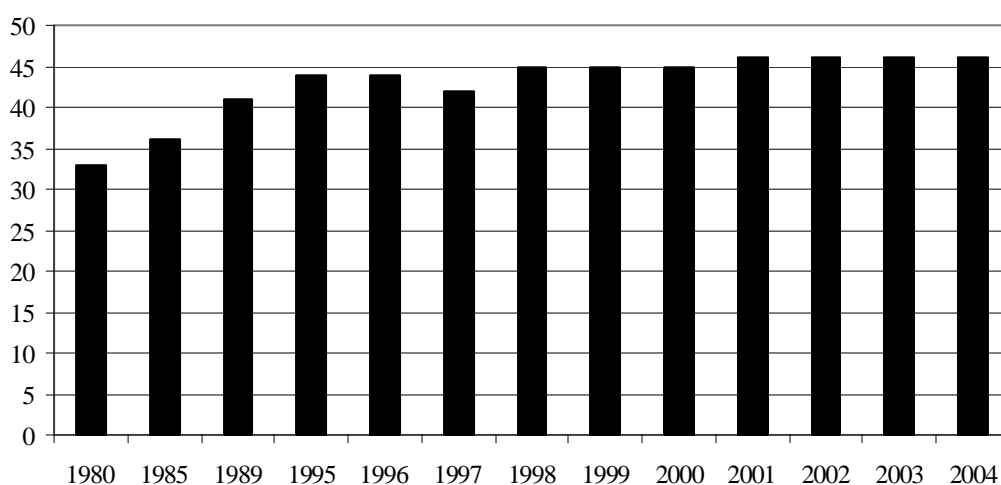
Source: Statistics Finland, official labour force surveys. Figures for 1997–2004 are not fully comparable with those for earlier years. I would like to thank Päivi Keinänen, Lea Parjo, Timo Peltomaa and Veli Rajaniemi from Statistics Finland for providing the data.

Figures released by Statistics Finland give a somewhat more detailed picture of the development of the information sector. According to these figures up to one third of all employed persons were engaged in information occupations (a term taken straight from Porat) in 1980; by 1995 the share had increased to 44 per cent but then levelled off. Interestingly, since the mid-1990s, growth in these occupations has been virtually non-existent: the proportion of information occupations reached 46 per cent by 2001, and no

change took place in the following three years. Unfortunately, due to revisions of statistical criteria in 1997, subsequent comparisons are not completely reliable. Nevertheless, we may conclude that the most rapid transitional period is over and the proportion of informational labour has become more or less stabilized, as illustrated in Figure 3.1.

Why this sudden slowdown in the growth of informational labour? The most probable explanation lies in the recession that swept across Finland in the first half of the 1990s, and particularly in its impact on the public sector, which is still reflected in the figures for the latter half of the decade. Due to the recession the expansion of the public sector not only ended abruptly, but many services had to be dramatically cut. Although the recession was followed by a period of strong growth, there was no turning back to the days of the expanding welfare state. This is important because public administration, health care and education employ large numbers of knowledge workers. For these reasons it is likely that the growth of knowledge work in Finland has approached its 'natural' point of saturation beyond which further growth slows down considerably. In the US this kind of turning point was reached as early as the beginning of the 1980s, although for different reasons, of course. There is also the possibility that increased information handling productivity, for example via office automation, will have a stabilizing effect on the relative size of the information sector, contributing to the saturation of demand for knowledge workers. Perhaps needless to add, it is impossible to make any firm predictions as to what is going to happen in the long term.

Table 3.4. Trends in the Proportions of Persons Employed in Information Occupations in 1980–2004 (according to Statistics Finland).

Employed population (1000's)	1980	1985	1995	2000	2001	2002	2003	2004
I Information producers	224	282	334	413	429	437	438	441
II Information distributors	100	117	137	168	170	167	169	174
III Information users	109	132	151	184	185	189	190	193
IV Information processors	215	229	213	231	228	230	220	215
V Use and maintenance of IT equipment	109	108	75	66	65	64	60	56
Total	757	868	910	1062	1077	1087	1077	1079
All employed persons	2328	2437	2068	2335	2367	2372	2365	2365
Information occupations (% of all employed persons)	33	36	44	45	46	46	46	46

Source: Statistics Finland, official labour force surveys. Figures for 2000–2004 are not fully comparable with those for earlier years. Although the data is derived from a somewhat outdated occupational classification, the results are of interest here because they allow for rough cross-national comparisons (for more details on the classification used, see Paakkolanvaara 1988).

In addition to the overall growth pattern of informational labour, figures by Statistics Finland reveal some other interesting facts about the structure of labour demand. Following the OECD (1981), Statistics Finland has divided informational labour into five main categories, as represented in Table 3.4. Clearly the most important observation here is that both the relative share and especially the absolute number of workers classified as information producers have shown the sharpest growth. Between 1980 and 2004 the number of information producers doubled, and today this group of workers represents about one-fifth of all employed persons.

In general terms, information producers create new information or rearrange existing information into novel configurations. In both instances the output of work is highly context-sensitive and sometimes even unpredictable. This group of workers includes all scientists as well as the producers of consultative services and market information (e.g., health care specialists, legal and financial advisers and technical experts). Arguably, Finland's recent development towards an innovation-driven economy is reflected in these figures. An illuminating fact in this regard is that different R&D activities employ around 70,000 people in Finland today (three per cent of all employed persons). Without a question this puts Finland in the top league among OECD countries.

Another important observation represented in Table 3.4 is that the share of information distributors and users has also increased, albeit not quite as sharply as the proportion of information producers. As distinct from information producers, these two groups of workers are primarily concerned with communicating existing information, although their work may include some elements of information production. The category of information distributors comprises teachers and communication and cultural workers (e.g., journalists), whereas the category of information users is confined to administrative and supervisory workers (e.g., line managers). As a whole the groups of information producers, distributors and users include every third employed person in Finland today.

On the other hand, occupations related to information processing (e.g., office clerks) have remained at quite a stable level while the use and maintenance of IT equipment has somewhat surprisingly declined. There are two primary reasons for these developments. First, office automation has made certain occupations such as simple word processing jobs redundant. To take a concrete example, in the age of portable PCs, palm computers and communicators there is no need for most knowledge workers to delegate simple word processing tasks to subordinates. Instead, it makes sense to send drafts via e-mail directly to the right colleagues, secretary or professional editor. Sec-

ond, modern computer hardware requires relatively little maintenance compared to increasingly complex software. Computer support personnel have consequently come to resemble information distributors who consult and mentor end users rather than merely install or repair machines.

Similar trends indicating the growing importance of professional and technical occupations have also been reported elsewhere, in accordance with Bell's (1973) theory of post-industrialization. To name a few examples, in such countries as New Zealand (Engelbrecht 2000), Singapore (Kuo & Low 2001) and the US (Martin 1998) and Canada (Lavoie *et al.* 2002) the growing proportion of informational labour has mostly been due to an increase in the number of information producers, scientists and engineers in particular.[47] Conversely, the occupations related to routine information handling have declined fastest. Since the production of information is fundamental to the growth and strength of an information society, this development can be interpreted as a healthy sign (Kuo & Low 2001, 286; *cf.* Pyöriä 2005e).

However, it has to be pointed out that the informationalization of work also means that the labour market has become more selective than before. The difference compared to the past is that a mere generation ago, relatively secure employment and career advancement were realistic possibilities, even without extensive education – now, those who lack adequate skills and education face a bleak future indeed. Similar trends have been observed in virtually all advanced information societies. For instance, Rob Kling, summarizing the experience of 20th century America, writes:

> 'The educational and credentialing requirements for jobs at all strata in the information sector have generally tightened during this century. College degrees were once the prerequisites for only the most specialized and technical or most professionalized occupations. Since World War II there has been a form of credential inflation; bachelors (and sometimes graduate) degrees have become commonplace requirements for many semi-professional jobs.' (Kling 1990, 100)

Thus the tendency for the workforce to be divided into a relatively stable core and a disposable periphery has become a common feature of advanced economies (Castells

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[47] In contrast to studies inspired by Machlup and Porat, some empirically weak yet rhetorically impressive accounts argue that the share of top experts involved in symbolic analysis may in fact be less than ten per cent of the US labour force (Henwood 1996; Warhurst & Thompson 1998a; 1998b). Critics of knowledge work often refer to the large low-paid service sector in the US. According to Blom *et al.* (2002), their figures for Finland would be at roughly the same level, if they were to apply a stricter set of criteria and restrict the definition of knowledge

1996; Frenkel *et al.* 1999). In Finland, this is clearly seen in high unemployment levels being constantly coupled with a shortage of competent labour in certain industries. In the current situation the people who are out of work simply do not have the competencies required by potential employers.

Moreover, it seems that not even knowledge workers are completely immune to the polarization of professional competencies. Although the proportion of information occupations as a whole has not increased since the mid-1990s, the internal differentiation within this stratum has continued (again, refer to Table 3.4 above; see also Pyöriä 2005e). On the basis of the foregoing it can be argued that there is a tendency of increasing differentiation between those who create and broker new knowledge and those whose jobs mainly involve routine information processing.

Knowledge Work as an Ideal-Type

Statistics Finland's analysis is interesting because it is heavily influenced by the examples set by Porat and his precursor, Machlup.[48] Yet, it was Porat whose method became more influential. For example, with some minor alterations, the OECD adopted Porat's approach and this model, in turn, was employed by Statistics Finland (see Tables 3.1 and 3.4 above). Clearly, the most important contribution of these studies has been to facilitate cross-national comparisons.

However, the view I advocate here, following Blom *et al.* (2001; 2002), is that occupational classifications tend to be misleading in that they are poorly suited to comparisons over time. The longer the period under scrutiny, the more problematic comparisons become. As Donald Lamberton, one of the first economists to criticize the occupational approach, puts it:

'… The question to be posed is whether the information sector of country X in 1975 is one and the same sector as it was in, say, 1925. Even a cursory glance at

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worker to those wage earners whose job almost exclusively involves the production, processing or dissemination of information.

[48] More precisely, Statistics Finland's analysis is based on the official Finnish classification of occupations from 1987. In retrospect, this classification has been deemed more suitable for the analysis of information occupations than more recent classifications that are based on the ISCO-88 standard; i.e., the International Standard Classification of Occupations by the International Labour Organization (ILO). According to Päivi Keinänen (2001, 20), the classification from 1987 provides a better picture of the development of the information sector than for example a renewed classification from 1997.

the list of information occupations included in the information sector reveals that many of those occupations have made their appearance in the list in the last few decades.' (Lamberton 1982, 41)

Although analyses relying on official occupational categories have their undisputable merits, I also consider it important that alternative analyses on knowledge exist, regardless of the title or industry. Blom and associates, for example, resting on a critical reading of existing studies have sketched an ideal-typical portrait of a knowledge worker and from this vantage point set out to construct their operationalization of the concept. The rationale behind their choice of criteria is simple. Especially in countries such as Finland, where social change has been exceptionally dramatic, it is clear that an outdated occupational classification does not provide the most viable basis for analysis. Since the early 1990s, the pace of social change in Finland has accelerated further, making it even more difficult for social scientists to gauge the change than before. Today, the occupational structure in Finland as well as in many other advanced post-industrial economies is very different from what it was just a decade ago. For instance, as I have remarked above, simple word-processing tasks and telephone exchange work have been transformed considerably. Accordingly, sociologists generally agree that the formal occupational categories are outdated and cannot keep up with the change (Barley & Kunda 2001, 83).

In contrast to the approach inspired by Machlup and Porat, the main strength of the classification suggested by Blom and associates is that the criteria applied are less dependent on time. IT use, education and the design element emphasize not only the use of information technology, but also point to the nature and content of the job, regardless of the title. As we have seen above, a well-known problem with occupational statistics is that somewhat arbitrary decisions cannot be avoided when deciding who is a knowledge worker and who is not. An additional problem is that the distinction between mental and physical labour has become increasingly blurred, in some cases non-existent, due to the automation of routine work first in factories and more recently in offices. For example, based on their detailed analysis of occupational titles, Jorge Schement and Leah Lievrouw (1984) argued two decades ago that knowledge work occurs across all sectors of the workforce. For these reasons, a classification that takes into account the qualifications required is more closely in line with the theoretical idea of knowledge work than schemes based on occupational classifications – although, of course, no determinants are either supra-historical or exhaustive.

Admittedly, the notion of knowledge work is highly controversial and often remains ill-defined. Despite these shortcomings, it serves to draw attention to the multifaceted effects that technological development has for individuals and organizations as well as for academic attempts to comprehend the change. While it might indeed be impossible to come up with an unambiguous and uncontested definition of knowledge work, it is certainly possible to advance our understanding of the information society and its constituents. It is my belief that the discourse on knowledge work is a step in the right direction. It provides an important alternative to the study of work going beyond the traditional distinction between agriculture, manufacturing and services, rather than merely being an exercise in re-labelling old occupations. In this respect the heritage of Machlup and Porat remains a substantial accomplishment that provided a new perspective on work and occupations.

To conclude my analysis then I would like to propose that the concept of knowledge work be understood as an ideal-type, because in reality knowledge workers do not constitute an empirically homogenous category. According to Max Weber's (1922) classic definition, ideal-typical concepts are neither empirically detailed descriptions nor theoretically exhaustive elaborations of reality. Instead, their utility lies in the encapsulation of meaning by capturing essential attributes of certain classes of social phenomena sharing common features or family resemblance. Just as one can speak of ideal types that inform our thinking of organizations, one can speak of ideal-types of work: by reducing the diversity of work to a few modal images, ideal-typical occupations such as the category of knowledge workers help us comprehend the complexity of the division of labour and assign status to individuals (Barley & Kunda 2001, 83).

Similarly, the concept of a knowledge-intensive organization is best understood as an ideal-type, which draws attention to a fact that in some organizations knowledge as a production input has greater significance than other input-factors. By definition, a knowledge-intensive organization may be characterized as follows:

'The term *knowledge-intensive* imitates economists' labelling of firms as capital or labour-intensive. These labels describe the relative importance of capital and labour as production inputs. In a capital-intensive firm, capital has more importance than labour; in a labour-intensive firm, labour has the greater importance. By analogy, labelling a firm as knowledge-intensive implies that knowledge has more importance than other inputs.' (Starbuck 1992, 714; italics in original)

Table 3.5 summarizes the main characteristics of traditional work based on routines and standardization and knowledge work based on non-routine problem solving and the contingency of work processes. The groups of traditional workers and IT users have not been separated here because in many important respects these categories are similar (see especially Blom *et al*. 2001). It has to be emphasized that the distinctions presented in Table 3.5 should not be understood either as exact opposites of one another or as pure empirical types. To recapitulate, they are ideal-types that do not exist as such and that constitute a continuum between different levels of skills, education and job related demands.

Table 3.5. The Ideal-Types of Traditional Work and Knowledge Work.

	Traditional workers/IT users	*Knowledge workers*
Education	Requires some formal education and on-the-job learning	Requires extensive formal education and continuous on-the-job learning
Skills	Strictly defined skills	Transferable skills
The nature of work	High level of standardization, involves working with physical matter either directly or indirectly through electronic interfaces (e.g., control of production processes)	Low level of standardization, involves working with abstract knowledge and symbols (e.g., design and planning of production processes)
Organization	Ranges from bureaucracy to teams, fixed roles and positions, knowledge as a secondary production factor	Ranges from professional bureaucracies to self-managing teams, job and task circulation, knowledge as a primary production factor
The medium of work	Physical materials and/or people	Symbols and/or people

Managing Knowledge Workers

Beyond academia, of course, the label with which I have chosen to describe the changing nature of work hardly has much practical value. However, what is important is that our experience of work is different from what it was for the previous generations – whether we like it or not, the glory days of the industrial man are long since gone. Practising managers need new tools and techniques to harness the potential of informational labour. As Drucker (1999) says, this is the management challenge for 21st century organizations. Although everyday managerial practices are beyond the scope of the present analysis, two key points emerge from the current research literature that are worth

addressing before we move on to a closer assessment of changing work and organizations.

First, as Drucker implies, the most critical question for contemporary organizations is how to nurture the capabilities of knowledge workers, i.e. how to manage knowledge and human intellect. The problem is how to *capture, store, and feed forward* the knowledge of informational labour in ways that contribute to the sustainable well-being of organizations (Tovstiga 1999, 733). The key here is sustainability. Any organization dependent on innovative personalities needs to strive for a balance between productivity norms and individual tolerance, on the one hand, and between the technological and human side of organizations, on the other. A fair pay, for example, is a necessary but far from sufficient condition for retaining and motivating knowledge workers, as we will see in Chapter Six. According to the majority of contemporary management theorists, such factors as the challenge of the job, exposure to new technology, career opportunities, an inspiring work environment and on-the-job learning come before monetary rewards for most knowledge workers (Amar 2002; Horibe 1999; Newell *et al*. 2002). Recent survey material on Finnish knowledge workers also lends support to this interpretation (Blom *et al*. 2001; Kaajas *et al*. 2001).

A second major concern for the management of knowledge-intensive organizations is that the traditional definition of productivity, i.e. the ratio of labour outputs to labour inputs, does not apply in knowledge work. This definition is well suited for routine manual work, where outputs and inputs are easy to distinguish, but this is not the case for most white-collar or knowledge work (Beruvides & Koelling 2001, 287; *cf*. Okkonen 2004). For example, improved quality of symbolic outputs is not captured in traditional productivity measures (Davis *et al*. 1993, 339). Furthermore, whether or not knowledge workers use their intellectual capital in such a way that it best serves their organization can usually only be assessed at a time well past the point that a company can do anything about it (Horibe 1999, 2). Traditional management tactics such as the close supervision of the work process and the breakdown of work tasks into simple routines are largely inadequate in knowledge work simply because the most valuable part of the work process is latent and its results often remain intangible.

As we shall see in the following chapter, the problem of assessing knowledge workers' performance is complicated even further by the fact that information technology is of little direct help in the process of augmenting human creativity and problem-solving abilities. When used properly, information technology may boost knowledge workers' productivity through the automation of routines, thereby creating more space

for creativity, but IT is not a panacea. Above all else, managing knowledge work requires symbolic tools and techniques.

Chapter 4

Knowledge Work Teams

In this chapter I argue that despite the breakneck pace of technological development that has occurred across advanced economies, there have been very few, if any, changes in the most basic social prerequisites for organizing work and building healthy and productive work environments. I maintain that as such, ICTs have little direct relevance to knowledge workers' performance. Rather than focusing too much on technology, knowledge-intensive organizations should emphasize the importance of teamwork – that is, building cooperation through trust and longevity in employee relations.

The Social Shaping of Technology

After discussing the conceptual framework behind the idea of knowledge work at some length, we are now ready to take a closer look at how the informationalization of society and its organizations has changed and is changing the work environment. In the chapters that remain I turn my focus to two interrelated yet somewhat contradictory themes that are often discussed in conjunction with knowledge work: teamwork and distributed work arrangements. In the research literature teamwork has traditionally been associated with close physical collaboration, whereas distributed work, of which telework is the most often discussed example, bears an explicit connection to the rapid development of ICTs since the 1970s; although, of course, people have exchanged information over distance since ancient times. What is new, however, is the widespread consideration of the possibility that ICTs could provide a viable substitute to physical interaction.

In contrast to the recent enthusiasm for virtual working, network organizations, and an abundance of other buzzwords speculating on the often unrealistic possibilities of technological 'progress', the following analysis is in line with those mainly sociologically oriented and essentially empirical studies that focus on everyday interaction in work organizations (see, e.g., Heiskanen & Hearn Eds. 2004; Heath & Luff 2000; McLaughlin *et al*. 1999). The majority of these studies are centred on the notion that technology is socially and culturally shaped or, to put it differently, ICTs only become meaningful in the hands of real-life users, just like any previous technology. As my analysis attempts to demonstrate, there is no impenetrable mystique in ICTs. In its simplicity the main argument here is that the use of the latest technology can never replace good team spirit and skilful management, both of which are dependent on mundane and primordial patterns of interpersonal relationship formation. I propose in the following that a strong informal organizational culture is an invaluable yet surprisingly often neglected source of competitive advantage.

In itself there is of course nothing new about this observation. The point is that human relations are now more crucial than ever before due to the growing knowledge intensity of work and due to the deeper immersion of work organizations in information technology. The rationale behind my argument is simple: whether an information technology-based organization gets the most out of the latest technology or not depends on the way in which these tools are used. As Lars Groth – a sociologist-turned-IT-consultant – reminds in his important book *New Organizational Design* (1999), there is no other widespread technology than computer-based systems where relative differences in knowledge and skills are so decisive for the success of an investment. Furthermore, even leading edge information technology can be copied quickly, making it an untenable foundation for sustainable competitiveness. As a consequence, two very similar firms can invest the same amount of money in exactly the same systems but experience radically different results.

This is not to say that hardware or software bears no significance whatsoever to organizational performance, but when put in perspective, IT use is far less constrained by physical investments than is the case with industrial technologies (Monk 1989). Because technological advances in IT are available universally, at least relatively speaking, it should be clear that to focus solely on technology is a dead end. Rather, as I suggest here, the solution is to concentrate on harnessing the innovative potential of knowledge workers to the fullest. In order to achieve this, a knowledge-intensive organization should place special emphasis upon developing its organizational culture, which for the

purpose of the following analysis may be defined as 'the set of shared values and norms that control organizational members' interactions with each other and with people outside the organization' (Jones 1998, 176). Thus, all things being equal, technology as such is not the driving force behind successful organizations – it is the firm with superior staff and a creative working climate that will forge ahead of others.

In this chapter I start out by reviewing the relevant research literature in order to demonstrate the validity of my argument above. In particular, I discuss Elton Mayo's classic contribution to organization studies, namely the importance of teamworking, as well as drawing on more recent sources influenced by Mayo. Second, in addition to this critical reading of existing research, I draw upon my experience from conducting case studies among five distinct business organizations. These included: a global 'manufacturing enterprise', a 'telemarketing firm', a 'construction planning office', a modern 'wood-processing factory' and a small 'accounting office'. As I described in greater detail in Chapter One, these organizations as well as the remaining two cases that I introduce in Chapter Six are obviously very different with regard to their core business functions, but they nevertheless represent better than average, if not exceptional, proficiency in their respective fields. Moreover, the cases I analyse in this chapter can be regarded as prime examples of well-functioning and healthy work environments from the point of view of individual workers. Access to these enterprises was sought because of their innovative yet down-to-earth attitude towards doing business.

Since the interviews generated an abundance of important and interesting insights, not all of which can be reported here, I highlight observations that have the most universal value. To recapitulate, the analysis focuses primarily on the effects of information technology on organizations.

Elton Mayo's Contribution to Organization Studies

The discourse on informal organizational culture goes back a long way. The idea is usually credited to the classic Hawthorne experiments conducted between 1927 and 1932 under the auspices of Elton Mayo at the Hawthorne plant of the Western Electric Company in Chicago, where 29,000 employees, representing sixty nationalities, produced telephone equipment for the Bell system (Grint 1998, 119). This was the first time (in the history of organization studies) that human aspects of industrial work were taken under systematic observation. As well as criticising the prevailing mechanistic perception of manual labour, exemplified by F.W. Taylor's principles of scientific manage-

ment, Mayo and his associates showed how formal and informal patterns of interaction, i.e. visible hierarchies and latent social relationships, are equally crucial for organizations (see Mayo 1933; 1945; Roethlisberger & Dickson 1939; *cf*. Taylor 1911).[49]

Probably the best-known part of the Hawthorne experiments comprised a close monitoring of a group of six female workers assembling telephone relays, a repetitive task lasting about one minute per assembly (five young women assembled the relays and one supplied the parts). Over a period of five years the effect of different variables on productivity was assessed: while an accurate record of output was maintained, the researchers manipulated such factors as the intensity of lighting and introduced various methods of payment and working time arrangements. In the course of the research it soon became clear that the observers' intervention entirely reconstructed the workers' 'industrial situation', whereas the manipulation of external conditions proved to have a random effect. According to Mayo (1933, 73), the consequence was that the individual workers and the group as a whole had to adapt themselves to a new industrial milieu in which their own self-determination and their social well-being ranked first and the work itself was incidental. Several years later, reflecting upon the past experiences of the original research, Mayo (1945) wrote that the experiment 'was responsible for many important findings – rest periods, hours of work, food, and the like: but the most important finding of all was unquestionably in the general area of teamwork and cooperation' (p. 82).

In spite of the widespread interest initially generated by the Hawthorne experiments, it took half a century for the idea of organizational (or corporate) culture to become a truly popular topic in organization and management studies. A well-known fact is that these experiments inspired the formation of the human relations movement, which produced some of its most distinguished studies in the 1950s and 1960s, but the

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[49] The usual birth date of the Hawthorne experiments is given as 1927, for in that year the research group began the most labour-intensive and arguably the best-known phase of their study, albeit some initial experiments had already been launched three years earlier. The Hawthorne researchers found their first results so puzzling that they decided to continue the experiments until 1932, when the 'Great Depression' finally terminated the study. Mayo joined the Hawthorne group in early 1928 and, as Richard Trahair (1984, 356–357) writes, his role at the Hawthorne plant was to facilitate the research rather than direct or control it. Mayo helped the research group as well as the individuals who participated in the study. He also counselled executives on the importance of the research and publicized the results, thus protecting the project from criticism. By the time the Depression brought the experiments to a close, the research group had nonetheless made history, at least as far as the amount and depth of data collection is concerned.

concept of organizational culture (as it is understood today) was still rarely used.[50] Before the end of the 1970s hardly any attention had been given to the view that an advanced understanding of organizations calls for an emphasis on their symbols and their cultural systems or, to use another formulation, for using culture as a metaphor for organization (Alvesson 1990, 31–32; see also Alvesson 2002; Collins 2000; Morgan 1997). However, during the 1980s hundreds of books and articles appeared on the subject; and the debate on organizational culture has proliferated ever since.

The research literature offers a number of reasons to explain the sudden upsurge in the use of the concept of organizational culture during the 1980s. Obviously, the original Hawthorne experiments (or for that matter even the numerous studies conducted in their wake) did not exhaust all the possibilities for reasonable interpretations concerning of the functioning of organizations as systems of culturally mediated symbols and informal personal relationships. For example, David Collins (2000) repeats an old claim in his discussion of the issue and says that Mayo and his colleagues were wrong in relating informal with irrational and formal with rational: 'By focusing upon the formal system as the only plausible and rational account of the workplace, therefore, the Hawthorne researchers failed to understand the complexity of the workplace, and so misunderstood the contours and rhythms of the workplace culture at the Hawthorne plant' (p. 119). Even if Mayo did recognize the importance of informal interaction for organizations, he was misguided in interpreting it as illogical in nature and as something that should be cultivated and, if necessary, corrected by a sole enlightened manager in order to secure an optimal balance between the economic and social logic of work. In Mayo's words:

> 'Human collaboration in work, in primitive and developed societies, has always depended for its perpetuation upon the evolution of a *non-logical* social code which regulates the relations between persons and their attitudes to one another. Insistence upon a merely economic logic of production – especially if the logic is frequently changed – interferes with the development of such a code and consequently gives rise in the group to a sense of human defeat. This human defeat results in the formation of a social code at a lower level and in opposition to the economic logic.' (Mayo 1933, 120–121; italics added)

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[50] For example, upon its founding in 1946 The Tavistock Institute of Human Relations in England has focused on studying organizations as 'sociotechnical systems'. The term was coined in the 1950s by members of the institute to highlight the view according to which all technical systems (whether in the form of an organizational structure, job design, or particular technology) always have human consequences, and vice versa (Morgan 1997, 38).

Whatever the shortcomings in Mayo's work, the fact remains that the core of his argument concerning the collaborative nature of productive human work still applies today. Mayo's (1945, 84) firm contention was that the Hawthorne experiments first enabled us to assert empirically that a major preoccupation of management must be that of organizing teamwork, i.e. developing and sustaining cooperation. Whether or not this discovery by the Hawthorne researchers truly was a novel invention, is irrelevant here.[51] The important thing to bear in mind is that efficient teamwork requires a collective goal, informally constituted personal ties among group members and, consequently, strong group cohesion which may be understood as a feeling of togetherness or a sense of belonging to something more than 'just an organization'. In the case of the Hawthorne studies, it was the experimental setting and most notably the presence of the researchers that created an atmosphere of cooperation among the workers, strengthening their social cohesion, and eventually leading to the formation of genuine team culture.

It is precisely this collaborative aspect of work that is considered to distinguish 'real teams' from other possible forms of cooperation such as group work, which is a term used in a much wider meaning. According to a popular definition, 'a team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable' (Katzenbach & Smith 1993, 45; for in-depth accounts on teamwork, see also Procter & Mueller Eds. 2000; Yeatts & Hyten 1998). Again, with regard to these elementary characteristics of teams, hardly anything has changed in the course of history. The basic tenet of organizing work in teams, which Mayo was eager to emphasize, is one part of existing organizational theory that truly has lasting value.

The Flattening of Organizational Hierarchies

In economic and technological terms, on the other hand, we cannot escape the fact that the industrial landscape has been transformed completely since Mayo's days. New technological innovations, the growing importance of technical and theoretical know-

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[51] For example, long before the Hawthorne experiments, Marx's analysis of the capitalist employment relationship transcended a simple and vulgar generalization of an unconditional struggle between workers and managers over work intensity. This kind of simplistic assumption ignores Marx's insights into the role of community within the firm, expressed in his analysis of cooperation and the collective worker – a collective that includes managers in their productive, as distinct from exploitative, roles. (Adler 2001, 222)

how and the disappearance of boundaries between national markets are rapidly transforming the very essence of our material and cultural environment.

For example, since the launch of the first mainframe computers in the mid-1950s, the advances in information technology have been truly mind-boggling, the price to performance ratio in particular. Above all else, computer-based systems have made it easier to couple separate organizations into extended value chains with strong central coordination. This has enabled ever more complex organizational configurations with the added benefit of increasing the flexibility of production processes. As Groth (1999, 378–385) puts it, ICTs enable 'flexible bureaucracies'. That is, thanks to computer-based automation, many traditional industries can now accommodate large variations in product types and also respond to diverse customer needs on a just-in-time basis. The key here is the possibility to reconfigure production processes. Reconfigurable automation solutions enable manufactures to respond rapidly whenever their capacity needs vary or product changes are needed. Consequently, we have seen continuous growth of productivity especially in industrial manufacturing. This is important because productivity growth is the only route to sustainable competitive advantage and wealth creation in the long run.

From the point of view of individuals, however, the advances in information technology remain more controversial. Technological 'progress' has put an end to many routine jobs, thereby inducing unemployment in the short term. Yet new employment opportunities have also been created for those who have been able to keep up with the pace of change. As a consequence, the social division of labour has shifted towards ever more compelling tasks that require extensive and often continuous training and that emphasize cognitive abilities over and above manual skills. In terms of the occupational structure, as we have seen earlier, blue-collar employment has fallen steadily while white-collar work has expanded, service occupations now outnumber those in manufacturing, and knowledge work is becoming the norm in every branch of the economy. In the chapters that remain we will see that there are both negative and positive aspects that these changes have brought about. This said, however, it is hard to deny the beneficial impacts of technological development on our living and working environment.

Even in conventional industries, process workers are becoming (part-time) knowledge workers who control production processes and workflows through computer systems. For example, in the mining industry the main workspace is no longer a dark and dusty network of tunnels, but an office-like operating room full of state-of-the-art technology, including modern social facilities – in the case of Finland, foreign visitors

should not be surprised to find a sauna deep down in a modern mine! Today, the processes of drilling, loading and transporting metals and minerals can be fully mechanized; only excavation requires some manual labour. From a work process perspective, this means that process operators have to visualize the task at hand through an electronic interface that is often at some distance from the production site. Continuous real-time responsibility characterizes the process operator's work: a vast amount of information from the process must be monitored and analysed correctly at all times, and every deviation requires a timely reaction (Nieminen *et al*. 2000).

Moreover, at least from time to time, process operators participate in collective decision-making. In fact, when modern industrial workers get together to analyse production problems, develop strategies for improving the efficiency of their machinery, or redesign their work, they, too, are analysing information and applying expertise much like ideal-typical white-collar knowledge workers, concludes Richard McDermott (1995, 36), one of the most renowned consultants specializing in knowledge work. Of course, it is unlikely it will ever be possible or economically feasible to automate all physical work, but suffice it to conclude here that the trend away from traditional manual labour looks set to continue, albeit not at the same pace as in the 20th century.

This brings us to another reason – besides the shortcomings in the seminal work by the Hawthorne researchers – that explains the renewed interest in the informal side of organizations. The rise of knowledge work that favours 'brains over brawn', together with stiffening and increasingly global competition, has forced contemporary organizations to streamline their bureaucratic structures with a view to improving productivity and fostering innovativeness, for example by implementing team-based work arrangements. The growing interest of management in supporting the performance of their core knowledge workers may be interpreted as an indication of their recognition that the business environment has changed profoundly since the post-war economic boom ground to a halt with the first oil crisis in 1973. The end of the Golden Era not only led to political attempts to regenerate Western economies, but also to major changes at the level of work and organizational processes.[52]

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[52] The causes and consequences of the economic restructuring of the 1970s have been the target of voluminous research (see, e.g., Harvey 1990; Maddison 1991). According to some critics this has led to an imbalanced view on organizational processes. For example, Stephen Barley and Gideon Kunda (2001) have argued that with few notable exceptions, organization theorists have not only taken recent economic changes seriously, but they have overreacted and placed too much emphasis on organizations' outer environment, organizational performance, strategy and structure. The price of this paradigmatic shift has been the failure to present a detailed analysis of situated and contextual work processes and a less than solid empirical understanding of organizations' micro-level foundations. As a consequence, the authors arrive at the following con-

Consequently, a flat, flexible and responsive network organization emerged as the vision that rose to the top of the list of human resource issues during the last decades of the 20th century (Coulson-Thomas 1991). At least this is the image that contemporary organizations are trying to convey of themselves to the outside world.

Figure 4.1. The Prevalence of Teamwork among Knowledge Workers, IT users and Others in 2000 (% of Finnish wage labour).

■ With co-workers
□ With clients
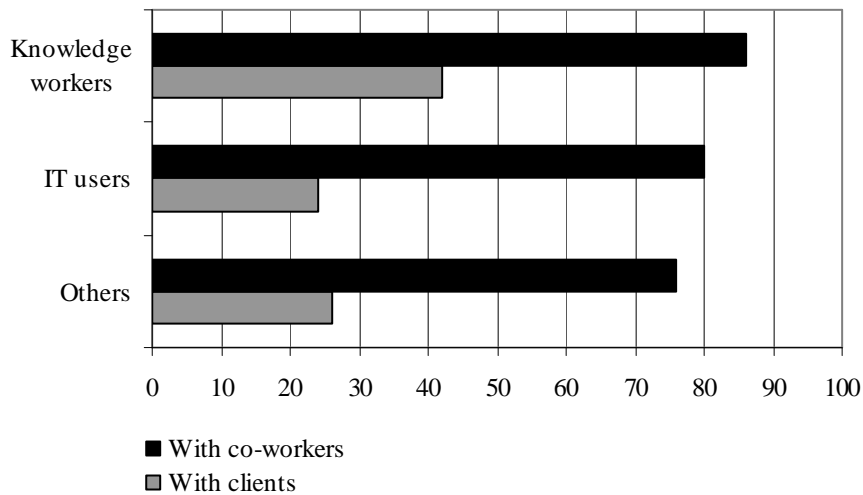
Source: Blom *et al.* 2001, 177.

The current vogue for teamwork seems to be a case in point. Before the 'cultural turn' there was only little enthusiasm for teamwork; now, the ideology of teams is an integral part of every management theorist's as well as business consultant's rhetorical arsenal. At the same time, it seems that the rhetoric of collaborative work has been adopted even on the shopfloor. According to Blom *et al.* (2001), 81 per cent of Finnish wage earners said they work either in groups or teams as of 2000. One third or 32 per cent of the survey respondents also said they work in teams with their clients. Among knowledge workers the corresponding figures are even higher (Figure 4.1). Similarly, as the annual Working Life Barometer compiled by the Finnish Ministry of Labour reveals, four employees in five now regard themselves as working in teams, cells or project groups. Figures released by Statistics Finland are also in line with these numbers. It has therefore been suggested that in Finland, the team-based work organization has penetrated the whole economy.

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clusion: 'The field of organizational studies currently confronts a significant challenge: discovering, documenting, analysing, and perhaps even shaping, the organizational implications of the shift from an industrial to a postindustrial economy. … In particular, we contend that organization theory's effort to make sense of postbureaucratic organizing is hampered by the absence of what once served as its empirical foundation: detailed studies of work.' (p. 90)

However, the statistics tell us very little about the nature of collaboration – they tend to give a biased if not completely misleading picture of the prevalence of team-based work arrangements (Alasoini 1998; 2000). Experience has shown that the transition to teams is a difficult one, requiring not only infrastructure realignment but also the development of appropriate cultural values and leadership skills, as well as a great deal of time and expense invested in development, implementation and administration (Cross 2000, 29; see also Lavikka 1997) – i.e. almost precisely the same ideas that Mayo emphasized in his classic Hawthorne studies in the 1930s. Moreover, sustaining effective teamwork is an ongoing and continuous process that must be strengthened and renewed every day. In effect, 'the great myth is that cooperative team skills are soft and simple when in reality they require life-long learning and refinement' (Tjosvold & Tjosvold 1995, 28).

For these reasons alone it should be obvious that truly efficient teams cannot be put together overnight. Nothing could be further from the truth than the belief that the implementation of teams means a mere restructuring of an organizational chart and making a one-time investment in the process. Calling a group of people a team does not mean that they can function effectively together. Especially in groups that deal predominantly with demanding problem-solving in long and unpredictable projects, it is necessary to have a deep bond of trust and mutual understanding among team members, and this is always a time-consuming process. It may take several years for a group of high-level specialists to gel and to form both formal and informal ties to the larger organizational structure or, perhaps more appropriately, to establish a tightly knit social network with other peers.

Knowledge Work Resists Systematization and Standardization

This elementary yet surprisingly often neglected social fact became evident during the course of my interviews covering seven business organizations (five of which are discussed in this chapter). Simply put, the formation and continuous re-creation of trust among knowledge workers can be interpreted as one of the most fundamental prerequisites behind a successful firm in the contemporary business environment. Furthermore, it can be argued that the importance of trust formation increases with the knowledge intensity of the work. This is explained by the fact that high-level specialists have a tendency to affiliate with their peers rather than their organization *per se*.

As the case of the R&D staff in the global manufacturing enterprise clearly illustrates, individual knowledge workers form 'communities of practice' (Boland & Tenkasi 1995; Brown & Duguid 1991; Lave & Wenger 1991; Wenger 1998) or professional subcultures that transcend formal and clear-cut organizational boundaries. By definition, communities of practice are social spaces of learning, 'where groups are bound together by similar values and beliefs to resolve a common set of problems' (Campbell 1999, 21). This way of working is considered suitable particularly for new product development, since it facilitates the integration of dispersed knowledge through informal social relationships irrespective of formal intra- and inter-organizational hierarchies.

In this respect a most telling example is the fact that about half of the subcontractors working for the R&D department were located on the same physical premises as the 'regular employees'. Although these two groups of employees differed in terms of their formal organizational positions, they nevertheless constituted a unified working culture. No distinction was made between 'us' and 'them':

> '*In our enterprise subcontracting is long-term collaboration. We have many subcontractors who have been here for years. They share our facilities and participate in R&D. In mundane, everyday work you don't think who is a subcontractor and who is not.*' (Development engineer, Manufacturing enterprise)

The case of the manufacturing enterprise is particularly illuminating with regard to multi-disciplinary teamwork. Of the five cases that form the empirical background of the present chapter, this particular organization is by far the most interesting because of the nature of its products and services. The manufacturing firm provides automation solutions, machinery and after sales services for the process industries. More specifically, the unit concerned specializes in highly complex information management systems that are used by the pulp and paper and energy industries as well as by the hydrocarbon and minerals processing industries. For example, the R&D department produces software that is used for control processes in paper mills, power plants and other similar industrial complexes. In other words, the work done in this unit fits 'perfectly' the ideal-type of knowledge-intensive activity.

The R&D department had undergone a major organizational overhaul at the beginning of the 1990s, albeit within the traditional paradigm of software development. In textbooks software development is usually described as a cycle of planning (identifying users' needs), requirements analysis (codifying the requirements to meet users' needs),

design (setting up a schedule to get the job done) and, finally, programming and testing before a new software package is ready for release.[53] What is unusual, though, is that due to high security and functionality standards, the testing phase may take as long as half of the whole project duration. As one of my informants explained, even the most miniscule change in the programme code may affect the whole software architecture; a single misplaced keystroke may suffice to cause a catastrophe. Avoiding human errors is all the more difficult because many programmers and other specialists typically collaborate; that is, the task of coordinating the work process becomes more and more difficult, as the number of collaborators increases. Therefore, the testing must be a continuous process. However, in the early 1990s the management felt that this fact was not a plausible explanation for the less than optimal efficiency of the R&D department. Inspired by a model successfully used in the sales department, it was decided that also the R&D staff should give up their old predetermined divisional boundaries and turn to a project-centred and less hierarchic structure.

The purpose of this 'business process reengineering' (Hammer & Champy 1993) was to start looking at relationship with the customer from a completely novel angle. In the old system work tasks were assigned on the basis of the individual worker's formal position. In other words, a relatively strict division of labour preceded actual work tasks, which is a defining characteristic of a bureaucratic organization. The problem, however, was that the system was not particularly sensitive either to increasingly diverse customer needs or sustaining collaboration with different specialists. As McDermott (1995, 39) says, organizing a project by dividing it into component parts and using project management to reassemble it limits the degree of in-depth, content contact team members have with each other. Eventually, something had to be done.

When the new model was introduced, the whole production chain was figuratively speaking turned on its head. Work was no longer divided in accordance with predetermined positions, but the exact division of labour was now determined only after a customer assignment had been received. Once the assignment was on board, the responsible team managed itself. Although each team had a project leader, there was no clear hierarchical structure within or between the teams. Each project team enjoyed operational

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[53] In textbooks this process is typically labelled the waterfall model. In a perfect world software development should proceed from stage to stage like an irreversible stream of events. However, in real life requirements often change over the course of the project. This observation has led information system specialists to develop alternatives to the traditional waterfall 'method'. Today, the metaphor of spiral is often used in this context due to the fact that software development is an iterative rather than linear process (Megill 2004, 130–131).

autonomy within the limits of time, budget and other resources negotiated with the customer. After the commission had been completed, the project team dissolved and individual workers moved on to other assignments.

The rationale behind this change was twofold. First, compared to the old system, the new model meant it would be easier to recruit the most suitable workers into different projects. It would therefore hardly make any sense to try and draw an organizational chart of the current model because all work tasks were to be organized as individual processes. As a matter of fact, in the interviews it was explicitly said that there was no organizational chart indicating different positions. The current division of labour had been formed through trial and error. Second, it became easier to control fluctuations of the workload because staff could be moved from one group to another within the organization. Indeed individual workers would often be assigned to a number of parallel projects. In short, the project teams were cross-functional and horizontal.

Thus, in line with software development more generally, project teams are instituted and appointed formally but how they operate, communicate and interrelate is left unspecified and emergent over time (Clegg *et al*. 1996; Waterson *et al*. 1997). This is often a necessary precondition in R&D work since the various tasks required to develop a new product tend to evolve and change as new knowledge is gained or unanticipated problems surface. Therefore, a dynamic organizing approach stimulating knowledge creation throughout the process is called for, rather than more planning of tasks prior to their execution; or, to put it differently, the less programmed and more complex a task is, the greater is the need for flexibility around the structuring relationships (Kolehmainen 2004; Lundqvist 1996).

Of course, this is not to say that knowledge work should in any circumstances be organized in a haphazard way. I simply want to draw attention to the fact that human creativeness (for example formulating solutions to unique problems) is an unpredictable process. For this reason knowledge work 'resists' systematization and standardization, yet no organization can survive without some degree of systematic goal-setting, planning and decision-making authority (McDermott 1995; Mohrman *et al*. 1995b). Little is revolutionary in this idea. The point is that in the strict sense of the word knowledge cannot be managed, no more than it can be owned in the traditional sense. From this perspective knowledge management – a fashionable sub-discipline of organization studies – resembles futurology, which aims not at producing actual predictions but rather at comparing alternative future scenarios. Similarly, a 'knowledge manager', for example a team leader in charge of an R&D project, should provide relatively general guidelines

for action without interfering too much in his or her subordinates' work process. Indeed, my informants in the manufacturing enterprise emphasized that the most important skill of a good project manager is the ability to listen to and understand different personalities, rather than possessing superior expertise over others. Other views on how to resolve the problem of planning included equal responsibilities, budgeting enough time for projects, an open and communicative atmosphere and careful documentation of different work phases.

In this respect the case of the manufacturing enterprise is typical of the existing research literature, which highlights the benefits of the ongoing trend towards lean and flexible post-bureaucratic organizations (Alasoini *et al.* 1994; Kalthoff *et al.* 1997; Womack *et al.* 1996). In light of the interviews it would indeed be tempting to conclude that a move away from bureaucracy is always for the better. None of the interviewees criticized the final outcome of the organizational transformation. For instance, it was pointed out time and time again that organizing work in projects, which have a clear beginning and end, has been a significant improvement. The cross-functionality of teams was also considered beneficial. The organizational change had broken the isolationist mind-set that was characteristic of the old system based on strict functional boundaries.

> '*Earlier the divisions merely tried to cope with their responsibilities. ... The old division of labour clearly was dysfunctional, but today project workers are carefully selected.*' (Design engineer, Manufacturing enterprise)

> '*The change was about time management. Often deadlines are still hard to meet, because designing [a new product] is so difficult. But earlier the work was much more difficult. ... Back then we used to work all day and night.*' (Requirements engineer, Manufacturing enterprise)

However, it was also made clear that the implementation period of the new model was far from painless. In practice the transformation process proved to be gradual and iterative in nature, much like R&D work itself. Although precise conflict situations are hard to retrieve afterwards, it is likely that the break-up of the old structure severely complicated the coordination of work tasks. Because the old hierarchic order had ceased to exist, there was a greater need for mutual adjustment. The division of labour had to be renegotiated on the interpersonal level without the support of the predetermined structures of a 'faceless' bureaucracy. The price of flexibility was thus an increased need for interpersonal communication, which posed problems of it own (more on this later). With time and effort, however, the newborn organization learned to adjust itself to the de-

mands of customer-centred projects and a less hierarchic decision-making culture. Fortunately, the organization was able to keep employee turnover at a manageable level, thus allowing its core knowledge workers to mature together and find new ways of acting as a coherent whole.

Longevity is Essential in Knowledge Work Teams

Indeed, longevity may be one of the key preconditions for optimal team performance, especially in knowledge-intensive organizations. This interpretation is supported by a number of studies. Although lacking a clear definition of knowledge work, Karl-Erik Sveiby and Roland Simons (2002), for example, have found that a collaborative climate tends to improve with age. Based on data from 8,277 respondents in a wide variety of public and private sector organizations, who were allowed to access an Internet questionnaire between 1999 and 2001, Sveiby and Simons concluded that 'it takes much longer for new employees to become truly effective in their new environment than has been generally understood and definitely more than accounted for in induction programs, which typically rarely last longer than six months' (p. 425).

In a more detailed research setting Brian Janz *et al*. (1997) focused on 231 knowledge workers from 27 work teams. The sample consisted of information system departments in 13 different *Fortune* 500 organizations. All team members chosen for the study worked in the same location, a choice probably based on the assumption that fruitful teamwork requires face-to-face contact. The research setting is of particular relevance here because teams dealing with information system design and maintenance obviously operate in knowledge-intensive work environments, and because team-based organizations are often considered to be characteristic of knowledge work (Beyerlein *et al*. Eds. 1995; Cutcher-Gershenfeld *et al*. 1998; Fisher & Fisher 1998; Fruin 1997; Mohrman *et al*. 1995a). Among a number of other interesting implications, Janz *et al*. arrived at the following conclusion:

> 'It may be that mature teams are more *capable* of channelling high levels of motivation into positive team process. This suggests that team performance, as with individual performance, can be a multiplicative function of ability and motivation. Teams must be motivated to engage in effective process behaviours, but must also have the organization and unity that comes with development. Indeed, such maturity may be especially critical to knowledge worker teams because of the increased

complexity inherent in the work they perform.' (Janz *et al.* 1997, 899; italics in original)

Another well-designed survey by Patrick Flood *et al.* (2000; 2001) set out to assess the 'psychological contract' among knowledge workers in the high technology and financial sectors. According to the authors, a psychological contract between the organization and the employee refers to a specific state of relationship in which the employee may expect that the employer fulfil its contractual obligations (such as monetary rewards, training and skill development, interesting work, etc.). Based on an analysis of a sample of 402 knowledge workers from eleven organizations, the authors concluded that the most important aspect of the psychological contract relates to the role of met expectations, which in turn affect obligations to contribute and stay with the employer. This finding was hardly unexpected. More importantly, the study also indicated that meritocracy and equity have a direct effect on organizational commitment. Especially among knowledge workers, meritocracy (the degree to which employees perceive that their rewards and career advancement are based on merit rather than other forms such as nepotism or seniority, for instance) seems to be particularly relevant. Like trust, true organizational commitment as well as meritocracy presupposes longevity in employee relations.

The preceding overview of the importance of longevity for team performance has significant managerial implications. Above all, as was remarked earlier, effective team performance requires a bond of mutual understanding and trust among group members. In its essence a team is a community, and trust is a key coordinating mechanism. Yet every organizational structure has certain limitations and costs (see Coleman 1990; Groth 1999).

Although trust is a powerful mechanism in coordinating group behaviour, sole reliance on it has many pitfalls. As I have argued, the most relevant constraining factor with regard to trust formation may be longevity, especially in the context of knowledge work teams. The development of trust requires the formation of close interpersonal ties, and this, in turn, takes a great deal of time, which arguably has become one of the scarcest resource in our economy. At the other end of the spectrum, a further disadvantage is the fact that trust can easily turn to mistrust. In the worst case a single conflict can ruin many years' worth of trust-building.

Moreover, exceptionally long-lived teams may turn into cliques that resist regeneration. Teams with dense ties promote stability, but less clannish groups are more open to newcomers, thus promoting debate. However, the argument here is that in favourable

conditions trust provides the strongest possible foundation for fruitful collaboration in small groups. The more time is invested in building trust, the more the investment pays back in terms of higher morale and efficiency. As the shared context of understanding among team members grows deeper, the easier it becomes to communicate *complex* ideas and avoid *useless* interaction.

These elementary social-psychological facts emerged as a characteristic shared in common by all business organizations included in the present empirical analysis. Longevity in employee relations was particularly characteristic of the manufacturing company's organizational culture, and this had clear advantages. Compared to computer work in general – which according to many commentators is notorious for high labour turnover, unrealistic schedules and time pressures resulting in projects that fail to meet customer requirements – the R&D department studied clearly stood apart. All interviewees regarded a stable work environment and informal organizational culture as crucial for long-term success. Good project management with an emphasis on a manager's ability to understand different personalities, casual corridor conversations and common leisure time activities were seen to make work not only more rewarding individually but also as helping to sustain reciprocal support within and between teams. Indeed, knowledge work in the field of software development is characterized by reciprocal interdependence among experts, clients and management: management has to rely on experts' problem-solving abilities, experts rely on management for resources and support, and clients, in turn, rely on the quality of the service they get (Kolehmainen 2004, 100).

On the other hand, apart from the recognition that building trust is a time-consuming socialization process, there are also professional reasons why close interpersonal ties are crucial for optimal team performance. Without any intention to portray the case organizations in an overtly romantic light, a fully functional knowledge work team can be characterized as a modern version of traditional craftsmanship, where workers were responsible for doing a total job in small groups, and where knowledge was tacitly passed on from masters to apprentices. Like craftwork, knowledge work in teams is largely individual, *ad hoc*, and invisible (McDermott 1995, 38). The engagement in the work process or practice is the key here. As Jean Lave and Etienne Wenger (1991), who have coined the term 'communities of practice', argue, learning takes place within a framework of participation, rather than in individual minds. In this process an individual not only learns about a practice, but he or she becomes a practitioner conforming to a common set of implicit and explicit rules, regulations and a shared way of thinking (Brown & Duguid 1991).

Yet, the difference compared to the past is twofold: in knowledge-intensive organizations the 'new craftsmen' are dependent on theoretical knowledge and formal education rather than on empirical and anecdotal experience only; and, because of the increasingly abstract nature of knowledge, it is often necessary to work closely with other specialists. A combination of both theoretical and interpersonal knowledge is needed. As Eileen Trauth, the author of *The Culture of an Information Economy* (2000, 10), writes, the former is required for one's specific job; the latter makes workers well rounded and enables them to respond to the contingencies of the workplace. It is therefore the job of the modern manager, project leader and every worker to contribute to a climate where theory and practice are fruitfully intertwined.

Thus, it goes without saying that practical and tacit forms of knowing are of crucial importance, but the point addressed here is that in contemporary work organizations formal training generally precedes hands-on experience, as I argued in Chapter Three. Because the life cycle of advanced knowledge and new technologies is getting shorter and shorter, the most important skill a knowledge worker can possess is the ability to continuously build upon his or her previous state of expertise. In this process formal training provides a theoretical foundation without which on-the-job learning would not be possible. In other words, theoretical knowledge, for example the mastery of mathematical symbols and equations, functions as a common language among specialists, enabling them to interact and exchange ideas and, as Trauth (2000) says, 'make the mental leaps into the new methods and approaches that accompany the technology that is ever on the horizon' (p. 10).

As the remaining sections suggest, technology is of little direct help in the process of augmenting human collaboration in knowledge work. However, modern information technology continues the long trend of the automation and mechanization of work and, if used properly, it can indirectly contribute to creating more space for interpersonal interaction by eliminating routine work.

The Power of IT Lies in Eliminating Communication[54]

One of the most alarming examples of how existing knowledge about organizations is ignored, is provided by the false conception of the utility of IT for enhancing interpersonal interaction by constructing new communication channels parallel to old ones. As Groth (1999) has reminded, the true revolutionary nature of IT lies in its capacity to overcome limitations in our natural physical and mental capabilities by eliminating the need for communication. Somewhat paradoxically, this is what organizing is all about: building coordination mechanisms for complex social action through the delegation of authority and the encapsulation of information, which both help manage the communicative burden that individuals in an organization have to carry. Organizing is not about extending the range of choices *ad infinitum* but ruling out alternative possibilities for action.

Especially in knowledge-intensive organizations, which Groth has labelled 'Interactive Adhocracies' following Henry Mintzberg's (1983) work, the best solution is not to attempt to make communication among organization members smoother and more efficient, because of the very simple reason that human communication is always a resource-consuming activity. Groth's reasoning is worth quoting at some length:

> 'Rather, *the solution is to use the technology to eliminate the need for most of the communication in the first place*. If the organization's main tasks can be modelled with sufficient precision and incorporated into a computer system (or an integrated suite of such systems), the members of an Interactive Adhocracy may be coordinated simply through their work with the system – in the same way that all travel agents who use the Amadeus or SABRE reservations system are perfectly coordinated in their seat reservations without ever having to talk together. An early example may be the organization that produced the structural design of Boeing's new 777 jetliner. If we thus can eliminate most of the communication overhead in the Adhocracy while retaining its creative strengths, the result could be a formidable

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competitor in the territory between mass production and the one-of-a-kind designer shop.' (Groth 1999, 18; italics added)[55]

However, Groth does not imply that cooperation among organization members is counter-productive. On the contrary, the efficient use of IT simply enables the automation of routine tasks and helps us to avoid useless communication. For example, the most important pre-computer technology – namely writing – provides unlimited possibilities for information storage and sharing with others. Before writing was invented people had to rely on their memory and time consuming face-to-face interaction, which seriously limited the size and complexity of organizations. In fact, as Groth states, it was not until the advent of the Industrial Revolution that the potential of writing and other pre-computer tools was explored to any depth, and it was not until the 20th century that the limits of pre-computer technologies became an obstacle to the further growth of modern organizations. There is no magic inherent in IT, Groth emphasizes, but computers have taken the process of coordinating complex organizations to a qualitatively new level by automating and eliminating time-consuming human communication.

What, then, is so special about information technology? In Groth's analysis, the main contribution of information technology to organizations struggling with complexity is that computers allow us to process information outside the human mind for the first time in history. The computer is becoming an expression of the human mind rather than of the human hand. According to Groth this is a contribution fully on a par with the memory revolution brought about by the art of writing, even if the kind of processing power provided by the computer is much narrower than the capabilities of the human mind. However, certain tasks requiring complex mathematical calculations, for example weather forecasting, would not be possible without the help of computing power. Computers also augment organizations' capability to store and disseminate information. Unlike writing, computer-based databases allow not only information storage but also very efficient search and retrieval mechanisms. In addition to computerized airline reservation systems, trading systems for stocks and currency are other prominent examples Groth uses to illuminate his point. Although these kinds of systems are not organizations in the classical sense, they are nevertheless highly organized.

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[55] The neologism 'ad-hocracy', with a hyphen, was popularized by Alvin Toffler in *Future Shock* (1971), but it was Mintzberg who gave the word precise meaning. According to Mintzberg (1983) an adhocracy is a highly informal organizational configuration 'that is able to fuse experts drawn from different disciplines into smoothly functioning ad hoc project teams' (p. 254).

In other words, IT is first and foremost a technology for coordination and automation enabling larger and more complex organizational configurations than would be possible with pre-computer tools, and as such is of greatest benefit to large organizations. According to Groth:

'The notion that IT will favour small firms is, I think, based on wishful thinking. IT is very complex, and anything but the simplest use requires fairly sophisticated knowledge, and a knowledgeable staff – which is normally not found in small companies. Highly integrated systems make large firms surprisingly lean and fast, and increase their flexibility in crucial areas. Whatever small firms use IT for can also be done by the large firms, and they will generally be able to bring a lot more resources to bear – both in terms of capital and of competence.' (Groth 2003b, 12)

From a management point of view, the challenge faced by a knowledge-intensive organization is how to make a clear distinction between essential and non-essential forms of communication, i.e. to what extent IT could help in the automation of routines. To borrow an analogy from biological sciences, certain nutrients – such as a group of eight amino acids, two fatty acids and a number of vitamins and minerals – are categorized as essential because the human body cannot synthesize them from other nutrients. In a similar fashion, metaphorically speaking, organizations have needs that are crucial for survival. For example, as the preceding discussion of teamwork has implied, face-to-face communication is a social necessity that no technology is likely to replace. For this reason organizing work virtually among geographically distributed team members is considered extremely challenging (Fisher & Fisher 1998). Especially in the case of continuous virtual teamworking, personalized trust relationships established through intense periods of face-to-face interaction and socialization are more than essential (Nandhakumar 1999).

The metaphor of organizations as organisms has its limitations, though. Because in the world of organizations essential communicative needs can be highly context-sensitive and prone to changes over time, one possible way forward might be to focus on identifying those aspects of activity that can be considered non-essential. A common example of reducing communication overhead is bypassing certain phases in the work or production process. A classic case made famous by Michael Hammer and James Champy (1993, 36–39) is IBM Credit Corporation, which is in the business of financing the computers, software and services that IBM sells. After years of trying to speed up the frustratingly slow loan processing, two senior managers had a brainstorm. They de-

cided to walk a financing request themselves through all the steps in the process, which involved five different departments. According to Hammer and Champy the actual handling of the application took only 90 minutes compared to the average of one week! Finally, IBM Credit decided to train its workers so that they could handle all the consecutive steps of the request process on their own with the support of a new computer system and a small pool of experts whom they could consult in case of exceptionally tough situations. As a consequence:

> 'IBM Credit slashed its seven-*day* turnaround to four *hours*. It did so *without* an increase in head count – in fact, it has achieved a small head-count reduction. At the same time, the number of deals that it handles has increased a hundredfold. Not 100 per cent, but *one hundred times*.' (Hammer & Champy 1993, 39; italics in original)

A different yet equally impressive example of making work more productive is the invention of computer aided design (CAD) programs. In industrial engineering this has led to the virtual elimination of physical materials in the design process. Before the introduction of CAD software, drawings had to be produced by hand, and concrete handmade models were often needed as well. This resulted in considerable coordinative costs due to difficulties in the handling of physical documents and materials. The case in point that Groth highlights is the Boeing 777, which was the first aircraft whose whole structural design was done with the aid of three-dimensional (3D) computer design. With the Boeing 777, digital design made it possible to display each part as a 3D picture, rotate it to view it from different angles, test the effect of movements, etc.; and because of the integrated database connecting all the workstations, neighbouring parts could then be joined together on-screen to simulate a complete model of the aircraft (Groth 1999, 311). Not surprisingly, significant increases in knowledge worker productivity have been reported following the implementation of CAD programs (Gaimon 1997).

My interviewees in the manufacturing enterprise as well as in the construction planning office stressed the benefits of recent software development, especially the compatibility of their tools resulting from standardization. In these two cases CAD programs in particular had considerably reduced the need for transferring printouts between team members, saving both time and money. Printing drawings beyond A3 size is relatively expensive and time consuming, not to mention the difficulties presented by completely handmade drawings. A senior manager interviewed at the construction planning

office, however, remarked that the reduced need for transferring paper documents in industrial engineering and architecture might be at least partly an illusion. In many instances the widespread use of e-mail attachment files merely shifts the unpleasant printing responsibilities, i.e. communicative and monetary transaction costs, from the sender (producer) to the receiver (customer). In his opinion the main result of the almost exponential growth of e-mail has been an uncontrolled information overload that has largely invalidated the initial benefits that this particular communication channel once promised to offer. He also emphasized that above all else time is money and in this sense e-mail is hardly the most cost-effective means of interaction.

Another promising yet problematic example of eliminating the need for routine communication is the use of office automation in administrative tasks. For example, in the case of the telemarketing firm, a secretary described how electronic invoice handling had significantly facilitated routine monetary transactions. Using a commercial software package, she first scanned and then electronically approved all incoming paper invoices. The next step, already adopted between the most progressive firms, is to digitize the whole transaction process, which according to some estimates could ultimately result in 90 per cent savings in transaction costs (OECD 1999, 14). In addition to eliminating the need for time-consuming and error-prone manual inputting of data, digital invoice handling provides the benefit of linking the transaction process to a larger accounting platform or organization-wide information management system. This kind of a system allows for the automation of inter-organizational information transfer, for example between accounting offices and their customers:

> ‘*With regard to payroll a case in point is an enterprise in which a worker enters his or her personal code into a cash register upon clocking in and out of work. The machine calculates the working time automatically. When it is time for the payroll computation the data will be retrieved straight from the cash register.*’ (Manager, Accounting firm)

In the wood-processing factory modern information technology has been employed through the whole value chain, starting with the purchase of raw materials to the manufacture of highly refined goods. For example, personnel responsible for purchasing timber carry with them a mobile office. Their job is to negotiate the terms of sale with individual forest owners and base their judgement on other experts' analysis of the quality of the material (in Finland it is quite common for ordinary people to own small areas of forest as an investment).

In this case the introduction of transportable PCs and tailor-made software had made it possible to handle most administrative routines on the road, right on the spot with the customer. Organizationally speaking, this meant more responsibilities for the purchasers and less need for administrative personnel. Before the era of laptops, purchasers had to rely on conventional paper forms and transfer all invoices, legal contracts and other documents physically to headquarters, where secretaries did the paperwork. Now, every relevant piece of information on the customers travels digitally with the fieldworkers and is also digitally transferred to the head office. In this example the next logical yet still unrealistic phase is to eliminate routine communication between the fieldworkers and the head office altogether. However, this may never materialize. The head of the purchasing department stressed that as long as there was even a remote chance of human error (e.g., in tasks that require filing important data), there must be some control mechanism in place. For the time being it makes sense to have a separate administration for the purposes of checking, giving final approval and filing back-up copies of important documents.

Nevertheless, the reduced need for handling physical documents is a small but important illustration of how a technological innovation (software development) can streamline work processes by eliminating routine communication. The point addressed here is that if it is possible to bypass certain phases of work by getting rid of the need to handle physical material, we will no doubt over time witness a relative decline in paper use and less need for administrative routines. However, it is still unlikely that offices will completely get rid of paper formats as digital technology continues to advance. The vision of the paperless office will probably remain an ephemeral myth rather than a conceivable reality. During the past decade, despite huge advances in digital communication, paper consumption in offices continued to increase and in fact outstripped the general growth in paper (Brown & Duguid 2000, 27). It seems that traditional paper quite simply has certain important advantages over electronic interfaces: paper is not only inexpensive but extremely lightweight yet sufficiently durable, making annotations easy, and above all paper is friendly to the human sense of sight. For reading, paper simply remains supreme in its flexibility. Somewhat paradoxically, hardware and software producers are trying to compete with the best physical qualities paper has to offer: portable computers are increasingly lightweight, desktop displays are becoming larger, the World Wide Web is comprised of 'pages' that can be bookmarked for further reference, and word-processing programs offer the possibility of annotation. Nevertheless,

paper continues not only to persist but also prosper (for a comparison of paper and digital technologies, see Sellen & Harper 2002).

On the other hand, paper 'resists' the powerful search methods enabled by digital technology. For example, in the telemarketing firm the most important advantage of information processing was clearly an innovative system of integrated databases that provided information on practically every privately and publicly owned enterprise in Finland. The system was designed to automatically integrate different commercial and governmental registers that alone were far less than comprehensive either in scope or accuracy. From this huge amount of raw data, the telemarketing firm compiled its own directory of business services available in both electronic and printed format. The job remaining for sales negotiators (as they were called) was to offer companies advertising space in the directory profiled for their individual needs. Thus, in the telemarketing firm technology was successfully used to automate as many routine tasks as currently possible. What remained was a job that cannot be mechanized: non-routine interpersonal service work.

Creativity Cannot Be Forced

To summarize my argument so far, the underlying logic behind the examples given above is the elimination of routine communication. With the help of modern information technology, the individual worker can handle either more work or a more diverse array of tasks, reducing parallel activities in an organization. In this sense, IT is simply a tool, albeit a powerful one, for taking the automation and mechanization of routine work to the next level; this is the very heart of the technological revolution from industrialization to informationalization. And in the foreseeable future technological convergence – i.e. system integration or consolidation in more technical terms – is likely to push the pace of automation and mechanization even further, both in offices and factories.

The development towards unified computer systems is likely to progress on three inter-related levels. On the level of general computer infrastructure, the trend towards distributed computing has been reversed. That is, enterprises have found it expensive to support separate computer departments as well as individual PCs. Instead, it is more economical to have one or few centralized databases or a string of integrated databases, which individuals may access via their workstations. This offers the possibility for accessing information from multiple sources through a single interface. On the second

level, centralized databases not only allow for easy information retrieval but also efficient information storage. Once new data have been entered into the system it can be used by all authorized persons. Finally, there should be less need for different software applications as system integration progresses.

One concrete application, which in all likelihood will become increasingly common, involves connecting machines, ranging from paper mills to cars, to the Internet (or some other form of digital network). A prominent example already in use in many industries involves establishing a wireless link between a machining tool and its operators and/or maintenance personnel. When a problem occurs the system sends an alarm message directly to relevant persons regardless of their physical location. Depending on the situation, possible options include remote diagnostics or immediate physical service. In any case, service delays are likely to be reduced and problems solved more efficiently and with less personnel than before. Connecting industrial machinery (or consumer durables) to a network also provides new possibilities for full life-cycle support. In the best case scenario, an automated maintenance system could detect failures even before they become problems, for example by analysing critical performance parameters in real-time, isolating faulty parts, and ultimately 'learning' operating conditions and self-diagnosing appropriate repair procedures when parameters deviate from acceptable levels.

However, it is worth emphasizing that the idea of reducing communication overhead does not refer to downsizing, personal time management, or working in isolation from peers. On the contrary, especially in knowledge-intensive organizations cutting the transaction costs involved in all communicative acts is the only way to win more time for collaborative problem-solving and other tasks that resist 'the logic of the binary code'. It should be clear that in organizations that depend upon workers' creative output, a straightforward exercise in business process reengineering (Hammer & Champy 1993) is faulted inasmuch as it seeks productivity gains only through brutal and coercive means aimed at reducing the organization's headcount. In their later writings, both Hammer (1996) and Champy (1995) came (no doubt in response to their numerous critics) to stress human relations, organizational culture and worker satisfaction as important productivity variables. On the other hand, the reduction of communication overhead does not refer to personal time use because individual time management does not necessarily affect overall organizational performance. Whereas business process re-engineering fails to take into account the individual's value system as a critical element of organization, personal time management neglects organizational productivity (Sah-

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raoui 2001, 71). Perhaps needless to add, the most successful firms manage to strike a balance between these extremes.

To recapitulate, the most important reason why Groth (2003b) urges knowledge-intensive organizations to rid themselves of non-essential communication has to do quite simply with the ironclad constraints of time and our cognitive capabilities: 'The speed of decision-making is not only dependent upon how fast information can be collected and presented, but also upon the decision-maker's ability to absorb the information, reflect upon it, and form an opinion which is soundly based – a process that is not augmented by technology' (p. 12). Therefore, the elimination of *useless* interaction is the only way an Interactive Adhocracy (or a knowledge work team) can save time for developing its true creative strengths, which constitute the core of knowledge work: the creation and productive application of new knowledge as a collaborative process. It is in this distinctively human territory of creative problem-solving and non-routine decision-making where information technology as such is least capable of increasing productivity. Since knowledge work generally deals with information in non-routine or non-predictable ways, rule-bounded information technologies can contribute only minor improvements in productivity – and they are largely incapable of automating or mechanizing the process of human judgement and creativity (Martin 1998, 1063).

Moreover, given the unpredictable nature of creativity, it is likely that the time component becomes more and more constraining as the knowledge-intensity of work deepens. Consider the work of a musician and a composer. An example made famous by the economist William J. Baumol is a live performance of a chamber ensemble. Regardless of the musicians' wages (or any other factor except the tempo of course), the performance of a 45-minute quartet requires three man-hours worth of time (Baumol & Bowen 1966, 64). This simple and objective fact makes all service work incomparable to the production of goods; thus, the basic level of productivity in all personal services is irreversibly constrained by the time factor. In the case of the composer's work, it becomes even more difficult to conceive what productivity is and how it should be evaluated. Obviously, it makes no sense to assess the composer's productivity in purely quantitative terms. The same holds true for most work that is dependent on creative solutions to unique problems and in which the content of the work and its performer cannot be separated. In practice, however, few knowledge workers are free from time pressures imposed by management (see Chapter Six).

For the reasons outlined above, Groth is highly sceptical of groupware solutions (such as IBM's Lotus Notes/Domino or Workplace) and other information systems de-

signed to support knowledge workers' decision-making process.[56] Among its other features, basic groupware software extends the bi-directionality of e-mail towards computerized conferencing that enables all members of a bounded social network to read all messages (Wellman *et al*. 1996). More advanced systems allow for real-time Web conferencing. A potential benefit of these kinds of systems is the possibility of on-line storage of communication for subsequent search and retrieval.

However, this is not necessarily a good thing, if the result is a worsening of the information overload, a problem that was a major cause of work-related stress well before e-mail, and one that is unlikely to diminish. Therefore, tools that effectively and reliably select and filter information without compromising users' communicative needs should have a bright future. So-called intelligent agents, which collaborate with the user, 'mimicking' the work of librarians, could potentially perform such a function, although at this stage viable agent technology still remains on the horizon (Martin & Metcalfe 2001). For the time being, then, various business intelligence (BI) or computer aided creativity (CAC) systems, just to name two recent catchwords, are more or less on the level of prototypes.

An additional problem inherent in all computer-mediated communication, which I will come back to in the following chapter, is the lack of immediate face-to-face interaction. The use of asynchronous messaging such as e-mail may prolong the decision-making process, as feedback will suffer from delays. Furthermore, even in real-time virtual conferences combining audio and video, most social clues – arguably the most efficient form of immediate feedback – will remain absent. The point here is that at present there is simply no substitute for physical presence, and if any communication technology is used without plan and insight, it is likely to have a negative effect on knowledge workers' productivity.

In this respect all the case organizations represented here had followed a realistic strategy of technology implementation and a relatively cautious policy of introducing organizational changes. Face-to-face meetings, e-mail and (mobile) telephones were considered more than sufficient communicative tools for the knowledge workers inter-

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[56] IBM's Lotus Notes/Domino is probably the best-known traditional groupware programme first introduced two decades ago. It has well above 100 million users worldwide. Its offspring, IBM Workplace, was brought to the marketplace early on in this millennium. Its features include document management, e-mail/real-time messaging and virtual team spaces, all of which can be accessed via conventional web browser. Most importantly, however, its software architecture is based on an open standard, which means that its compatibility with other vendor's products is improved in comparison to Lotus Notes/Domino.

viewed. In the manufacturing enterprise a possibility for videoconferencing existed, but this option was very rarely used.

As a matter of fact, it was quite surprising to find out how critical the R&D engineers were of their craft and also of technological development in more general terms. Before my fieldwork I naïvely expected that at least these knowledge workers would be more than eager to talk about technology. How wrong I was! All my informants agreed with the idea that the foundation of a productive work environment has very little to do with technology. Rather, the importance of an informal work atmosphere and the skills of the project managers were emphasized (*cf.* Alvesson 1995). It was stated in the interviews, for example, that the core of programmers' work has changed very little, if at all, in spite of the sophistication of their tools. Another interviewee maintained that his organization is indeed technologically networked, but *'perhaps there would be more need for networking on the human side'* (Sales manager, Manufacturing enterprise). The sales manager interviewed suspected that knowledge disappears *en route* from Germany to Finland. He had doubts as to whether German colleagues always disclosed all the information they had. His answer reflected the point made above that the basis for fruitful communication is face-to-face interaction that no amount of information technology can substitute for.

Again, mutual trust is the key here. Willingness to share and learn cannot be compelled or mandated. Because sharing is always voluntary, the challenge is to create a collaborative environment in which people both want to share what they know and make use of what others know; otherwise, databases and other formal communicative structures are virtually useless. If sufficient time or willingness to share with others is for any reason compromised, IT is the last to be blamed.

Finally, some R&D engineers interviewed went on to ponder the paradoxes of our ever more complex society and our increasing dependence on technology. One interviewee, who was contemplating alternative career possibilities, explicitly said that technological development has gone overboard:

> *'The good thing about technology is that it eliminates repetitive manual work and is more reliable. The more work is mechanized, the less it is prone to human errors. But today, the bad thing is that the development has gone too far. Technology has become so complex that it is difficult for anyone to manage. Few people can even use a word processing program in so far as knowing every sophisticated feature that it incorporates.'* (Quality engineer, Manufacturing enterprise)

According to my interpretation, the realistic and down-to-earth attitudes towards technology exemplified above have wider implications than mere personal opinions. The views of my informants can be interpreted as much as a necessity dictated by the business environment as a conscious choice to avoid uncalculated risks related to unproductive investments. The manufacturing enterprise, just like the wood-processing factory and the construction planning office, operates on the verge of tradition and renewal. On the one hand, manufacturing and process industries have long traditions that in the case of Finland date back to the late 19th century; on the other, these industries have become almost thoroughly knowledge-intensive during the past few decades due to rapid computerization and mechanization. However, the high level of technological sophistication these companies possess may also cause awkward situations. Increases in subcontracting and customer-centred thinking have to some extent inhibited the effective use of the latest technology. For example, the case of the construction planning office revealed that design engineers and their customers are not fully on a par with their technological know-how:

> '*From our point of view the degree of electronic cooperation is limited by the fact that other parties, customers and construction sites do not keep abreast with the development. Clearly, it is we who are leading the way.*' (Manager, Construction planning office)

The manager and owner of the accounting firm also indicated that neither he nor his organization was reluctant to implement the latest and finest that office automation has to offer; it is the customers who sometimes are conservative. An interview with one of his employees confirmed this:

> '*Indeed, there are still some entrepreneurs who have not entered the computer age! They may not even have an on-line banking terminal at home, so they still pay their bills at the bank counter.*' (Accountant, Accounting firm)

Finland was among the first countries in the world to endorse electronic accounting in 1997, but it still remains quite rare.[57] The reason is not technical but social. Although the law permits paperless accounting, there still remains disagreement concerning appropriate standards and practical procedures. This lack of mutual understanding is slowing down the development, not the technology as such. Nevertheless, the manager of the

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[57] According to the Finnish accounting law everything else except the final balance sheet book can be produced and stored electronically.

accounting firm stressed that his business was changing, although the pace of change was hardly what the most eager visionaries had anticipated. In the long run highly automated tax and accounting systems will probably reduce traditional bookkeeping to a minimum, but at the same time more specialized and demanding consulting services will gain ground (Elliott & Jacobson 2002). Thus, in line with the general trend of growing educational and occupational demands placed on the working population, the knowledge-intensity of the accountants' work process looks set to increase.

The reasons outlined above also go some way in explaining why e-business, i.e. Internet-based commerce, has not lived up to its initial promises (*cf.* Jackson & Suomi Eds. 2002). The main explaining factor is again social rather than technological. Although Finland has one of the most advanced on-line banking systems in the world, avoiding many of the security pitfalls inherent in conventional credit card payments, and the country is indeed technologically interconnected, vendors seem to have forgotten the basics such as the importance of traditional market research. E-business has remained marginal because vendors have overestimated the customer potential, underestimated logistical requirements, or simply have gone on to sell products that are either easily available via traditional outlets at competitive prices or not suitable to be sold over the Internet at all.

In itself there is of course nothing wrong with e-business. As a matter of fact, Internet-based commerce between Finnish enterprises is already rather well developed in comparison to retail sales. Once again, the key here is to understand technology as a social construction. Technology should not be seen as guiding people's needs, desires and choices. Rather, the starting point for doing business in general should be human behaviour.

Towards a Sociology of IT

> 'The challenge for sociology is not so much to deny the weight of technology, but rather to develop analytic categories that allow us to capture the complex imbrications of technology and society'. (Sassen 2002, 365)

An understanding of knowledge work and its social and cultural foundations is important for several reasons. In particular, the lack of basic research, or disregarding existing results, can have drastic consequences. The implementation of ICTs is a case in point. The field of information systems has traditionally been plagued by high implementation

failures because the understanding of socially situated practices in knowledge work is incomplete (Schulze 2000, 4). As a consequence, the world of IT projects is replete with unintended outcomes, delays and cost overruns. Although the development and implementation of information systems is just as much a social process as it is a technical one, most of the research has been concerned with the latter dimension. Furthermore, despite the increasing awareness of social and cultural factors in technological change, research in these issues tends to remain fragmented and different disciplines detached from each other.

On the other hand, it also seems that existing knowledge about organizational behaviour is far less than adequately applied. The idea that IT has made tried and true management techniques redundant is not only wrong but also outright dangerous. In effect, one might go even further. 'To implement technology without giving due consideration to organizational matters is to invite disaster', says Groth (2003b, 11), relying on his experiences in practical consultation work and academic research. In this respect my argument, reflecting the lessons I have learned from my informants, can be summarized as follows:

1. Knowledge-intensive organizations should always value human relations above technology. With few exceptions can IT be bought or copied; therefore it is skills and talent that must be nurtured.

Loyal and motivated staff is the most precious asset any organization can hope to possess, but a high level of commitment, trust and intense collaboration is most pronounced in organizations dependent on knowledge work teams. Perhaps needless to say, knowledge workers relish the pride of belonging to a competent team. Thus, rather than focusing solely on technology, the goal should be to create an atmosphere of passion and enthusiasm and a culture of innovativeness and creativity.

2. General beliefs in the communicative advantages of IT are highly overvalued. IT is first and foremost a technology of coordination and automation.

Surprisingly little attention has been given to determining the real need for more communication or analysing the social and psychological prerequisites determining the contours of organizational interaction. In contrast, all the empirical examples above serve to highlight the most powerful yet often misunderstood role of information technology: IT has the potential to raise the automation of routine work or, as Groth puts it in more dramatic terms, the elimination of the need for communication, to a level never before

seen. Groth's formulation is indeed radical compared to the common wisdom according to which one of the main benefits of IT is that it facilitates interpersonal interaction, rather than eliminating communicative needs altogether.

Table 4.1. ICT Functions and Their Importance for Companies in Eight European Countries (%).

Functions	Share of companies mentioning the function as important (%, multiple answers were possible)
Organizational function	23
Automation function	46
Communication function	64
Control function (production process)	65
Surveillance function	36
Tool function (quality)	73
Tool function (time)	58
Information provider (accelerate innovation)	49

Source: Schienstock 2001, 58. The following territories were represented: Flanders, Niederösterreich, the Tampere region, the Stuttgart area, Portugal, the Republic of Ireland, Lazio, and the West London area. The sample included 800 firms, 100 from each territory. The data were collected between 1998 and 1999 (see also Schienstock 2005).

In the theory of organizational communication, for instance, there is a widespread consensus of opinion that emerging organizational forms – built around the principles of vertical integration, teams and worker empowerment – increase the need for information exchange among individual actors within and among organizational boundaries (see, e.g., Straub & Karahanna 1998). The majority of practising managers share the same belief. In a large-scale international comparison comprising a sample of 800 organizations from eight European countries, IT's communicative function ranked surprisingly high among different variables affecting organizational performance. In the survey, 64 per cent of the companies considered the communicative function of modern information technology as important, whereas only 46 per cent regarded automation as important (Table 4.1). The finding raises interesting questions for future research, some of which will be briefly sketched below.

Let me consider the widespread use of groupware solutions. Some researchers have postulated that there are two environmental factors that determine whether e-mail or some other medium is used among knowledge workers. For example, Detmar Straub and Elena Karahanna (1998) argue, quite reasonably, that the presence of a critical mass of users and the temporal availability of the recipient are the main determinants for e-mail use. Their implication is that knowledge workers act as rational subjects who will only spend time learning and using groupware technology if they are reasonably confi-

dent that most others within the firm are prepared to use this same medium, and if the tasks to be performed are not particularly complex; i.e., not requiring a high social presence (Robertson *et al.* 2001, 340). In other words, the level of urgency and complexity of communication determines whether an asynchronous media such as e-mail or a synchronous media such as telephone is used. If communication does not need to be immediate and does not require negotiation, e-mail is likely to be chosen (Wijayanayake & Higa 1999).

However, most researchers have failed to consider the obvious, that a critical threshold level of communication must exist beyond which the use of any medium becomes counterproductive – the continuous flow of e-mail, for example, makes people jump from one task to another thus fragmenting concentration. The bulk of the research literature is implicitly biased towards endorsing technological solutions to communicative bottlenecks, albeit the real constraint lies in our cognitive capabilities. Regardless of this fact, numerous IT-based systems are being offered to augment existing communication channels, the rationale being 'more is better' and 'the faster (or the broader the bandwidth) the better'. According to some critics, the speed with which these applications are being introduced, coupled with knowledge workers' lack of time and resources to internalise them, have resulted in a more or less chaotic situation (Syed 1998, 61). As the critics seem to imply, the majority of these tools are promoted on the basis of unfounded claims with little if any testing ahead of the launch of the product. Indeed, numerous critical studies ranging from ethnography to surveys indicate that groupware or other intranet-based solutions rarely if ever work exactly as planned, and the systems are often used in an uncontrolled and impulsive manner (Hayes 2001; Hayes & Walsham 2001; Hayman & Elliman 2000; Ngwenyama 1998; Robertson *et al.* 2001). At best, existing research on the subject remains inconclusive and often contradictory (Shani *et al.* 2000).

There are several reasons why more critical research is needed on the effects of information technology on organizations. First, researchers, much like journalists, are inclined to focus on successful cases. For example, some scholars such as William Starbuck (1993) have demanded that organization scientists pay more attention to exceptional success stories rather than 'only' average cases. Starbuck's argument is that average cases tend to be unimportant and uninteresting because exceptional success cannot be gained by imitating others and exploiting shared properties. Granted, Starbuck has a point; but the approach he supports would probably lead to an elitist and biased view of organizations in general.

The second reason why success stories tend to generate so much interest is that enterprises that could provide new insights into organizational problems and conflicts are often reluctant to let researchers in and so researchers end up underreporting problems by focusing on success cases, since they cannot get access to the problematic ones. Unfortunately, this focus on success stories distorts the image of the reality of work organizations even further, and the consequences can be grave. In contrast to Starbuck's argument, it could be equally well argued that if only successful cases are documented, this may mediate an impression that 'best-practices' or 'benchmark cases' can be straightforwardly emulated. Nothing can be more dangerous and further from the truth in the complex world of organizations. Subtle differences – from market conditions and organizational cultures, to political agendas and expertise levels – make the transplantation of any technology from one case to another fraught with difficulties (Jackson 1999, 3–4).

It has to be admitted, of course, that the case organizations I evaluate here are by no means representative. Especially from the point of view of individual workers, they represent better than average work environments. However, the cases also highlight some of the numerous difficulties and paradoxes that are inherent in organizations struggling to strike a balance between tradition and renewal (see also Chapter Six). As my analysis attempts to demonstrate, these problems as well solutions to them are first and foremost social rather than technological in nature. Indeed, one of the biggest challenges of the information age is that the more deeply we are immersed in information technology, and the more routine work is transferred from men to machines, the more important it is to understand the human side of work. In this respect there is a need for research that combines perspectives from technical, behavioural and social scientific disciplines.

Finally, I must emphasize that no amount of basic research can substitute for practical and innovative applications of knowledge. New knowledge has to be integrated into concrete work processes and products in order to become functional and this calls for closer collaboration between different academic disciplines and the business world. Of course, this is not to deny the importance of academic freedom associated with basic research. A well-known fact is that corporate R&D is highly standardized and organization-specific and, consequently, the results often remain classified. As a practitioner of basic research myself, I simply wish to call forth more effort to intertwine theory and practice. The applicability of research should not be seen as the antithesis of either academic freedom or rigour – understanding the ongoing rapid pace of change in the de-

velopment and use of new technologies simply calls for a pluralistic approach incorporating contributions both from basic research and applied sciences.

On an organizational level, for instance, there exists a chronic need for more personnel who have expertise in business imperatives, technology and human resource management. IT projects should never be left to IT people alone. Therefore, as Groth (2003a) rightly suggests, IT projects should always involve experts who can act as 'translators'; i.e., persons who understand business objectives, but who also have a basic to medium-level understanding of the technology under implementation. As a matter of fact, Groth explicitly says that 'the vast majority of derailed IT projects hit the ditch because of mismanagement, not because of technological problems' (p. 8).

Again, Groth's ideas are worth quoting at length. Based on his consultation experience, Groth has come up with a list of questions that reflect the mistakes most commonly associated with failed IT projects:

1. Is line management involved and committed?

2. Are objectives and expectations clear to all?

3. Are specs thoroughly prepared, and on the right level?

4. Does the project have the right people, with adequate competence?

5. Is the project organization adapted to the task?

6. Are the users involved?

7. Is the technology new and untried?

8. Are plans and estimates realistic and on the right level?

9. Are recognized methods and tools in use?

10. Does the vendors' work have sufficient quality?

11. Is reporting and following up adequate and adapted to the purpose?

12. Does work actually progress?

13. Does the project team have good morale, and is the work environment supportive? (Groth 2003a, 8)

The point Groth makes is simple and bears a lesson of universal value. If you look closely at the list above, you will notice that only one of the questions is about technology! In fact, Groth concludes, 'if it turns out that the technology is your main headache, the chances are that you have a very successful project on your hands!' (p. 8). After all, technology is always designed and implemented by people for other people to use. Recognizing this fact helps to nurture in organizations the ability to balance between tradi-

tion and renewal and cope with today's rapidly changing business environment. In this respect sociology and IT are not an odd couple at all.

Chapter 5

Distributed Work Arrangements

After defending my argument according to which informal organizational culture remains the foundation of well-designed workplaces, I progress to discuss and analyse empirically the problems and possibilities of distributed work arrangements. Although I see benefits in telework, one of the most often discussed forms of distributed work, it is hard to argue against my empirical evidence: telework remains a marginal phenomenon.

Telework – A Social Innovation in Its Infancy

In addition to being called team players, knowledge workers are quite commonly characterized as mobile and dynamic 'road warriors' or 'nomadic workers'. According to an optimistic vision, advances in technology allow knowledge workers 'full access to communication, data, and computing from any location at any time' (Davis 2002, 67). Here, however, we face a paradox difficult to overcome. As I have argued in the previous chapter, physical proximity is essential for fruitful collaboration in most jobs and especially in knowledge work teams. No amount of information technology can replace face-to-face interaction required in the creation of a strong informal organizational culture, which I highlighted as a crucial source of competitiveness in knowledge-intensive organizations. If this proposition is indeed valid, the scope for virtual teams or computer-supported collaborative work (CSCW) must accordingly be fairly limited. Empirical evidence supports my position. Although knowledge work occurs across all branches of the economy, informational labour has a tendency to concentrate in eco-

nomically prosperous areas and organizations (Cooke 2002) and, with few exceptions, favour close physical collaboration (Södergren 2002).

Regardless of these critical remarks, the possible advantages of distributed work arrangements are worth considering, not only because recent developments in ICTs hold promise for enabling more flexible ways of working, but also for the reason that telework has once again surfaced as an important topic in labour market policy. As is well known, the idea of telework or telecommuting (an American equivalent of teleworking) is far from novel. Since the dawn of history people have searched for means to overcome spatial and temporal barriers (King & Frost 2002; O'Leary *et al.* 2002); and today, ICTs continue the long-since established tradition of communicating over distance, albeit having raised the speed and volume of information flows to a level unimaginable just a mere generation ago. By modern definition, distributed work arrangements encompass many different alternatives to working at the traditional office, including satellite and neighbourhood work centres, flexible work arrangements, generic offices (recently renamed hotelling), and telework (Bélanger & Collins 1998, 137). In this current meaning, i.e. work done independently of time and place with the help of ICTs, telework has attracted interest at least since the early 1970s, but in the past few years it has also been the target of renewed enthusiasm among academic scholars and policy makers.

The persistence of the interest in telework is not difficult to explain in the world of dystopian prophecies of the future of work. As Ursula Huws (1991) writes, the image that it conjures up is indeed a powerful one: 'To the plate-glass and steel city centre skyscraper it counterposes a rural cottage; to the bustling, humming life of crowded office, it counterposes domestic tranquillity; to the daily bodily crush on a rush-hour commuter train, it counterposes a disembodied, abstract, almost ethereal form of communication which leaves the senses intact and unassaulted' (p. 20). The idea of an empowered teleworker has become a highly charged symbol, in some instances a clear myth, incorporating an overtly optimistic vision of the almost limitless possibilities that ICTs have to offer.[58]

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[58] In addition to conjuring up an intriguing image, there are a number of other possible reasons for the persisting interest in telework. Obviously, the rapid development of ICTs is one factor that should be considered. In particular, the development of the Internet and mobile communications has fostered visions of a boundless work environment. Commercial interests are another factor. ICT manufacturers as well as related service providers (e.g., telecom companies) have been active in promoting telework solutions for individuals and enterprises. For example, one of Nokia's visions is a world free from the limits of time and space that is connected, of course, through Nokia's cell phones and networks: hence the slogan 'Nokia – Connecting People'. However, as Norwegian telework specialists John Bakke and Tom Julsrud (1999) emphasize,

If we take a closer retrospective look at 'traditional' telework, it is quite clear that this, one of the most vividly discussed forms of distributed work, has failed to live up to its initial promises. Much like the paperless office, it has proved surprisingly difficult for people to escape the constraints of the material world and to disperse work activities freely across time and space via digital networks, even for those who are engaged in highly autonomous, independent and mobile work. Although the idea of telework is not only technically feasible but also indeed highly desirable, for environmental reasons alone, only a small proportion of the global workforce is today actively teleworking. Whilst there are considerable discrepancies between different studies, most estimates of the prevalence of telework in different European countries and the US stand at well below ten per cent (Daniels *et al.* 2001, 1152–1153). In the most 'advanced' countries like the Netherlands, Finland and Denmark, estimates based on the broadest definitions put the figure at above 20 per cent of the workforce. However, these figures encompass not only traditional home-based teleworkers but also mobile 'e-workers' and the self-employed working from a home-base with the support of ICTs.

The estimates according to which more than one-fifth of the Finnish workforce is currently teleworking are from widely publicized surveys conducted by Empirica, a German private research and consulting firm concentrating on information technology and information society statistics.[59] According to Empirica, a considerable share of the EU workforce makes use of ICTs to enable working from more than one location while staying connected to the company and work colleagues. More precisely, there were almost three million home-based teleworkers in the EU-15 in 1999, representing four per cent of the European workforce. The vast majority of these teleworkers divided their working time between home and central office, suggesting that teleworking is not widely used as a solution to increase the flexibility of work or to lessen the burden of the daily commute. A total of 1.25 million employees were classified as self-employed teleworkers working from home, and 2.3 million were mobile teleworkers. Interest-

technological development is but one aspect that explains the renewed attention telework has been receiving of late: 'A general change within organisational practises that support more flexible types of work is probably equally important. … Similarly, organisations that work in a global environment with a high degree of co-operation between dispersed departments tend to be positive toward telework. This points to a more general shift in the structure of the workforce where information-based work and knowledge-production becomes more important than traditional industry.' (p. 5)

[59] According to Empirica, 17 per cent of the Finnish workforce was familiar with some form of telework in 1999. By 2002 the proportion of teleworkers had increased by six percentage points. In the Netherlands and Denmark the proportion of teleworkers in 2002 was 27 and 22 per cent, respectively.

ingly, by 2002 the proportion of 'multi-locational e-work' (all the above categories combined) had increased to 13 per cent of the European workforce, reflecting a two-fold increase since 1999. However, as illustrated in Table 5.1, the proportion of salaried employees working *at least one full day per week at home* had remained virtually unchanged, that is around two per cent of the workforce. Clearly, this is a social innovation still in its infancy.

Table 5.1. The Prevalence of Multi-locational E-work in EU-15 in 1999 and 2002 (%).

Types of E-work	1999	2002
Home-based telework (> 1 day per week)	2.0	2.1
Home-based telework (< 1 day per week)	2.0	5.3
Mobile telework	1.6	4.0
Self-employed working from home	6.1	3.4
All types	6.1	13.0

Source: ECaTT 1999; SIBIS 2002. ECaTT is an acronym for the project Electronic Commerce and Telework Trends: Benchmarking Progress on New Ways of Working and New Forms of Business across Europe; SIBIS is an acronym for the project Statistical Indicators Benchmarking the Information Society (for more details, see www.ecatt.com; www.empirica.biz/sibis).

This chapter presents a critical assessment of the problems and possibilities involved in the implementation of telework. According to numerous studies, including the research upon which this book is based, telework still seems to be a marginal phenomenon, at least when compared to the boldest visions from the 1970s and early 1980s. The taking up of telework also seems to be progressing much more slowly and unevenly than anticipated.

Yet this is not to say that telework is a futile innovation that has no future. On the contrary, as practically all relevant studies concerning Finland indicate, telework is a potentially useful way of arranging work in the future, possibly a win-win-situation for both employers and employees, offering more advantages than traditional arrangements (see Hanhike 1998; Helle 2004; Helminen *et al*. 2003; Luukinen Ed. 1996; Pekkola Ed. 1993; Pekkola 2002; Suomi & Pekkola 1998; Vartiainen *et al*. 2004). However, in order to make it a viable alternative to more orthodox work practices, it has to be thoroughly understood that a transition towards distributed organizations comprised of people connected mainly via ICTs is a large-scale social and cultural transformation that will not happen overnight. Although telework is greatly dependent on technology, it is also a social, cultural and political innovation; the role of technology is to act as an enabling force rather than a driving one, as more and more scholars are suggesting (see, e.g., arti-

cles in Jackson Ed. 1999; Jackson & van der Wielen Eds. 1998). This is the focal point of the critique presented here.

Although the idea of telework may sound paradoxical in light of the previous chapter, which emphasized the importance of personal face-to-face interaction in knowledge work teams, it is my contention that the best of both worlds can and should be reconciled. Especially for those knowledge workers engaged in creative problem-solving, a part-time telework arrangement could increase productivity by helping them to concentrate on tasks that require peace and solitude, away from office distractions. On the other hand, partial teleworking, especially if the arrangement is made at the worker's own will, should not jeopardize crucial relations with peers, or result in feelings of social exclusion. In the best scenario imaginable, a part-time telework arrangement could boost individual and organizational productivity and create more room for flexibility in the labour market. However, it can hardly be overemphasized that this calls for decisions specific to individual and organizational needs. No quick-fix solutions or inconsiderately designed procedures are likely to produce long-term benefits.

The discussion below starts out with a description of the vision and theoretical idea behind the enthusiasm for telework. Next, I proceed to propose an empirically measurable definition of telework. Although I agree with the view according to which it is impossible to provide a single absolute figure for the number of teleworkers (Haddon & Brynin 2005, 37), I nevertheless go on to argue that in the Finnish context it is plausible to restrict the use of the term telework to those wage earners who work at home under an employment contract. Third, I summarize the relevant empirical facts about telework and teleworkers in Finland. Fourth, I discuss challenges that the future development of telework is likely to present. Finally, the chapter concludes with a summary of some of the possible reasons why the large-scale implementation of telework seems to be such a slow and difficult process.

Since the body of knowledge on the subject clearly exceeds the scope of the present analysis, priority is given to those studies that are related to knowledge work. As defined earlier, knowledge work is a term that refers to a tendency towards increasing organizational flexibility and expert jobs requiring high formal educational qualifications, individual decision-making and the use of ICTs.

The Early Vision

'Bzzzzz… You glance at the clock. 7:30 a.m. You roll out of bed, put on some sweats, and go to the kitchen. After a quick breakfast, you pour a cup of coffee, walk down the hall to your office, and begin to work. With your computer and fax-modem, you are quickly connected to your central office. Another day at work begins!' (Devine *et al.* 1997, 97)

Not long ago it was widely speculated that working from a distance and making full use of ICTs would transform the boundaries of the conventional office environment for good. It was thought that once the proper technology was in place, work processes would suddenly and magically become independent of physical presence and fixed working hours. It was believed that telework would drastically reduce the need for commuting and break down the strict adherence to regular working hours that had characterized most occupations since the birth of industrialism.

In more practical terms, the vision of telework grew out of the oil crisis of the early 1970s, when Western nations were forced to cut down on their energy consumption. In the US Jack Nilles *et al.*, at the University of Southern California, popularized the term telecommuting in a now classic study, *The Telecommunications-Transportation Tradeoff* (1976), in which satellite offices (and to a lesser extent home-based teleworking) were proposed as a potential way of saving energy costs by substituting electronic communication for physical travel. The argument was based on calculations demonstrating that white-collar office work or information occupations comprised the largest and fastest growing segment of the US labour force. Given the capability of modern telecommunications and computer technologies to efficiently produce, transmit and store information, it appeared that many information industry workers could telecommute, Nilles *et al.* postulated (p. 4).[60]

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[60] According to Werner Korte and Karsten Gareis (2001, 47) the word telework was first used in 1972 when Jack Schiff coined the term in the *Washington Post*. However, it was Jack Nilles who was the first scholarly authority on telework and/or telecommuting. Presumably Nilles (1998, viii) became convinced that telecommuting had a future while sitting in his car stuck in a traffic jam. Other early authorities on telework research include Richard Harkness, who Nilles credits as one of his sources of inspiration. Harkness published a doctoral dissertation under the title *Technology Assessment of Telecommunications/Transportation Interactions* at the Stanford University in 1977. It is unclear, however, when the *idea* of telework first surfaced. Ursula Huws (1991, 22), for example, remarks that the notion of an electronic homeworker has existed at least since 1957 in the literature about automation. Nevertheless, the fact is that telework made its appearance in mass public consciousness in the early 1970s, and ever since the concept has intrigued the scholarly mind as well as journalists and policy makers (for an overview of the early telework literature, see Huws *et al.* 1990, xiii–xv).

In the discussion that followed, telework was soon put forward as a solution to a variety of individual, organizational and social problems. Telework was not only supposed to alleviate traffic congestion and save scarce natural resources, but also to reduce unemployment by increasing employment opportunities for the disabled and other disadvantaged groups, reduce labour costs, increase productivity and work motivation, open up new choices about where to live, and even improve the overall quality of life through increased job satisfaction and reduced stress. These were just some of the expectations harboured by many leading information society theorists, futurists and other visionaries.

The early and well-known visions of Marshall McLuhan, Yoneji Masuda, John Naisbitt and, of course, Alvin Toffler are obvious examples of the futuristic thinking that speculated on the fruits of technological 'progress'.[61] In *The Third Wave* (1980), Toffler envisioned a society of 'electronic cottages', a brave new world of work in which most of us would be working in the privacy of our homes through communication networks:

> 'Today it takes an act of courage to suggest that our biggest factories and office towers may, within our lifetimes, stand half empty, reduced to use as ghostly warehouses or converted into living space. Yet this is precisely what the new mode of production makes possible: a return to cottage industry on a new, higher, electronic basis, and with it a new emphasis on the home as the center of society.' (Toffler 1980, 194)

However, it was Masuda who had the most romantic vision of the possibilities that advances in information technology might offer. Referring to Japan's official information society strategy, originating from the turn of the 1960s–1970s, Masuda boldly forecast the victory of mind over matter:

> 'The goal of the plan is the realization of *a society that brings about a general flourishing state of human intellectual creativity, instead of affluent material consumption*. If the goal of industrial society is represented by volume consumption of durable consumer goods or realization of heavy mass consumption centering around motorization [*sic*], information society may be termed as a society with

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[61] Interestingly, there is an evident parallel between popular culture and science in the context of the very first telework visions. As early as 1889 the popular science fiction author Jules Verne described the 'virtual' collaboration between a newspaper editor in Paris, and one of his journalists in the US in the book *One Day in the Life of an American Journalist*. Verne's characters used a 'screen medium' to talk to each other and to distribute written information. (Julsrud 1999, 3)

highly intellectual creativity *where people may draw future designs on an invisible canvas and pursue and realize individual lives worth living.*' (Masuda 1981, 3; italics in original)

Although Toffler's and Masuda's work is considered outdated from today's perspective, unrealistic and populist claims still doggedly raise their heads when discussing the prospects of telework and other related possibilities of ICTs. A recent example from the vast literature is work by Ian Angell, Professor of Information Systems at the London School of Economics, who has toyed with the idea that in the foreseeable future the economic elite of knowledge workers, the 'brave new barbarians', will detach themselves from the restraints of earthly and perhaps even planetary (*sic*) physical boundaries. Work will be done any place, at any time; whatever best suits the individual.

According to Angell's controversial book *The New Barbarian Manifesto* (2000), the most dynamic organizations of the information age will not let themselves get tied down to long-term office leases, since the office or desk is wherever it is possible to plug into the network. The argument sounds reasonable enough when we consider the development of mobile communication devices and portable computers (e.g., the technical possibilities offered by future generations of mobile phones or wireless local area network technology), but this is not enough for Angell. He goes on to ask why pay rent at all, 'why not hold your meetings in the lobby of the best hotel in town, and for as little as the price of afternoon tea?' (p. 43) Bad news for traditional retail investors! Although Angell rejects the long-held view of ICTs as our benign liberator from mundane work, he sees unlimited possibilities for the very few who belong to the class of winners in global and increasingly mobile capitalism. The new barbarians will construct their own 'smart regions' where entrepreneurship, libertarian human rights and enlightened personalities prosper, Angell believes:

'In future, work will still follow the phone number, but now mobile office workers are 'road warriors', taking their telephone numbers with them, anywhere. The contents of filing cabinets can be digitized and put in a networked file store, also accessible anywhere from a laptop computer. Organizations can communicate easily, effectively and cheaply with geographically remote locations. Teleworking, in all its various guises, is now being considered seriously by every company.' (Angell 2000, 43)

Unfortunately, in the simplistic sense exemplified by writers like Toffler and Angell, telework is a persistent myth, not a conceivable reality, not even for the elite of top-

notch professionals. The danger of popularized arguments like those outlined above is that they start living a life of their own, leading us away from *real* and *solvable* problems associated with new forms of flexible working that ICTs either enable or facilitate. It is very likely that telework may offer many potential benefits for individuals and organizations alike, but there are always numerous obstacles hindering organizational reforms; for example, workers' resistance to change, employers' reluctance to trust their employees, fear of social isolation, etc. Furthermore, the pioneering work by Nilles and his colleagues proved to have little societal influence, despite its scholarly rigour and undeniably important message: substantial amounts of energy and money are consumed and environmental hazards caused as a result of daily commuting. The idea that transport or telecommunications costs are a significant factor in the choice of whether or not to adopt teleworking has not been supported by research: 'Survey after survey has shown that, although many see it as one of several advantages of telework, avoiding the daily journey to work is rarely the primary reason for the choice, being ranked below such factors as the need to combine working with family demands, the need for flexibility or the desire for autonomy' (Huws *et al*. 1990, 2).[62]

Whatever explains the difficulties behind the required organizational changes, the fact remains that real teleworkers still constitute a small and most probably an elitist minority of the global workforce, as we shall see later on. A critical review of existing empirical studies reveals that highly educated professionals employed in team-based project organizations are the most likely candidates to experiment with and stick to telework arrangements. My data also support this position. However, before we get down to the numbers, there is an additional problem we have to deal with: unfortunately, the concept of telework is just as ambiguous and difficult to measure as knowledge work, which was discussed earlier in Chapter Three.

The Concept of Telework

In addition to the unrealistic hopes of being able to escape the confines of the modern workplace, it is also hard to come by a clear and concise definition of telework (Gray *et al*. 1993; Huws *et al.* 1990; Korte *et al.* Eds. 1988). Surprisingly little success has been

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[62] Huws *et al*. (1990, 2) cite an early study conducted in the early 1980s by Marghrethe Olson according to which organizational culture and managerial attitudes are the most important determinants as to whether or not remote working patterns are adopted. As I conclude later on, this view still remains relevant today.

achieved in defining its meaning in a satisfactory way. Some researchers have even raised doubts as to whether it is possible at all to construct a 'universally' useful definition of telework employing existing conceptual and statistical categories. According to this line of argumentation, with which I agree, project-specific definitions are inevitable (Sullivan 2003; see also Haddon & Brynin 2005).

Despite this lack of consensus, it is possible to identify certain key aspects that most researchers consider essential to telework arrangements. For example, according to André Büssing (1998, 145), four main dimensions are essential to all organizational forms of teleworking: (1) location; (2) time; (3); technical devices; and (4) employment contracts. Following Büssing's analytical distinctions, the location determines whether teleworking is performed in a fixed place or whether it is mobile by nature. The time factor reflects whether teleworking is done permanently or whether the work alternates between home and central office. The use of ICTs varies between on-line and off-line operations, i.e. whether the worker is plugged into the network or not. And finally, it must be taken into account that many different forms of contracting are applied to teleworking.

Although these criteria rule certain groups of workers out of the domain of telework, those who remain still constitute a heterogeneous category. For example, according to a very broad and controversial conception developed by Mike Gray *et al*. (1993), teleworkers equipped with modern ICTs may include:

1. Home-office telecommuters, in the traditional image, who can be self-employed or employed, full-time or occasional homeworkers.

2. Telecentre- and telecottage-based workers, usually dividing their time between home, a local telecentre and head office, as needs dictate.

3. Customer- or client premises-based workers, including professionals carrying out long contracts at clients' sites, such as computer installation and support, audits, training courses and research.

4. Vehicle-based workers, including most maintenance engineers, police, those in delivery services, taxi drivers, travelling sales people, and site managers.

5. Hotel-based workers, travelling by air and sea or long distances overland, including news reporters, financial researchers, diplomats, politicians and entertainers.

6. Workaholics, often small business owners, vocational workers or captains of industry who take their portable computers and mobile phones, usually reliant

on car-fitted systems, to villas, clubs, beaches, campsites, restaurants, hospitals, friends' houses and even to the theatre. (Gray *et al.* 1993, 15–16)

Here, however, I will be using the concept of telework in a much more restrictive sense. In a survey project in which I participated in 2000, a representative number of Finnish wage earners were asked whether they regarded themselves as doing telework, this being defined as *work done at home under an employment contract* (see Blom *et al.* 2001). Thus, the location (home) and especially the respondent's legal and contractual situation were emphasized. One may argue that without the latter demarcation, the concept would be far too comprehensive (Bakke 1993, 78). Furthermore, counting the numbers involved in informal teleworking is almost impossible (Gray *et al.* 1993, 20). The definition proposed above is also in line with recent efforts to formulate a common agreement on teleworkers' rights at a European level. However, it was not possible to specify the nature of the contract in the definition because, according to the legislation, an employment contract does not have to be in any fixed format; it can be written or oral (Heikkilä 1996, 37; Helle 2004). Many different forms of contract can therefore be applied to teleworkers.

In the Finnish case, however, it is possible to use the word 'telework' in survey questionnaires without long elucidation because most Finns are demonstrably familiar with the term. According to a 1995 study, three-quarters of the Finnish workforce knew what was meant by the concept; in an international comparison the corresponding figures were estimated at 23 % in Spain, 35 % in Italy, 37 % in Germany, 54 % in the UK and 59 % in France (Zamindar 1995, 5). It has to be emphasized that in countries where the concept of telework is not as widely recognized as in Finland, the definition proposed here would not necessarily be adequate. Taking these considerations into account, the rationale behind the formulation proposed above was an (un)easy compromise between as exact a definition as possible and clarity of wording. It is of course possible to formulate theoretically sophisticated conceptual constructions, but for empirical research the problem of making concepts operational always looms large.

Since the issue of working from a distance was only one part of a relatively long questionnaire, it was not unfortunately possible to fit in a question on the amount of time spent teleworking versus 'normal' office hours, although this is certainly a matter of great importance (Steward 2000). However, judging by other sources it would seem that only very few Finnish teleworkers work at home on a permanent basis (Helminen *et al.* 2003; Luukinen Ed. 1996). Alternating between home and head office seems to be the dominant and relatively established form of teleworking not only in Finland but also

elsewhere in Europe as well as in the US (Aichholzer 1998; Di Martino & Wirth 1990; Standen *et al*. 1999). Furthermore, compared to partial home-based teleworking, the use of telecottages, satellite or neighbourhood offices and other similar collectives is even less common. In Finland experiments with telework centres have been unsuccessful. The same has happened in Sweden, which is where the first telework centres were established (Paavonen 1999). At present it seems that permanent telework, regardless of how it is organized, cannot be considered a viable substitute for conventional work arrangements, although it does for some add an important dimension to flexible work practices.

As a last remark, it has to be mentioned that self-employed persons, small entrepreneurs and the like who operate home businesses were not included in the survey in which I participated. The survey was strictly confined to wage earners, i.e. people who work for and get paid by another party. This choice is in line with a distinction often made in the research literature according to which traditional home-based work has to be understood as a separate category very different from telework (Boris & Daniels Eds. 1989; Christensen Ed. 1988; Dangler 1994; Felstead & Jewson 2000). Likewise, people working overtime at home in order to catch up with work were not considered teleworkers because carrying work home is quite commonplace.

Telework Statistics – A Critical View

Keeping the above remarks in mind, it should be obvious that any efforts to measure telework are very much complicated by the lack of satisfactory conceptual tools. It follows that empirical estimates of its frequency in national contexts, not to mention its future prospects, vary widely. It is not uncommon for estimates of telework to differ by as much as a factor of ten, as we have seen earlier. Since it is even harder to produce reliable international comparisons, and since this is beyond the scope of this research anyway, the conclusions drawn from my analysis should be treated with appropriate caution. However, Finland is an interesting case, perhaps pointing the way to the future, because of its position at the cutting edge of technological development and its highly educated workforce. As we already have seen, the use of PCs, the Internet and mobile communication devices is particularly widespread in Finland, providing a sound infrastructure for telework to gain ground.

As Table 5.2 reveals, only four per cent of Finnish wage earners were engaged in telework arrangements in 2000 (according to the definition I have proposed above). An-

other four per cent had tried telework, but nonetheless more than nine employees in ten (92 %) had never experimented with telework. Among knowledge workers teleworking is slightly more common than in the wage-earning population in general, but even in this group it remains rare.

Table 5.2. Number of Teleworkers in 2000 (% of Finnish wage labour).

Position in telework	Knowledge workers	IT users	Others	Total
Teleworking currently	6	2	2	4
Has tried telework	6	3	1	4
Has never done telework	87	95	98	92
Total	100	100	100	100
N	668	479	281	1428

Source: Pyöriä 2003c, 170.

Statistics Finland (1999) has used a definition of telework similar to the one described above. The agency's definition of telework was formulated for the 1997 Quality of Work Life Survey, which drew upon an extensive set of questionnaire data from 1977, 1984 and 1990. The 1997 survey is comprised of replies from 2979 persons who were interviewed directly. In the Quality of Work Life Survey the exact definition used to identify teleworkers was as follows:

> '[Telework is] paid work done outside one's actual place of work. Basically this type of work can also be done on the employer's premises. The key aspect here is that the arrangements are not confined to any particular time or place.' (Statistics Finland 1999, 171; original translation corrected)

Interestingly enough, this survey, conducted three years earlier than the one in which I participated, produced the exact same results: telework was reported by four per cent of all employees, some 85,000 in all. However, only one per cent of the respondents reported having tried telework. On the other hand, the proportion of people who had agreed with their employers to do at least some of their work from home via computer was also measured in the Quality of Work Life Survey (extra work that is carried home was not considered telework). According to this definition, two per cent of all employees in 1990 were engaged in telework at least occasionally, whereas in 1997 almost one employee in ten (8.5 %) reported doing so. More recent statistics indicate that by the turn of the millennium some 11 per cent of all employees reported working from home

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at least occasionally, but then no change took place in the following three years (Statistics Finland 2004, 148–149). Defined in this way, telework in Finland increased five-fold during the 1990s.

Nevertheless, it is perfectly clear and obvious that telework still has a long way to go even in the 'high-tech' country that is Finland, often ranked among the most advanced and competitive economies in the world. Teleworking is rare even among knowledge workers, although it is often tasks requiring the manipulation, interpretation or communication of information that are considered the most suitable for teleworking. The view that knowledge work is not bounded by time or place was clearly expressed by Nilles *et al*. (1976, 4) in their ground-breaking research on American telecommuters, and ever since it has been a recurrent theme in the literature on distributed work (Venkatesh & Vitalari 1992) and virtual organizations (Depickere 1999). However, as I have already pointed out in the previous chapter, it is likely that knowledge work is founded upon a culture of close collaboration, physical proximity among team members and a continuous flow of social interaction, all of which are hard to sustain over electronic media. Thus, in contrast to winged visions of pure virtual organizations, a transition to the full dispersion of work activities may do more harm than good in organizations dependent on knowledge work teams.

Empirical literature on the subject is scarce, yet thought-provoking. For example, France Bélanger *et al*. (2001) have conducted a small-scale network analysis of 110 distributed knowledge workers in six organizations. Their research indicates that a high need to engage in work-related communication has a significant *negative* effect on teleworkers' productivity. According to the authors, the greater the number of communication links among telecommuters in their network, the lower their perceived productivity and performance: 'It is logical to think that individuals who must communicate substantially with others in order to perform their tasks, and spend more effort to adapt and structure their communications, feel less productive in telecommuting environments, where such communications may represent greater challenges than in the traditional office' (p. 169). Although interest in these issues is growing, there is a clear need for more research focusing on the ways in which organizational cultures operate in dispersed work settings (Ellison 1999, 346).

In addition to the growing interest shown by academics, large numbers of Finnish wage earners are tempted to try out the idea of teleworking. While the extent of telework actually done today is still quite small, the popularity of the idea is surprisingly high according to both my and Statistics Finland's research. In my survey, 32 per cent

of the respondents expressed an interest in the idea of telework; according to Statistics Finland, a slightly larger proportion of the workforce (35 %) was interested in the possibility. It is hardly surprising that knowledge workers are keener than other wage earner groups: 42 per cent of knowledge workers would be interested in the possibility of doing telework, while the respective figures for IT users and traditional workers are 30 % and 17 % (Table 5.3). In light of these numbers, with the possible exception of the group of traditional workers, the level of interest should not be a factor standing in the way of organizational reforms. Of course, it has to be remembered that many occupations falling in the category of traditional work are the least likely to be suitable for distribution (e.g., jobs in manufacturing and personal services).

Table 5.3. Number of Persons Interested in Telework in 2000 (% of Finnish wage labour).

Has an interest in telework	Knowledge workers	IT users	Others	Total
Yes	42	30	17	32
No	34	42	50	40
Don't know	24	28	34	28
Total	100	100	100	100
N	616	498	308	1422

Source: Pyöriä 2003c, 172.

Compared to actual telework, homeworking is a much more common phenomenon in Finland and elsewhere. Although only two per cent of the respondents in my survey reported working solely at home, a finding consistent with most other European countries, over one third (36 %) took work home at least some of the time. Most often this is extra work or overtime, which is not part of regular working hours. About one third (30 %) of the respondents say they use a PC in this kind of work.

On the basis of the data at my disposal it is clear that working overtime in general and taking extra work home in particular is very common especially in professional occupations. Using a PC in home-based work is also something very familiar to upper white-collar employees, or those whom I prefer to call knowledge workers. The differences between the wage earner groups analysed here are huge: 59 per cent of knowledge workers carry work home, whereas the figures for IT users and traditional workers are 19 per cent and 15 per cent, respectively. More than half (54 %) of knowledge workers use a PC for work at home, whereas among IT users only 13 per cent do (ac-

cording to the definition used here traditional workers do not use information technology at all).

Unfortunately, not much can be said about teleworkers themselves. Even simple cross tabulations are not reliable because the group of teleworkers is so small when compared with the number of all respondents. However, in line with other research dealing with similar problems, my data suggest that teleworkers in Finland are city dwellers, they are twice as often male as female, two-thirds of them are employed by private enterprises, their level of formal education is high and their organizational position requires a high level of individual decision-making, autonomy and skills associated with professional occupations (see also Helminen *et al*. 2003; Luukinen Ed. 1996; Pekkola 1997; Suomi *et al.* 1998). In this respect, at least as far as Finland is concerned, teleworkers differ very clearly from traditional homeworkers, who are among some of the most disadvantaged labour market groups. Homeworkers have historically been a vulnerable group of people, keen to work, but unable to enter the labour market on equal terms with others because of social commitments that keep them home (Webster & Robins 1986, 180; see also Felstead & Jewson 2000).

In contrast to other studies on the subject, however, a recent survey by Finland's Environment Institute (SYKE) cannot be accused of being incomprehensive (see Helminen *et al*. 2003). The study, conducted in 2001, was based on the annual labour force survey by Statistics Finland encompassing no less than 19,000 respondents. Again, in line with earlier studies, telework was reported by a mere five per cent of all employed persons, that is 102,000 persons in all. The respondents were simply asked whether or not they telework.

Although the research group focused on telework's potential environmental benefits such as its impact on commuting frequency, a topic that is beyond the scope of my analysis, there are three results worth mentioning. First, no more than one teleworker in five reported working at least one whole day a week at home, whereas the rest of the 'teleworking population' said that they drop in at their offices *daily*. Dropping in at the office on a daily basis hardly qualifies as real telework in the original meaning of the term! Secondly, teleworkers are concentrated in and around a few major cities, as illustrated below:

- the Helsinki region: 40 %
- the Tampere region: 10 %
- the Turku region: 6 %
- the Oulu region: 3 %

– other regions: 41 %

Finally, the researchers concluded that the overall impact of telework on commuting frequency is marginal: people tend to commute daily regardless of the distance between home and work. When commuting distances grow longer, people acquire secondary apartments instead of adopting telework. Clearly, at least as far as Finland is concerned, it is wishful thinking to hope that telework will allow for a geographically even distribution of employment (see also Pyöriä 2004a).

Bearing the above remarks in mind, it is impossible to say whether a sudden and widespread adoption of telework would mark a positive or negative change for those worker groups that are currently in disadvantageous positions. To what extent a 'telework revolution' might result in the empowerment and increased autonomy of workers, or to what extent it might lead in the opposite direction remains a matter of speculation. For example, some of the most optimistic visionaries have described teleworking as a solution to gender inequalities in the labour market, a possibility to diminish the friction between women's contradictory roles as an integral part of paid labour, while also being primarily responsible for the burden of domestic chores. However, equally convincing are those arguments which suggest that women are already disproportionately located in the peripheral, secondary labour markets with poorer conditions and narrower options than men; and teleworking might have the potential to exacerbate this trend by marginalizing women even further within the workforce (Haddon 1999, 29).

Nevertheless, whereas in some other countries telework is associated with peripheral worker groups, it might well be speculated that in Finland teleworkers represent an economic and social elite of the information age. As Lars Qvortrup, one of the most prominent European telework researchers argues:

> 'The dominating current trend in Europe seems to be that telework is performed by skilled information workers using computers and telecommunications for *flexible work*, i.e. working part time at home, part time in the office, and also bringing their portable computers on trains, aeroplanes, and to hotels, or visiting intelligent buildings.' (Qvortrup 1998, 34; italics in original)

A similar picture emerges from the group of employees who consider it worthwhile to experiment with teleworking. According to my results, highly educated professionals are the most likely candidates for future telework arrangements. In this respect there is no difference between men and women. Other sources, it might be added, indicate that small-sized team-based organizations are more eager to experiment with telework than

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larger companies. According to Reima Suomi *et al.* (1998), a survey-built database from the FET (Finnish Experience with Telework) project from 1994–1995 reveals three main factors determining whether or not an organization will adopt telework:

1. The greatest predictor for the implementation of telework is the existence of an appropriate information technology infrastructure.

2. Organizational size is important in predicting whether or not a firm will implement telework. The larger the size of the organization, the less likely they are to have telework arrangements.

3. Teamwork is positively related to the practice of telework. Teamwork structures may allow employees to overcome fears of social isolation that might result from teleworking. (Suomi *et al.* 1998, 332; see also Luukinen Ed. 1996; Zamindar 1995; 1997)

We can draw two important conclusions. First, individually speaking, professionals and other knowledge workers with a strong educational background are the most likely to engage in telework arrangements, albeit not on the sort of scale often predicted in the research literature. Second, from the point of view of organizations, structurally flexible team-based enterprises provide the most fertile soil for the growth of telework. However, it is likely that pure virtual organizations will remain rare because no amount of technology can substitute for the intense face-to-face interaction that is necessary in collaborative teamwork.

Especially in countries like Finland, the extent of the lack of technological infrastructure is only a minor problem relative to other factors hindering organizational reforms. Instead of focusing on technological solutions, as the authors cited above imply, we ought to adopt a more 'need-driven' approach to telework (Suomi *et al.* 1998, 335). The problem here is that those organizations and individuals with the greatest potential to influence telework adoption may not fully realize its benefits. As I have made clear, close collaboration with peers is crucial for knowledge workers, but they also need uninterrupted time free from outside distractions: a part-time telework arrangement could provide both.

However, this presents major challenges for individuals and organizations alike, not only in Finland but wherever telework initiatives are being proposed. In the following section I refer to examples derived from my case studies that highlight some of the numerous problems that should be addressed when considering the option of people moving out of the office and into their homes or mobile offices to work.

The Challenge

Given Finland's highly developed technological infrastructure, the success of companies like Nokia and its subcontractors, individual personalities like Linus Torvalds (inventor of the Linux system) and the high overall standard of education in the country, why is it that telework has, as reliable statistics indicate, never really got off the ground? Why is telework still a marginal phenomenon, despite the fact that it may offer many benefits to organizations in particular? It is known that telework might increase the productivity and profitability of work, lower tardiness and absenteeism rates, save infrastructure costs and office space, improve customer service as well as employee job satisfaction, increase organizational flexibility and networking, etc.

Although this question ought to be addressed in relation to different organizational settings, it may be concluded on a general level that the integration of dispersed work activities requires new forms of cooperation, coordination and control (Jackson & van der Wielen 1998, 14). An age-old organizational culture based on physical presence still prevails, and cultural traditions are usually slow to change. The most difficult problem to overcome is how to re-establish the basis for effective human communication in the virtual workplace, where the richness and variety of interaction associated with physical presence is, by definition, denied (Gillespie & Feng 1994, 268; *cf*. Nonaka & Takeuchi 1995). Especially face-to-face communication has its unique characteristics that no available technology can duplicate.

From the point of view of richness of communication, the use of electronic interfaces as a means of social interaction creates a restricted space for fruitful and constructive communication, as I have previously pointed out. For example, most non-verbal signs and gestures and the emotional understanding they convey will be lost when information is codified into short e-mail messages or phone calls. Even video-conferencing can hardly be considered as a substitute for the physical co-presence of individuals. Computer-mediated communication becomes particularly problematic in situations where interpersonal conflicts are prone to arise. When the medium does not allow individuals to express and respond to appropriate social clues, the risk of misunderstandings increases. Stories of business people who have dealt firsthand with the misunderstandings caused by an over-reliance on technology are commonplace today (Smith & Rupp 2002, 252). The lack of physical presence may also encourage people to communicate more freely and in extreme cases encourage the use of inappropriate language. As empirical research on the subject indicates, communication tasks high in am-

biguity, such as the settlement of disputes, require information-rich media (Wijayanay-ake & Higa 1999).

It is also unlikely that 'tacit knowing', a concept first elaborated by the philosopher Michael Polanyi, will evolve and be transferred in the best possible ways between individuals and groups when an electronic interface defines the boundaries of human interaction. As Polanyi (1966) put it in his famous phrase, '*we can know more than we can tell*' (p. 4; italics in original). It is probably only a fraction of our knowing that is explicit in nature, while the rest remains hidden in our actions and habits, in the way we do things without knowing exactly how we do them. To continue with Polanyi's idea a little further, the use of an electronic interface may not only restrict, but also in certain situations completely inhibit, attempts at explicating and disseminating our most intimate knowledge and feelings. Although face-to-face interaction has its own insurmountable natural limitations, the fact remains that it is the richest communication channel available.[63]

The significance of tacit knowledge goes some way towards explaining why enterprises have a tendency to form geographic clusters. A firm located in the area of a specialized cluster may benefit from a number of synergies:

1. knowledge spillovers (e.g., fast diffusion of information concerning new applications or other innovative practices)
2. the availability of skilled labour
3. good infrastructure
4. supporting institutions (e.g., specialized suppliers, universities, and research centres) (Koski *et al*. 2002, 147)

To take just one real-life example, it is unlikely that Nokia would have had the success it has had without the presence of all these factors. Despite the global scope of the company, over half of Nokia's R&D work is carried out in Finland. Clearly Finland (along with the other Nordic countries) has provided Nokia with an innovative environment

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[63] It is worth reminding the reader that Polanyi was above all a philosopher of science. For example, in *The Tacit Dimension* (1966) Polanyi continued his long-lasting criticism of the simplistic concept of science as a collection of observable facts that can be verified by anybody: 'When we speak of science and its progress, or its history, or speak of the standards of science and call them "scientific", we refer to a thing we call "science", of which no one has ever known more than a tiny fragment' (p. 74). Polanyi's great achievement was to elaborate the idea that a major part of our knowledge is inarticulate in nature; thus the interest in applying the distinction between tacit and explicit knowledge to contemporary organizations.

where cooperation with the local universities has not only been possible but encouraged by national innovation policy.

Why then has Nokia distributed the rest of its R&D among a number of countries? In the past Nokia's R&D was centralized and largely domestic, but since the mid-1990s the company has effectively distributed these functions. Today, Nokia has more than 50 R&D sites in 15 countries representing all main market areas: Europe, North America and Asia (Steinbock 2004b, 62). The stiffening global competition, facilitated by the deregulation of telecommunications, has obviously contributed to this development. But the underlying rationale behind Nokia's network structure is to learn from diverse cultural and technological traditions.[64] The point is that the nodes in Nokia's network are located in areas where a critical mass of synergy among different specialists exists. These nodes are much more than mere physical facilities; they help attract, retain and cultivate talent. Clearly Nokia has understood that the global information society is organized around territorially concentrated centres of excellence, where robust social infrastructure, high technology and entrepreneurship are intertwined, as Porter among others describes:

> 'Today's economic map of the world is characterized by clusters: critical masses in one place of linked industries and institutions – from suppliers to universities to government agencies – that enjoy unusual competitive success in a particular field. Like Silicon Valley, Hollywood, or Finland's "Wireless Valley", clusters dot the world's landscape. They affect competition in three broad ways: first, by increasing the productivity of companies based in the area; second, by driving the direction and pace of innovation; and third, by stimulating the formation of new businesses within the cluster. Competitive advantage lies increasingly in local things – knowledge, relationships, and motivation – that distant rivals cannot replicate.' (Porter 2004, 16)

The Lack of Physical Presence Entails Problems

The reasons above may also explain why so many workers are intuitively opposed to the idea of telework. Empirical research suggests that by far the largest category of rea-

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[64] Interestingly, Nokia's former CEO Jorma Ollila provides a living example of his company's network strategy. A renowned Finnish scholar, Martti Häikiö, who has written an extensive history of Nokia, describes Ollila as a very social person. According to Häikiö (2002, 25), Ollila likes to run his affairs through personal contact on the phone, he has extensive political contacts as well as an active network of top business colleagues around the world, and his ideas are often generated in informal gatherings.

sons not to telework is the need to share information with colleagues (Bélanger 1999), although such conclusions are frequently limited by small samples, a lack of longitudinal data, and inadequate control groups (Duxbury & Neufeld 1999). Interestingly, these limitations notwithstanding, some of the knowledge workers I interviewed were quite eager to describe the importance of tacit knowledge. Especially the workers interviewed at the manufacturing enterprise and at the construction planning office remarked explicitly that being physically close to other team members is essential for their work. For example, one of the interviewees said that e-mail is in many cases convenient, but nothing beats the experience of being able to shout to your teammate over the wall and ask for assistance:

> '*Our team has been running for five years, and you can say we have a great team spirit. ... We are used to sitting close to each other so that the whole group is within shouting range. That's how the team works so well.*' (Sales manager, Manufacturing enterprise)

As has been reported earlier in the research literature (e.g., Bentley & Yoong 2000), the need for informal interaction emerged as a central feature of knowledge work in my study as well (see also Chapter Four). In the case of the manufacturing enterprise, telework was considered a viable alternative primarily in circumstances where it is necessary to have quiet and uninterrupted time. Work process documenting, reading and programming were highlighted as the most prominent examples of tasks that were suitable for teleworking; yet it was difficult to make the actual decision not to show up at the office:

> '*It's much better to do your programming in a quiet and peaceful place, rather than in an open-plan office where the phones are ringing and other interesting tasks are available. But there is a certain drawback to staying at home, you don't get to communicate with others...*' (Process manager, Manufacturing enterprise)

Similar observations were made in interviews with workers at the construction planning office specializing in construction architecture and design. Although construction planning is a prominent example of mobile knowledge work (visits to customers, subcontractors and construction sites are frequent), the actual planning process is dependent on collaboration between a relatively stable team of specialists. Therefore a significant amount of physical co-presence is necessary. The manager interviewed emphasized the

benefits of open-plan office architecture and the physical proximity of workers. He could not imagine distributing his organization:

> '*Our work requires a lot of communication and collaboration, and you cannot get it done simply on paper or by transferring bits [digital files]. We have to be present in our mutual meetings and conversations.*' (Manager, Construction planning office)

Indeed, common sense as well as practical experience tells that physical proximity fosters spontaneous interaction, which facilitates the creation of tacit knowledge. For example, laying out team members' offices in a circle around a central conference space, which also houses coffee machines, and so forth, is one design that encourages maximal informal contact among all team members, McDermott (1995, 51) suggests. His point is that when people are located close to each other, team members from different functions are more likely to have serendipitous conversations about problems as they encounter them. Open-plan office architecture, however, is out of the question in situations where customer visits or calls need to be handled discreetly. For example, the accountants I have interviewed need individual rooms.

Interestingly, in the wood-processing factory workers responsible for the purchase of the raw material (i.e., negotiating sales with individual forest owners) were the most positive examples of successful distributed work. By necessity their work had always been highly mobile, but in recent years the development of ICTs had added a new twist to traditional work practices. As well as having mobile phones and laptop computers with portable printers, most of the workers also worked at home or in a small satellite office. This meant they could reduce unnecessary commuting and adjust their schedules to their customers' needs. In this particular setting the work was not only mobile but also effectively distributed among different locations in a combination that was considered functional from the point of view of individual workers, customers and the employer. As a result of this arrangement, it was thought that the flexibility of purchase agents' work had significantly improved. Only in situations requiring face-to-face interaction was distribution criticized:

> '*Of course, face-to-face interaction suffers [in distributed work]. Videophones are not a reasonable option. ... Sometimes it might be difficult to keep in touch with certain persons who are somewhat introverted. But I would not consider this a problem for us.*' (Purchase manager, Wood-processing factory)

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Work and Family

Some interviewees expressed their fear of conflicts between work and family obligations. In particular, it was thought that successful teleworking would not be possible in the presence of small children at home. For example, none of the R&D specialists said that technology presents any major obstacles to teleworking but family indeed does. A worker whose job it is to run usability and functionality tests, i.e. to simulate actual operating conditions of highly complex process management software, was specifically asked about this matter. I quite reasonably assumed that at least his work would require technically too sophisticated and expensive equipment to be transferred home. This assumption proved to be utterly wrong. Without even thinking a second what to answer, the interviewee said: *'No, we have so many children that you cannot do anything there [at home]'* (Quality engineer, Manufacturing enterprise).

Of course, much of R&D work especially at laboratories involves the use of specialized equipment that needs to be shared among a group, but the example above nevertheless provides a humane perspective on telework that should not be overlooked. Demographic variables such as individual life cycle stage, gender and parental status are imperative factors when considering a move from office to home, although this is not much appreciated in technological readings of telework. It should, however, go without saying that telework ought never to be considered as a substitute for public childcare provisions or as a simple solution to combining housework with paid work. In the research literature this view is unanimously shared by those who have studied female teleworkers. It is a clear misconception that working at home will assist in childcare arrangements, especially with preschoolers (Devine *et al.* 1997, 101). Telework also seems to reproduce traditional gender differences. According to Huws *et al*. (1990, 56) male teleworkers will generally be provided with a separate room to work in shielded from distractions; women, in contrast, are likely to work in a communal area, such as a kitchen, playroom or living room, and to be simultaneously responsible for keeping an eye on dependants or the general running of the household.

In more general terms, it has also been remarked that both work and private aspects of households impose competing demands on teleworkers (Haddon & Silverstone 1994; Leidner 1988). This could result in conflicts and strains from alternating quickly from one role to another. On the other hand, some households may find it stressful to share the same four walls together all day long, even if a separate workspace for the remote homeworker has been constructed. In addition, some feminist writers have made

the important point that futuristic imaginings of telework tend to construct a peculiarly male world premised on the assumption of little or no responsibility for the care of others (Armstrong 1999, 47). Curiously, in this sense hardly any progress has been made since the 1970s. Technological visions, now and then, implicitly depict a typical teleworker as a middle-class male conforming to an individualistic and entrepreneurial work ethic.

It seems then that the decision to take up telework is as much dependent on the nature of the work as it is on individual traits like family status. Clearly, both physically fixed and distributed forms of work have their benefits and inconveniences. For the above reasons, none of the people interviewed regarded telework as a viable substitution for normal work, except perhaps occasionally. Even in the case of the manufacturing enterprise, which had a specific corporate policy that allowed employees to work from home one day per week if they chose to do so, telework was considered as just one minor dimension of flexible work practices. In the telemarketing firm the employees were even more sceptical about the benefits of telework. In fact, the interviewees were clearly startled when they were asked what they would think about switching to telework. One female worker quickly replied that there is no way she could feel good about working from home. She clearly felt a need to maintain a clear boundary line between work and non-work duties:

> '*Personally, I prefer to come here to my office, because in my opinion home is home, it is a place for rest and family.*' (Sales negotiator, Telemarketing firm)

The idea of switching one's workplace from office to home was inconceivable for all other interviewees at the telemarketing firm as well. These responses were quite understandable in view of the conscious and considerable efforts made by the employer to create a good team spirit and good working conditions. Unlike some other services in this sector, and call centres in particular, this employer provided an exceptionally modern and pleasant office environment and some additional benefits like extra bonuses, social activities and even household help for distinguished senior workers. It is possible that in cases like this, the fear of losing fringe benefits is the main reason why workers are reluctant to turn to telework.

Data Security, Managerial Supervision and Other Concerns

In other case organizations different yet equally important problems were raised. Concerned about potential data security risks, the manager and owner of the accounting firm

had forbidden working from home and even carrying work-related documents home. This was based on the potential for fraud, abuse or accident, no matter how remote the possibility:

'I have said no to teleworking. Legal issues are involved. I do not like to see clients' papers carried home. Professional secrecy and the like might be endangered. Or if people have children at home, they may tear up the papers or pour coffee all over them, and so forth. At my behest nothing is carried home.' (Manager, Accounting firm)

Working on the customers' premises from time to time is of course another matter altogether; this is in fact a common practice in the accounting business. Nevertheless, considering the widely publicized accounting scandals (Enron, WorldCom, etc.) that were shaking the global stock markets at the time of the interview, the manager's policy could hardly be regarded as overly cautious. In the accounting business it is crucial that the customer relationship is founded upon trust and a strict code of professional ethics. However, considering the theme of this chapter, the most important lesson to be learned from this case is that data protection is a much wider issue than just a technological one. Unfortunately, people remain the weakest link in the security of any business. Access control, encryption and the integrity of digital data flows, as well as efficient firewalls and anti-virus software are crucial today, but as long as discreet documents are filed in paper form or invaluable materials and equipment are being handled, traditional control systems and precautions are likely to remain in place. Even in the case of digital security the most common problems are often surprisingly mundane and essentially human in origin. The careless use of passwords, for example, can compromise any security system.

Especially in the case of organizations like the telemarketing firm, there is still one aspect that is of utmost importance: the exercise of control over the work process. As in all sales work, the team spirit in this organization was intensely competitive. Actual monthly sales figures for each competing team were posted on a chalkboard for everyone to see and compare. Both individual and group bonuses were determined according to the volume of sales completed. Although it would be too simplistic to suggest that monetary rewards were the only motivating factor for the workers in the telemarketing firm, it is very likely that management preferred to keep up a highly competitive atmosphere:

'I'm sure there are some people who could do their job at home. But we want to keep control and in that way guarantee how the work is done. ... On the other hand, when the team spirit is high, that creates positive synergy.' (Sales manager, Telemarketing firm)

In the context of organizations like the manufacturing enterprise, the issue of supervision is obviously more complicated because there the employees are specialists in different fields of expertise, and management cannot be fully on a par with their subordinates. In 'communities of practice' (see Chapter Four) managers must assume the role of facilitator or coach rather than traditional supervisor, whose authority is based on a formal position or seniority.

In most organizations the fact still remains that it is easier for management to control the work process when people are physically close to each other or otherwise available for monitoring. It is probably for this reason that management may feel reluctant to take a chance with telework experiments. Some middle managers may also fear the possibility of becoming obsolete if a large proportion of their subordinates are out of sight. Yet, running a successful business is about taking calculated and conscious risks. Without any risk of failure, you cannot make a profit. The same applies to new forms of work. This, however, is easier said than done. If telework is to be adopted on a large scale, a paradigm shift is needed in managerial norms and attitudes (Ellison 1999; Nilles 1998, Suomi & Pekkola 1999). Management has to shift its focus from traditional means of controlling work processes and employee behaviour to the evaluation of performance and end results. In other words, managers should rely more on planning and coordination and less on monitoring. The point is to use indirect controls and worker empowerment over direct supervision; these could include, for example, performance appraisals, career advancement, training and skill development, etc. (Adami 1999; Depickere 1999). Especially with distributed knowledge workers, trust and respect provide the most powerful means management can hope to deploy.

In addition to the problems referred to above, some of the persons interviewed were concerned about the prospect of social isolation, sometimes called the 'trapped housewife syndrome'. Although this aspect of telework is often mentioned in the research literature, relatively little is known about the consequences of isolation or other important issues related to occupational health and safety (e.g., designing ergonomically sound telework environments, managing working time and avoiding unnecessary stress and information overload).

Existing research suggests, though, that the higher the proportion of their working time teleworkers spend at home, the more dissatisfied they are with their contacts with others in similar work (Huws *et al.* 1990, 62). In some case studies teleworkers have said it is difficult for them to justify their free time when work is invisible to others and when free time is permeable to employers' demands (Steward 2000, 60). Some occupational psychologists have also hypothesized that teleworking has a significant emotional impact on employees as reports of negative emotions such as loneliness, irritation, worry and guilt are more apparent than with office workers (Mann & Holdsworth 2003, 208). In the worst-case scenario, telework embedded in a less than optimal psychosocial environment could lead to a 'workaholic culture', shattering the balance between work and private spheres of life and exacerbating feelings of isolation. Long working hours and badly designed physical settings could accordingly result in adverse health consequences (Huuhtanen 1996; Rantanen & Lehtinen 2000).

These are just some examples of the many difficulties surrounding telework experiments that should be taken into consideration when discussing the potential problems and possibilities of distributed work, including the legal rights and responsibilities of teleworkers and their employers. To conclude this chapter, we can now proceed to the final summary (Table 5.3) and draw together the practical implications of the above analysis. Due to the limited generalizability of the results, the conclusions drawn are tentative. Since every organization faces different environmental conditions, business goals and managerial challenges, it is obvious that there are few universal 'truths' concerning organizational behaviour. Therefore, my recommendations are put forward as suggestions for more detailed and context-specific analysis.

Practical Implications

'5 p.m. Time to call it a day. You leave notes for yourself on what has to be done tomorrow and then e-mail your supervisor at the main office to tell her you will be going to the meeting on Friday. You leave the office, check on your 12-year-old watching TV in the family room, and head outside to do some gardening. It's been a good day at work!' (Devine *et al.* 1997, 103–104)

Unfortunately, the above quotation is fictitious, as the authors themselves convincingly demonstrate in describing the case of Canadian teleworkers. There is no teleworking revolution underway. Because people do not live by information alone, the notion that a

majority of the population could ever become teleworkers is far-fetched (Huws 1991, 29).

What we are likely to see is an evolutionary development towards increased flexibility as a long-term result of the information technology revolution and the gradual absorption of teleworking into the mainstream of normal working practice (Gray *et al*. 1993, 22). For years to come, working free of spatial and temporal restraints will remain a privilege for only a small minority of wage labourers. Probably even fewer teleworkers will experience this new form of work solely in a positive light, as involving no problems whatsoever. Like all work arrangements, telework too has its pros and cons. Table 5.3 summarizes some of the most important possibilities as well as potential problems associated with distributed work arrangements.

Table 5.4. The Pros and Cons of Distributed Work Arrangements.

Pros	Cons
Individual level	
More flexible working hours; improved productivity and profitability of individual workers; stronger employee job satisfaction, motivation and positive occupational identity	Boundaries between work and non-work disappear; more 'workaholism', ergonomic problems, stress symptoms and adverse health reactions; teleworkers have to make heavy investments in necessary equipment
Home provides a peaceful work environment free from interruptions	Lack of self-discipline and the 'comforts' of home interfere with work duties
Organizational level	
Positive effects on employment by helping to match supply and demand	Employers use telework arrangements only to minimize overhead costs and save office space
Employees are given more autonomy and responsibility; employee retention improves	Employers seek new means of supervision and control; the privacy of homes is disrupted; more problems with data security
Telework creates a dynamic and modern organizational image	Teleworkers have difficulties in conveying the image of being in the workplace to both management and outsiders
Social level	
New job opportunities created for disadvantaged labour force groups; entrepreneurial activity is encouraged; geographical inequalities are reduced	Teleworkers become socially isolated; interaction inside organizations suffers; workers' collective trade union representation weakens
Positive environmental effects through by reduced commuting-related traffic problems and urban congestion	Teleworkers scattered around rural areas are more likely to use private instead of public transportation

To overcome these and other possible obstacles to the use of telework, there are several practical policy recommendations that should be considered (for step-by-step guidelines

for teleworkers and their managers see especially Gray *et al.* 1993; Nilles 1998). Here I raise only two main concerns that came up repeatedly during the course of my case studies.

First, both employers and employees experiencing telework arrangements should formally agree upon the legal rights and appropriate working conditions of teleworkers. A teleworking initiative should never be imposed, and only those who show the right aptitude and desire to work in this way should be selected as teleworkers (Coulson-Thomas 1991, 31). If the primary reason for adopting telework is to cut costs at the expense of worker satisfaction, for example by coercively making employees independent contractors, an organization can be expected to run into difficulties. This can be very costly in terms of productivity, employee morale and turnover. Furthermore, without mutual understanding and necessary precautions to protect workers' rights, a telework initiative is unlikely to be continued permanently. Especially in countries like Finland where trade unions have a strong footing in regulating the labour market, the contractual nature of telework should be emphasized from the very outset. The implementation of new organizational forms is more likely to prove successful if all relevant parties including the respective workers and trade unions are democratically involved in the process of change – forget the rights of an individual, forget telework, it is as simple as that.

In accordance with the European Commission's recommendations, a telework contract should encompass the following general themes (see especially Helle 2004):

- voluntary participation for both workers and employers
- the right of return to normal work arrangement
- maintenance of employee status and equality among employees (i.e., teleworkers are entitled to the same rights as other worker groups)
- adequate information on assignments and working conditions
- coverage of costs by the employer (as a general rule, the employer is responsible for covering the costs of necessary equipment)
- a guarantee of specific training by the employer
- health and safety provisions by the employer
- working time (as a general rule, the teleworker manages the organization of his/her working time)
- data protection (i.e., the employer has the responsibility to inform the teleworker of all relevant legislation and company rules and sanctions in the case of non-compliance)

- the protection of personal privacy by the employer
- contact with colleagues, collective rights and equal opportunities (e.g., the employer ensures that the teleworker has access to company information and no obstacles are put to communicating with other workers or their representatives such as shop stewards)

Second, in order to smooth out any problems that might occur, only a part-time telework arrangement, specifically tailored for a selected sample of potential teleworkers, is advisable, at least in the initial phase of organizational change. An organization-wide solution should only be sought after the first experiences have been analysed. In addition, it is also likely that in the long run, partial telework could very well be the best alternative for most organizations, minimizing the need for extra education, support and supervision of teleworkers, to name just a few potential problem areas. Although empirical evidence remains mixed and incomplete, available research suggests that part-time telework arrangements have little disruptive impact on intra-organizational communication, which is one of the main concerns among employees pondering the pros and cons of staying out of the office (Duxbury & Neufeld 1999). Some studies also indicate that most employees who are interested in teleworking would prefer to not stay away from the office longer than one to three days a week (Teo *et al.* 1998). This is yet another reason speaking on behalf of partial work distribution.

If, however, a full-time telework arrangement is implemented, it should be ensured that teleworkers are provided with appropriate technical and educational support, including financial compensation for the fact that considerable costs are involved in the construction of an ergonomically sound home office. Extra measures to compensate for isolation and to maintain professional relationships are also advisable. As a necessary minimum, there should be opportunities for regular meetings and engagement in informal social activities. The key here is to facilitate necessary social exchange while paying less attention to unnecessary interaction (Nilles 1998, 36) – in other words, to eliminate useless communication.

In this last respect the personality of individual employees as well as the nature of the work tasks are the most critical considerations that should be taken into account when selecting prospective teleworkers. For some, telework means freedom, for others it is not a socially sustainable option at all. Care must also be taken to ensure that prospective teleworkers' communicative tasks are mostly asynchronous in type, for example involving e-mail or fax, which have the advantage of being spatially and temporally independent media. In turn, the analysis I have provided here indicates that tasks requir-

ing a lot of synchronous communication, especially collaborative problem-solving and negotiation, are the least likely to be successfully distributed.

These and other possible problems notwithstanding, it is reasonable to conclude that the opportunities and benefits telework could offer far outweigh its potential risks. However, as I have repeatedly suggested, partial telework may be advisable for most organizations. In this way, a compromise between traditional and still-experimental distributed forms of work might be achieved – and perhaps the best of both worlds could be combined.

Chapter 6

The Limits of Teams and Distributed Groups

In this chapter some of the most pressing problems inherent in contemporary work organizations are spelled out. Here I draw attention to the fact that the growing knowledge-intensiveness of work organizations has not made organizational hierarchies obsolete or empowered all employees equally. Considerable differences still exist between organizational types, for example, in terms of team formation, pay systems, recruitment and forms of control.

A Variety of Organizations

In the previous chapters I have dealt with the ongoing change towards the informationalization of social and organizational structures from different yet interrelated viewpoints. Above else, I have highlighted the growing significance of knowledge as a strategic asset for individual and organizational performance in the contemporary workplace – the micro-foundations of national competitive advantage. I have also argued that no amount of state-of-the-art technology is in itself enough to guarantee competitive edge. What counts is putting human capital to the best possible use. In this respect understanding the basic laws of human behaviour not only remains the basis for well-designed workplaces, but proper human resource management is (or should be) today more pronounced than ever as organizations become increasingly dependent on the creative input of their core knowledge workers.

In this chapter, which concludes my empirical analysis, I continue my critical assessment of growing flexibility of work and organizational processes. As I briefly noted in Chapter Four, the first oil crisis in 1973 was a wake up call signalling a sea change in the capitalist mode of production. The Fordist mass production system proved too rigid to meet ever more diverse customer needs, and therefore new organizational and technological innovations were called forth. As David Harvey (1990, 124) puts it, the breakup of the Golden Era inaugurated a period of rapid change, flux and uncertainty, a shift from Fordism to a 'flexible regime of accumulation'. Many visionaries, for example Rosabeth Moss Kanter, even went on to proclaim the death of the bureaucratic organization, the epitome of Fordism. According to Moss Kanter (1989), 'business is gradually shedding the shackles of an artificial status order that told people what their place was – and to stay in it' (p. 18). Indeed, to some extent the above views are correct. As I remarked in Chapter Four, many traditional industries can now accommodate large variations in product types and also respond to diverse customer needs on a just-in-time basis, thanks in large part to computer-based automation (Lavikka 1997). It is also true that possibilities to participate in problem-solving and decision-making have become broader, as Moss Kanter among others anticipated. Yet, in my view, it is far too premature to conclude that the information technology revolution has made industrial bureaucracies completely obsolete.

Although the change towards leaner organizational structures is quite clear and unequivocal, not all organizations are created the same. Despite all the hype about employee empowerment and equal opportunities, there are still major differences between organizational types for example in terms of the intensity of teamwork or possibilities to enjoy flexible working time arrangements, not to mention various control mechanisms restricting individual autonomy.[65] These differences reflect a more general division be-

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[65] For example, it is interesting to note that during the past couple of decades we have seen an increase in supervisory positions in Finland. According to Blom *et al*. (2001, 55–59) the numbers employed in supervisory positions from 1981 through to 2000 have increased rather steadily from 23 to 31 per cent (see also Pyöriä 2003d; 2004b). This observation runs counter to most expectations. In particular, researchers have suggested that the numbers in immediate supervisory positions should decline as organizational flexibility increases. What, then, do these changes tell us about power relations in the workplace? Have supervisory functions really increased so dramatically? Not necessarily. According to Blom *et al*. (2001), the pattern of change is quite clear and unequivocal, but a closer analysis of the situation of people working in these positions indicates that, to a certain extent, the increase in supervisory functions is merely an illusion. Although the numbers occupying such positions are higher than earlier, the employees now exercise less power and authority over their subordinates. The main reason that explains this paradox is the ongoing tendency for companies to split up into individual profit units. At the same time, a growing proportion of necessary support services are being contracted out. Another possible reason is the current vogue for 'credentialism'. As a consequence of these

tween traditional and proactive (or flexible) workplaces that coexist in the emerging information society (Antila & Ylöstalo 2002; Blom & Melin 2003). Although Finland has rapidly evolved towards an innovation-driven economy, only part of the country's enterprises have been shaped by organizational change. It is also clear that the public sector, although certainly not the antithesis of knowledge intensity, is far less flexible and more bureaucratic than the business realm. This contrast serves to remind us that the Finnish information society is still in its formative phase. While ICTs have increased the efficiency and flexibility of industrial production, it still remains to be seen to what extent public administration and services will be able to reap the potential benefits of these technologies and renew their organizational structures.

However, there seems to be at least one thing in common in contemporary work organizations. As many commentators have recently suggested, there is a simultaneous tendency in the workplace today towards increased flexibility, towards strengthening staff commitment and controlling work (see, e.g., Robins & Webster 1999; Sennett 1998; Thompson & Warhurst Eds. 1998). Clearly we have a paradox here. Although a growing proportion of the labour force enjoys considerable autonomy, work today is also closely supervised (see especially Blom *et al*. 2001). This is explained by the fact that especially the new knowledge workers – arguably the most productive core of the economy – are under constant pressure to perform better and better. Indeed, it has been argued that knowledge workers exercise their autonomy within a bigger scheme of capitalistic accumulation, i.e. generating profits for the organization (Blom *et al*. 2002, 340). For example, such fringe benefits as stock options offered to top-drawer managers are used to create an illusion that the interests of paid labour and capital are one and the same. This is simply not true because no organization under the influence of global financial markets can guarantee a secure job for its employees, at least not for the majority of the wage earning population. Instead, knowledge workers are indoctrinated in competing openly with each other, bearing the risk of not meeting the demands of the market.

For good reason, then, recent research in the sociology of work has focused largely upon problems related to mental stress as well as the growth of performance pressures (Blom *et al*. 2001; Julkunen *et al*. 2004). More traditional issues have included questions of job authority, autonomy and incomes in the workplace. These constitutive elements of the labour process might collectively be described as the structura-

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changes, we have seen a growth in nominal authority positions; yet, logically, managers today must have fewer subordinates than before.

tion of the individual's work situation (Blom *et al.* 1992, 102–139). Following on the trails of this line of research, my discussion here tackles the following question: what is knowledge work like in terms of its psychological demands? The question stems from a popular misconception according to which mobile and technologically interconnected knowledge workers 'choose how and when they work, control their own knowledge resources and therefore capitalize on their skills, while enjoying self-controlled work patterns negotiated to reflect their individual needs' (May 2002, 53). The reality is more complex and contradictory. Although knowledge work allows for some considerable benefits such as a high degree of autonomy, on the reverse side of the coin it may also involve high levels stress and high expectations to meet the rapidly changing productivity norms in the contemporary workplace.

In addition to delving a little bit deeper into the data already presented to the reader, I introduce two new case organizations that, on the one hand, provide further evidence on the growing importance of human capital in knowledge-intensive organizations and, on the other hand, shed light on various problems inherent in managing knowledge work (see also Pyöriä 2005c). The first one of these organizations is an 'IT-consultancy' specializing in the development and implementation of computer infrastructure. The company designs computer systems and software solutions for both private and public sector organizations. The second case is a 'telecom operator' that provides mobile phone and Internet connections as well as related value-added services. Because both companies are international and hence too large entities for the scope and purpose of my study, I followed a similar research protocol than I found useful with the case of the manufacturing enterprise; that is, I selected a small and highly specialized unit for my study. In the IT-consultancy the unit concerned focuses on developing and maintaining information systems for the health care sector. In the telecom company the 'voice switching team' studied maintains and repairs telecommunications network in Finland.

In line with other case organizations, the two units concerned employ highly skilled knowledge workers whose work is a mixture of collaboration and autonomous problem solving. Altogether 11 interviews sufficed to provide enough information on these organizations. However, before elaborating how the interviews reflect recent changes in the contemporary workplace, it is worth taking a more general look at how the work environment has developed since the Fordist mass production system ran into a crisis.

Deskilling vs. Upskilling

Three decades ago – despite the crisis of Fordism had already become apparent – a number of prominent sociologists of the time anticipated a progressing loss of worker control over the labour process. It was assumed that because the productivity benefits of Taylorism, especially the standardization of individual tasks and technical and bureaucratic supervision of labour, had been exhausted in factories, it would be only logical for capitalists to transfer these strategies into offices. Indeed, restricting individual autonomy had many advantages in industrial manufacturing. The supervision of workers engaged in line production was far simpler than in craft-based production: the conveyor belt itself became an immediate supervisor, which meant that manning in direct supervision could be reduced (Melin 1990, 213).

For example, in *Labor and Monopoly Capital* (1974) Harry Braverman put forward his controversial argument according to which the skill and qualification requirements in white-collar work are declining, and we should therefore witness the proletarianization of office and service workers. In a similar vein, Erik Olin Wright, one of the most renowned contemporary class theorists, reasoned that due to capitalists' efforts to supervise the labour process as closely as possible, the basic principles of Taylorism, especially the breakdown of work tasks into simple routines, would continue to persist. In *Class, Crisis and the State*, published during the height of Marxist sociology, Wright argued as follows:

> 'The close supervision of the labour process is much easier when tasks are simple and routinized and their pace is determined by machinery rather than the worker. Thus, capitalists look for innovations which tend to reduce skill levels and reduce the autonomy of workers on the job. The culmination of this process was the mass production assembly line regulated by the principles of Taylorism, in which the worker lost all autonomy and became virtually a human component of machinery itself.' (Wright 1978, 65)

Wright and Braverman of course were well aware that there are also reverse tendencies to the deskilling of work. However, they both maintained that deskilling is the trend that prevails. While it may indeed be true that new skills are continually being created, there nonetheless is constant pressure to reduce the skill levels needed to perform a given task, Wright argued:

'Thus, for example, when computers were first being developed, the actual operators of computer hardware tended to be engineers. Gradually over the past twenty years this job has been "deskilled" until, at present, computer operators are technicians with only one or two years of post-high school training.' (Wright, 1978, 66)

According to more recent perspectives, in contrast, it has been predicted for some time now that the ongoing automation of routine tasks, coupled with such organizational innovations as self-managing teams, will create more space for decision-making on the shopfloor level (see, e.g., Piore & Sabel 1984; Sayer & Walker 1992; Zuboff 1988). From workers' point of view, the emergence of the post-bureaucratic organization was expected to generate all sorts of good things. First, workers were to gain more autonomy over their work tasks and over the goods or services they produced. Secondly, since there would be less need for direct supervision, there would be more autonomy in the use and control of working hours. Thirdly, workers would also have greater influence over decisions concerning their job. Finally, contrary to the deskilling thesis described above, workers' skills should become more pronounced as their autonomy increases.

Which one of the above views is correct? By now we may of course conclude that the most pessimistic predictions of proletarianization and deskilling of work have not come true. The automation and mechanization of manual labour has made certain jobs obsolete, as I have described earlier, but at the same time educational and skill requirements have become more pronounced than ever before, creating new employment opportunities for those managing to keep up with the pace of change. Consequently, education has become the most decisive factor that sets the boundary conditions for individual career prospects. In line with these developments, the labour process theory, and Wright's (1997) more recent work in particular, has evolved and turned to consider the role of skills and formal qualifications in explicit terms. In short, then, current research literature explicitly suggests that success at work is mediated by educational achievements (see, e.g., Peiperl *et al*. Eds. 2002).

The case of workers in money circulation provides a telling example. According to Blom *et al*. (1992, 199), bank tellers represented the most proletarianized group of the Finnish wage-earning population in the early 1980s. Their tasks were highly routinized and their work process was under strict external control. Today, however, due to the rise of self-service as well as the automation of routine monetary transactions, work

in this sector has transformed considerably.[66] During the 1990s large numbers were laid off from banking services, while the work that remained has become more demanding and varied, resembling the jobs of skilled financial consultants. In effect, it is hardly an exaggeration to conclude that once proletarianized bank tellers have come to resemble true knowledge brokers.

From Protestantism to the Hacker Work Ethic?

On these grounds, both utopian and dystopian visions on the future of knowledge work have emerged. For some, ICTs are a new way of liberating labour from the constraints of tedious work; others expect them to generate new forms of control, spreading outside the workplace into the domestic and personal spheres of people's lives (Rubery & Grimshaw 2001).

In the latter half of the 1990s, against the backdrop of the dotcom bubble, the vision of an empowered knowledge worker was born. To name just one recent example, Pekka Himanen, the Finnish philosopher who has had productive collaboration with Manuel Castells, has claimed that a new type of work ethic is gaining ground. In *The Hacker Ethic and the Spirit of the Information Age* (2001), Himanen goes on to argue that the Protestant work ethic – defined by Weber as an attitude of self-denial and conscientiousness – is giving way to a passionate relationship to work (*cf.* Weber 1904–1905).

Resembling the tone of early information society prophets such as Toffler, Himanen contemplates the possibility that the original hackers, the 1960s generation of computer enthusiasts, represent the vanguard of a rising class of creative labour who work neither for duty nor money, but rather for self-fulfilment and the respect of their peers, free from the alienating and exploitative forces of capitalism. In this context the word 'hacker' has nothing to do with today's computer criminals, who could more aptly be labelled 'crackers'. Instead, a hacker – in the original meaning of the word – simply is an individual who strives to realize his or her creative passion. Although Himanen does not say that the Protestant work ethic is dead, he nevertheless argues that its influence is diminishing as the new 'hacker work ethic' unfolds:

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[66] According to the Finnish Bankers' Association (www.pankkiyhdistys.fi) two-thirds of Finnish citizens today use on-line banking services on a regular basis. Most important of all, the number of 'traditional' customers has declined fast since the early 1990s. Only a few per cent of

'Looked at on this level, computer hackers can be understood as an excellent example of a more general work ethic – which we can give the name *the hacker work ethic* – gaining ground in our network society, in which the role of information professionals is expanding. But although we use a label coined by computer hackers to express this attitude, it is important to note that we could talk about it even without any reference to computer people. We are discussing a general social challenge that calls into question the Protestant work ethic that has long governed our lives and still maintains a powerful hold on us.' (Himanen 2001, 7; italics in original)[67]

To rephrase Himanen's argument, the changes brought about in the workplace by economic and technological development have been closely followed by a profound change in attitudes towards work. As Himanen seems to think, the hierarchic structure of the work organization characterized by discipline and routines is being replaced by networks of creative individuals, who assume an entrepreneurial and indeed an artistic spirit. Furthermore, according to this strand of thought, coercive management tactics should be replaced by increasing worker participation, also indicating a decline in the power of trade unions (*cf.* Drucker 1993, Trauth 2000).

The vision of an empowered knowledge worker also has its critics (see, e.g., Darr 2003; May *et al.* 2002). In particular, the critics have questioned the naïve assumption of a *linear* expansion of worker autonomy along with the rising level of education and mechanization of manual labour. Empirical evidence indeed indicates that many aspects
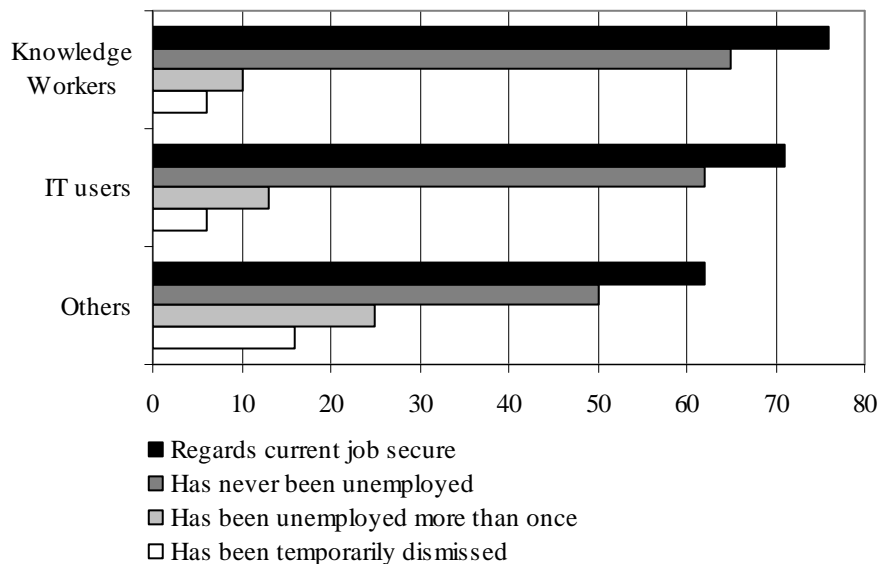

Finns pay their bills at the bank counter. It is also estimated that close to 100 per cent of all payment transfers are automated.

[67] Himanen is not alone with his ideas. Another recent example of the appeal of overtly positive visions of working life includes Richard Florida's best selling *The Rise of the Creative Class* (2002). Florida, Professor of Economic Development at Carnegie Mellon University (Pittsburgh), estimates that the 'class of creative workers' constitutes about a third of the workforce in the US as well as in other advanced economies. According to Florida's definition this 'class' includes those workers who are in the business of creating new ideas, technology and creative content (e.g., scientists, engineers, architects, educators, writers, artists and entertainers). Both Himanen's and Florida's contributions have their merits, yet they tend to produce an overtly elitist view of the world of work by placing too much emphasis on the positive aspects of economic and technological change. As I argued in Chapter One, quoting K.S. Taylor (1998), the fate of most knowledge workers is to recycle already existing knowledge, a fact that Florida seems to belittle. In *Cities and the Creative Class* (2005) Florida replied to his critics and said that his intention was not to portray contemporary working life in an elitist light, but he came to use the term 'creative class' out of a personal and intellectual frustration with the snobbery of concepts such as knowledge workers, information society, high-tech economy, and the like: 'I chose the term because I found it to be more accurate in defining the real source of economic value-creation – that is, human creativity – and because it is an intellectual construct that extends to all forms of human potential' (p. 4). Florida is indeed right in saying that human capital spurs prosperity, a point I also embrace, but a closer reading of the literature on knowledge work should reveal that there is very little snobbery in the usage of the terms Florida criticises, at least as far as the writings of reputable scholars are concerned (see Chapter Three).

of ongoing economic and technological changes are actually working against the simplistic assumption that knowledge workers possess their productive means, or their intellect, and thus practice full self-control. Knowledge workers' work situation in particular seems to have its grim downside. Contrary to the overt optimism of some popular writers such as Himanen, the diffusion of ICTs is far from being our benign liberator from the mundane realities and conflicts of working life. Even if economic and technological development has certainly created more humane and safer work environments for workers from all walks of life, the rise of knowledge work has also brought along new problems and challenges, as we shall see below.

Figure 6.1. Concerns of Unemployment among Knowledge Workers, IT users and Others in 2000 (% of Finnish wage labour).

■ Regards current job secure
▨ Has never been unemployed
▨ Has been unemployed more than once
□ Has been temporarily dismissed

Source: Blom *et al.* 2001, 89.

Knowledge workers' work situation is best described as contradictory. On the positive side of the coin, knowledge workers enjoy a relatively strong labour market position and better than average career prospects (see Blom *et al.* 2001; 2002). This is illustrated by the fact that in the light of their previous work history as well as future prospects, knowledge workers have a much lower risk of unemployment than either IT users or traditional workers. Moreover, every other knowledge worker occupies a supervisory position, whereas the corresponding figure for IT users is 22 per cent and for traditional workers 15 per cent. Knowledge workers also have greater autonomy in decision-making than other worker groups, but at the same time the quality and volume of their work is under strict surveillance. This is paradoxical because surveillance is in many respects the antithesis of autonomy, which is required in abundance from knowledge

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workers – who, more than average, should be involved in creative problem-solving. Knowledge work may be innovative (design autonomy) and demanding in terms of its content (frequent non-routine problem solving), but key aspects of the job may also be closely controlled.

Figure 6.2. Concerns of Mental and Physical Fatigue among Knowledge Workers, IT users and Others in 2000 (% of Finnish wage labour).

- Work is often or almost always physically strenuous
- Work is often or almost always mentally strenuous
- There is often or almost always a fast pace of work
- There is often or almost always more work than time to do it
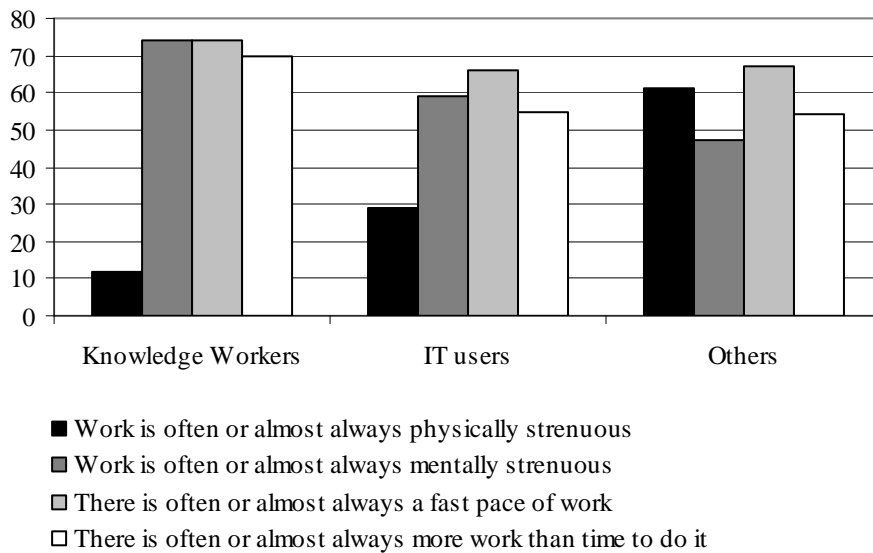
Source: Pyöriä 2001b, 8. The following alternatives were given to the respondents: never, seldom, sometimes, often and almost always. In the figure the last two alternatives are combined (often and almost always).

Figure 6.3. Some Aspects of Autonomy among Knowledge Workers, IT users and Others in 2000 (% of Finnish wage labour).

- I can decide myself what to do and which assignments to take
- The work involves a lot of tasks that cannot be solved routinely
- There is much scope for independently designing the product of work
- I can freely decide when to clock in and out of work
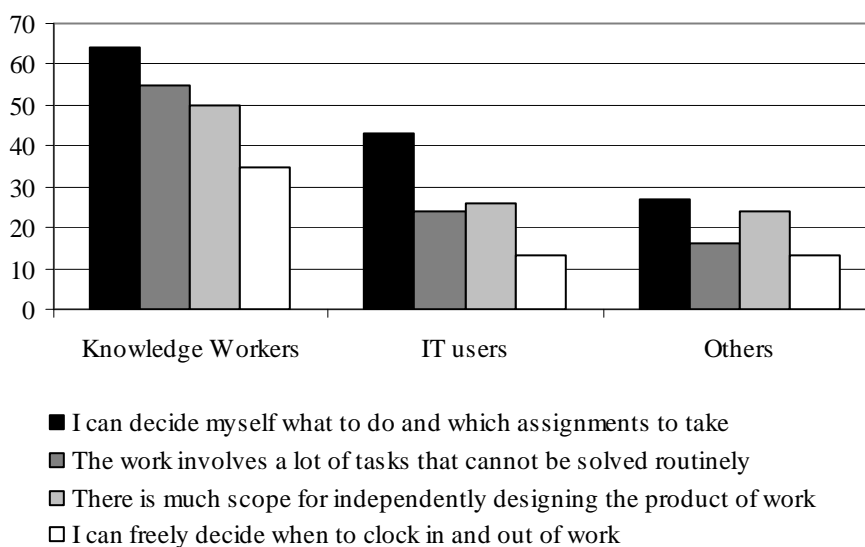
Source: Pyöriä 2001b, 9.

Despite some notable advantages, knowledge workers' work situation also has its problems. Although concerns of mental fatigue apply to the entire wage earning population in Finland (Julkunen *et al.* 2004; Lehto & Sutela 2004; Siltala 2004), informational labour works the longest hours and suffers from the greatest mental fatigue and stress, reflecting a major contradiction in contemporary capitalism. In addition to high levels of stress, working overtime and taking work home is clearly more common among informational labour than in the rest of the wage working population. This reflects a structural problem inherent in the current labour market situation of knowledge workers, especially in Finland but also elsewhere in Europe: despite the persistent problem of unemployment, skilled employees in particular are required to work overtime.

In this respect Finnish knowledge workers are hardly any different from highly skilled labour elsewhere. As a general trend, temporal and spatial boundaries between paid work and personal life are becoming increasingly blurred, especially among new knowledge workers (Lewis 2001). In the research literature knowledge work is also associated with postponing family formation (Anttila 2005; Nätti *et al.* 2004), perhaps indicating that dedicating time to home, family, friends or hobbies, is becoming the luxury of the future (Gripenberg 2004). Although empirical evidence still remains inconclusive and mixed, among informational labour it seems that working unsocial hours is the norm rather than the exception, and for this reason an important precondition for career advancement. This can be regarded as a form of 'self-exploitation', an extra commitment to one's work and the problems of the organization, contributing to the commodification of intellectual capital (Siltala 2004).

Furthermore, it seems that rapid computerization has brought in its wake new occupational health hazards, including mental and ergonomic problems. For example, musculoskeletal disorders, especially those of the neck, shoulder, and upper limbs, have been associated with computer work, indicating that the holding of static postures for hours is unnatural for the biological functioning of the musculoskeletal organs (Takala 2002). Work-related sleep disturbances have also become increasingly prevalent in Finland. This is important because insufficient sleep and sleeping disorders are risk factors for a number of medical problems and occupational accidents, as well as being related to decreased work motivation and impaired cognitive functions and work performance (Härmä 2003).

Clearly knowledge workers are forced to comply with ever more stringent productivity norms. On the basis of the foregoing it is difficult to find justification for the thesis according to which the Protestant work ethic is being replaced by individual aspira-

tions. In light of empirical research, the image of an empowered knowledge worker proves to be little more than a myth. Figures 6.1–6.3 illustrate the point.

Yet the flawed image of an empowered knowledge worker continues to be reproduced even by those who have conducted in-depth studies among informational labour. Eileen Trauth (2000), for example, quite reasonably argues that the ultimate productivity measure in knowledge work is the quality of the product rather than the amount of time spent on the job. However, this is not enough for Trauth who goes on to say that this change in the measure of productivity, therefore, brings with it a change in attitudes towards time: 'Time flexibility is introduced as workers are expected to put in whatever amount of time is necessary in order to accomplish the job' (p. 10).

Although Trauth has a point, there are two objections I feel obliged to make. First, in the vast majority of jobs competitive pressure is at least as important a determinant of the use of time as the quality of work. Secondly, though *direct* supervision by superiors may have declined, this may be because new technologies heighten the possibilities of monitoring workers; i.e., there is not so much need for personal supervision since it can be replaced by very detailed monitoring of working life and the regular reporting of it. Today's worker may be autonomous, but his or her every action is often followed by electronic technologies (Blom 2004). In a sense, we all are 'inmates' in a panoptic society, in which both business and government organizations are allowed to collect, store and analyse huge amounts of personal information ranging from our consuming habits to sensitive medical records (for a throughout account of the surveillance society, see Lyon 2001).

Indeed, it seems that the pace of everyday life today is becoming ever more hectic and our lives ever more subordinated to the principles of the market economy. Paradoxically, the modern way of life stresses the importance of individual independence, perhaps most clearly manifested in the choices we make as consumers, but those who can consume are at once those whose freedom is bounded by their responsibility 'to live to work'. There is certainly some truth in the popular, although certainly not representative, image of the knowledge worker to whom work has become the ultimate status symbol. Timo Kopomaa (2000), the Finnish sociologist who has studied the behaviour of urban mobile phone users, writes that people find it increasingly important to demonstrate how desirable, active, busy and important they are: 'Perhaps an extreme example of the ever-mobile urbanite is a rollerskater dressed in spandex and wearing a mobile phone head set, who can be seen taking care of business while racing through the city streets' (p. 15).

The image conveyed above is of course flawed, yet it neatly captures the spirit of our times. Equipped with mobile phones, laptop and palm computers, knowledge workers are not only able but also expected to answer their calls and e-mails at any time and in any place, contributing to perceived work-related stress symptoms. Thus, it is reasonable to argue that even though people are neither endowed with perfect rationality nor self-interest, in some important respects *Homo sapiens* could quite correctly be relabelled *Homo economicus*.

In light of the previous discussion, it is quite clear that rosy visions of an emerging information society are far removed from knowledge workers' lived experiences. The reason why it is knowledge workers who have to work the longest and most stressful hours is in fact quite simple. Firms use overtime hours because of quasi-fixed costs of employment, i.e. hiring and training costs and various employee benefits that are related to employment but not to hours worked (Böckerman 2002, 37). Logically, it is an expensive and time-consuming business to give new employees the training they need, which means that knowledge workers' performance counts more than the performance of assisting staff. Therefore, from an economic point of view, it is perfectly understandable that knowledge workers work the longest hours. However, it is a fine line between flexibility and stress-related health problems. In the long run workplace stress is costly not only to the employer, but to society at large.

Table 6.1. The Pros and Cons of Knowledge Work.

Pros	Cons
– Relatively strong labour market position	– Too much work
– Better than average monetary rewards	– Mental fatigue and stress
– Possibility to use flexible work arrangements	– Time pressure
– Possibility to have influence on the content of one's work and organizational decision-making	– Stringent productivity rules: the quality and quantity of work is under strict supervision
– Challenging and interesting work tasks	– Necessity to work overtime hours

Source: Pyöriä 2005f, 162.

On the basis of existing empirical literature, the pros and cons of knowledge work are summarized in Table 6.1. The table is by no means meant to be exhaustive, but it serves to draw attention to the changing risk profile of contemporary work organizations (see especially Blom *et al.* 2001; see also Julkunen *et al.* 2004). Today our physical work

environment may be safe and clean, at least as far as knowledge workers are concerned, but we are also working and living in a mentally more stressful environment than previous generations.

Teams between Collaboration and Competition

The problems listed in Table 6.1 are common in all types of organizations. Although the case organizations included in my study represent relatively well-functioning and healthy work environments, and my informants clearly take pride in belonging to their communities, the interviewees were by no means hypocritical. They all stressed that contemporary working life has many complications, most of which are related to the globalization of the economy and ever-more stringent competition between rival enterprises.

Again, the current vogue for teamwork, the theme of Chapter Four, provides a case in point. In line with the research literature (e.g., Bélanger *et al*. 2003), the intensity of collaboration varied considerably among the case organizations represented here. In the business world teams clearly are the preferred mode of organizing work, yet not all teams are created equal. Especially in the manufacturing enterprise as well as in the construction planning office, a culture of close collaboration prevailed, but in the context of other cases the nature of collaboration was much less intensive. In the manufacturing enterprise, for example, teamwork was an integral part of the corporate strategy, as the following quote from one of the company's official documents reveals:

> '*Cooperation between management and personnel is an integral part of the company's management culture. ... Most of the cooperation takes place at the workplace, as part of everyday operations. This cooperation is grounded in local legislation, generally accepted ways of working and the company's open human resource policy*.' (Manufacturing enterprise, Excerpt from Corporate Strategy)

Of course, corporate strategies such as the one exemplified above are often a lot of hot air. Yet, there are strong grounds to argue that the labour process in demanding R&D and engineering projects is quite similar to team-based research work in academia, with employees pooling their resources to resolve problems in a joint effort. As I argued in Chapter Four, the key element here is the need for intensive cooperation and mutual trust. Only faith and confidence in colleagues will translate into a strong sense of responsibility and mutual loyalty within knowledge work teams. The research literature

indeed lends support to the view that demanding industrial engineering and academic research work bear resemblance to each other (see, e.g., Simpson & Simpson Eds. 1988).

In this respect especially the employees in the manufacturing enterprise seemed to be pleased with the way their work is organized. Most employees claimed that it was the intrinsic nature of their work that brought them satisfaction. Since most teams had been working together for some ten years, personal bonds in the teams were strong. This was further supported by the culture of informal communication between team members and the consistently low labour turnover rates. Compared with the earlier work organization based on a strict division of labour, the employees stressed the benefits of a more relaxed atmosphere in the new lean organizational structure. At the local level there are only the teams, their leaders and the general manager. A typical team includes ten employees (eight specialists, one secretary and one team leader). The team leader is in a managerial position, but his or her duties mainly involve coordination of the administrative tasks for management rather than team supervision. In short, teams are the basic organizational cells and teamwork is designed to reach shared goals; for example, a sales or R&D project.

> '*In my opinion, as far as our department [R&D] is concerned, the atmosphere here is virtually free from internal competition, no elbowing whatsoever. ... Everybody helps each other as much as possible.*' (Process manager, Manufacturing enterprise)

In the construction planning office a similar organizational culture prevailed, although the interviewees said that their organization has a clear formal structure and predetermined positions. The persons interviewed talked about a line organization. However, it has to be remembered that in professional bureaucracies the formal structure tells very little about the actual division of labour. For example, in terms of his or her official position a general manager may have nominal power over all other workers, but in reality he or she may have little or no say regarding the work process of individual knowledge workers.

> '*Projects are organized following departmental boundaries, on the one hand, but also between the departments, on the other. ... Formally, we have a line organization, but in reality projects crisscross different departments. From the point of view of an individual, his or her department provides a mental home with one and the*

same administrative manager, in projects managerial responsibilities circulate.'
(Manager, Construction planning office)

The telemarketing firm, on the other hand, has relied on formal teams from the outset in 1997. Sales teams were considered to be the most effective way of organizing work; all company operations are divided into teams. The model was no doubt adopted following the example set by the competition. In this case the team organization has clearly proven its worth: the firm started with just one team of no more than 12 persons, today it has grown into a major actor in its field. From a work process perspective, the telemarketing firm may be considered a call centre, even though some parts of it also fit into the newly established category of knowledge-intensive business services (KIBS). By definition, 'KIBS in general are problem-solvers, and they help their clients navigate complex systems' (Miles 2002, 14). In this respect, the most knowledge-intensive part of the telemarketing firm is its main product, Internet-based business-to-business information service, which is highly focused and dependent on the innovative use of various databases as well as a network of strategic partners.[68]

Yet, as I have described earlier, the actual work process in the telemarketing firm is typical of sales work more generally. With the exception of one administrative team, all other teams are focused on selling and promoting the firm's products on-line and via traditional telephone. However, the workers interviewed do not simply sell a clearly defined product, but they need to have at least a basic level understanding of their customers' businesses to be able to propose a service package that meets individual needs. In this process collaborative knowledge sharing is crucial. A typical sales team consists of a sales manager, ten salespersons and two secretaries. All teams have their own budgets and monthly sales targets that they are expected to reach and ideally exceed. The production manager who was in charge of the administrative team explained the structure as follows:

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[68] To what extent call centre work is knowledge-intensive remains a matter of ongoing controversy. Some researchers (e.g., Mueller *et al*. 1995) regard telephone operators as consultants who meet diverse customer needs on a continuous basis. According to this view, operators engage in collaborative query refinement with customers, exhibiting a rich set of skilled performances. Others (e.g., Taylor *et al*. 2002) share a more critical stance and argue that evidence casts doubt on the optimistic perspective that call centre work resembles knowledge work. According to this pessimistic view, call centre work involves true creativity and problem solving only in exceptional cases. Thereby, the operator's role is characterized as a mere intermediary between customer and database, i.e. their work is guided by strict procedural rules and routines, with little if any room for autonomy. Although the case of the telemarketing firm that I evaluate here supports the former, optimistic view, it must be pointed out that the firm is by no means a typical call centre, but it clearly represents a better than average working environment. The telemarketing firm has earned public reputation for its human-centred management.

'If we want to keep our organization moving, teams are an absolute must. We must have small units that are responsible for their results. This is the only way we can retain this family atmosphere in a growing organization. You simply can produce better results with teams.' (Production manager, Telemarketing firm)

Above all, the production manager emphasized the importance of human resource management in maintaining high levels of the productivity. Clearly believing in his company, the manager took the view that respect for individual opinions and personalities is the foundation of efficient team performance:

'Our aim is that the company's objectives also become personal goals. In order to achieve this it must be understood that the personnel is the most precious resource we have. Our quest in teamwork is that people are allowed to express their personalities and opinions.' (Production manager, Telemarketing firm)

In this case it seems that teams serve as instruments of effective internal competition, although the employer's policies can certainly not be described as exploitative in any strong sense of the word. As I briefly commented in the previous chapter, competition between teams is fierce and the wages earned are partly dependent on individual team members' results as well as the results of the whole company. Therefore, the team organization in the telemarketing firm clearly is a tool of organizational efficiency. It is particularly interesting to note that the production manager quoted above stressed the importance of a family atmosphere, yet at the same time he did not see any contradiction *vis-à-vis* the competition in and between the teams.

How can this paradox be explained? In the telemarketing firm the majority of employees are very young. The company has recruited people straight from college, so for many this is their first permanent job. They take the work organization and its objectives almost for granted. They work as part of a bigger scheme of profit-making and rely on getting help from other team members. All teams have adopted the idea of competing with one another on friendly terms. From management's point of view, all this is easier to achieve with a young and relatively inexperienced staff. However, the universal problem here is that organizations relying on young and enthusiastic employees need to secure a high labour turnover rate without compromising either the continuity or quality of services produced. Obviously, the more knowledge-intensive the organization is, the more difficult it is to strike a balance between tradition and renewal.

The wood-processing factory and the accounting office fall in the middle ground between the above extremes, i.e. the culture of engineers and young sales executives. In

the wood-processing factory and the accounting office no official teams were appointed, yet the work required a measure of collaboration. In these organizations, too, the interviewees stressed the benefits of close interpersonal interaction, although the work process also requires a high level individuality. In the wood-processing factory the job of the workers interviewed was highly mobile in nature. As I explained in Chapter Four, my informants in this case organization were responsible for purchasing timber and negotiating the terms of sales with individual forest owners. The need for collaboration was manifested in regular 'team' meetings, in which information on customers and market changes were exchanged, as well as in relying on mobile communications equipment. In the accounting office, on the other hand, teams were not needed at all, but work was carried out in pairs or small groups.

> '*Our work is individual, no doubt about it. However, we do share the same problems, so we are used to negotiating problems on the phone. To some extent the job is team-based, although we don't have any official teams.*' (Purchase manager, Wood-processing factory)

> '*We have formed work pairs to overcome problems related to absences from work such as sick leaves or holidays. ... This also allows us to share responsibilities and lighten the burden of individual workers.*' (Manager, Accounting office)

Teams between Tradition and Renewal

What about the IT-consultancy and the telecom operator, then? Interestingly, these cases, conducted in the wake of the interviews discussed above, revealed some all too common problems inherent not only in the IT business, which is notorious for fast-paced project work, but also in the economy at large. Within a relatively short time span, along with the ongoing globalization of the Finnish economy, IT business has become a major branch of the economy in the country, the competition between industry rivals has intensified considerably and, as is well known, companies in this field have been plagued by a great deal of financial speculation.

The manager responsible for the IT-consultancy's occupational health and safety standards said it best when he went on to criticise the development of his trade during the past three decades:

> '*In general terms, the pace of work has become more and more hectic due to increased competition. ... We are living in a quarterly economy in which the pre-*

mium has shifted from functional products to short-term profits. ... Of course, this is not to say that quality has no meaning whatsoever, but it has become subordinated to the economy. Instead of following this path, we should concentrate on doing our jobs as well as possible and then, sooner or later, a good return should follow.' (Union representative, IT-consultancy)

The manager interviewed has observed the development of his trade since 1977, when he began to work for the IT-consultancy as a young university graduate. Back then the consultancy, founded already in the 1960s, was a small player in its field, providing services mainly for the banking sector. The company's growth was rather moderate until the 1990s, when it experienced a number of acquisitions, mergers and strategic alliances. Although the consultancy was growing fast along with the economic boom that followed the recession, its ownership had remained primarily Finnish. However, in the late 1990s, a decisive break took place and the consultancy merged with one of its foreign competitors. As a consequence, a strong concentration of expertise specializing in various IT services was created. By the turn of the millennium, the company had established itself as a major European force attracting foreign investors and had gained an international reputation as one of the most innovative and fastest growing IT service providers operating across the continent.

The telecom operator had also seen rapid growth during the 1990s. The company internationalized, its market value skyrocketed, and like many other success stories of the new economy, it ran into a deep financial crisis at the turn of the millennium. Consequently, the telecom operator had to wind down its plans to continue internationalization and concentrate on developing its domestic activities. The company also had to resort to difficult and protracted employer/employee negotiations in order to reduce the headcount of the organization. According to the rhetoric of official press releases, permanent changes in the competitive environment forced the company to streamline its activities. Although by the time of the interviews, the telecom operator was back on the growth track again, the interviewees were careful not to comment on the tumultuous past of their employer, perhaps for fear of getting in trouble. It should be noted, however, that the work situation of my informants in this as well as in other case organizations under scrutiny here seemed quite stable.

Nevertheless, the IT-consultancy as well as the telecom operator had seen both sides of the dotcom bubble. Before the bubble burst, IT business suffered from a chronic undersupply of competent labour. According to some of my informants, this led to overly tight project schedules, which turned out to be detrimental to quality (Pyöriä

2002b). Today, after the bursting of the dotcom bubble, the availability of expert labour is no longer an issue for the IT business at large but profitability is. Again, a blunt commentator could say that it is the quality of the work and the well-being of individual workers that suffers. Interestingly, the IT-consultancy's union representative seemed to have no qualms about revealing these problems. As he contended in the quotation above, we are indeed living in a quarterly economy in which short-term profit-making, measured four times a year in interim reports, seems to be far more important than quality products, customer service or long-term business goals.

Yet I would argue that there are signs of change in the air, at least as far as the Finnish ICT sector is concerned (*cf.* Julkunen *et al.* 2004). Although there is very little we can do about globalizing competition or the ever-volatile stock markets, why should IT business be any different from other forms of economic activity? The problems reflected in the above quotation are hardly restricted to any single branch of the economy; rather they are complications that encumber all kinds of business organizations and their employees. However, IT business still has many growing pains, because we are talking about a young and evolving branch of the economy here. As the ICT sector matures, it is likely to become an ordinary customer-oriented business (Pyöriä 2002b).

In addition to operating in a volatile environment, the IT-consultancy and the telecom operator had problems with their division of labour, although both organizations had managed to meet their business objectives relatively well. This was a result of their dispersed organizational structure. Whereas the engineers in the manufacturing enterprise as well as in the construction planning office had a culture of close physical collaboration, the IT consultants and the telecom specialists were geographically distributed across several cities due to their customers' needs and the availability of skilled labour. In the IT-consultancy the unit studied had offices in three major cities and the telecom operator's voice switching team had employees in half a dozen locations. Both organizations had about 20 employees.

In this respect, the interviews revealed that in both cases the distributed organizational structure was more or less a necessity imposed by the environment. In the IT-consultancy the unit concerned was newly founded and it had not yet matured into a coherent whole. The company headquarters had amalgamated two small teams into a single unit, with a view to cutting costs and creating a larger pool of expertise. The rationale behind this organizational alignment lay in the fragmented nature of the Finnish ICT sector. As one of the interviewees put it, no single person or even a small team can possibly possess enough expertise to meet all the demands modern ICTs impose. Therefore,

expertise must be concentrated into relatively large units and competent labour pooled from various locations.

Despite obvious advantages, the geographically dispersed organizational structure had its costs: the IT consultants considered their community spirit rather weak, as the following quotes illustrate:

> Could you describe your unit as a community? What kind of a community spirit do you have?

> *'Our community is like closed doors on the corridor. We are doing the best we can to change that, but ... it is difficult.'* (Team leader, IT-consultancy)

> *'Because our unit has been together for a very short time, we have yet to develop a team spirit. Moreover, because we haven't had opportunities to see each other much this doesn't feel like teamwork. ... Clearly our unit is fragmented.'* (Project manager, IT-consultancy)

> *'I don't feel any strong attachment to my company's community. I rather feel that I belong to the community of my customers. We have a lot of workers who work in their customers' premises for extended periods of time.'* (System specialist, IT-consultancy)

In the telecom operator, in contrast, the history of the voice switching team dates back to the mid-1990s, but the distributed nature of their work goes back several decades. In this case the burden of tradition was the problem. Rapid technological change had made the dispersed organizational structure virtually obsolete, yet it was considered an adequate way to work. In the past when telecommunications technology was analogue, maintenance personnel had to be physically close to their customers and telephone exchanges. As one of the interviewees explained, local knowledge was of paramount importance and local presence absolutely mandatory:

> *'Our job used to be utterly local. There was no possibility for remote maintenance whatsoever. Manning was required in every region.'* (Switch system specialist 3, Telecom operator)

Today, however, when virtually everything is digitalized, remote fault diagnostics and maintenance is the rule. After the maintenance personnel receives an alarm concerning a fault situation, they first localize the bug, measure the seriousness of the problem, and only then make the decision whether or not on-the-spot action is called for. The major-

ity of problems can be solved remotely, but when physical damage to the network occurs, local action is required.

> '*Back in the 1980s the nature of our work changed completely when the first digital telephone exchanges were implemented. ... Our job transformed from concrete repair work to computer work.*' (Switch system specialist 1, Telecom operator)

> '*In the olden days when a customer reported a bug, repairpersons hit the road immediately. Today we can do the required measurements from here [the office] and only when the defect has been diagnosed and only if it cannot be repaired over distance, a repairperson is sent on the spot.*' (Switch system specialist 2, Telecom operator)

For the reasons outlined above, in both organizations under scrutiny here the nature of the work was highly individual, although continuous interaction via e-mail and telephone was the norm (the telecom specialists also used Internet conferencing quite often). Nevertheless, it is clear that in these cases teamworking was much less intensive than in other cases, the manufacturing enterprise in particular. Somewhat paradoxically, however, all interviewees in the IT-consultancy and the telecom operator stressed the benefits of collaboration either explicitly or implicitly, but obviously the geographical distribution of work hindered genuine teamwork. Most of my informants wished they could have more frequent meetings and informal get-togethers. For example, one of the IT consultants pondered the pros and cons of her organization as follows:

> '*From the point of view of customers, our organizational structure is good. The health care sector is a case in point. Because information systems in this sector are scattered across the country, it is one of our strengths that we also have many satellite offices. However, from the point of view of concrete work [processes], this is challenging. ... Transferring experience and tacit knowledge is compromised because we are dependent on e-mail.*' (Project manager 1, IT-consultancy)

In a similar vein, the leader of the voice switching team acknowledged the fact that the interests of his organization are not always congruent with those of individual employees:

> '*Although our organization's geographical distribution has no adverse functional effects, it would certainly be good to have more face-to-face interaction. Daily physical presence and coffee room conversations remain absent from virtual*

teamworking. It would be easier to discuss and solve problems face-to-face instead of relying on the telephone, for example.' (Team leader, Telecom operator)

The Division of Labour in Distributed Organizations

In the IT-consultancy and the telecom company, the absence of continuous face-to-face interaction resulted in a less than optimally balanced division of labour. The problem was inadequate mutual adjustment: in the interviews collaboration between individuals and projects was deemed insufficient. In the IT-consultancy, the team leader himself confessed that, due to his organization's dispersed character, personnel resources were recurrently 'overbooked'. In project-based consultation work overbooking working hours is a common and acceptable practice because a certain amount of projects fail to be carried out, but in the case of the IT-consultants, there was a clear mismatch between the resources sold and the resources available. According to the team leader interviewed, it is not uncommon for an individual's work contribution to be overbooked three times worth his or her normal working hours. The interviews of his subordinates confirmed this:

> '*When we have a lot of bids pouring in, the same persons are sold over and over again, because it is impossible to tell which bid is going to progress [to a real project]. … The allocation of resources is a recurrent problem. The most skilled persons are in demand for every project, while the skills of the less experienced often remain under-utilized.*' (Project manager 1, IT-consultancy)

> '*We have not been successful in dividing the workload evenly between the workers. The problem is to find motivating work for all employees and to rotate tasks equally. … I have also heard through the grapevine that especially in new projects there have been some serious problems concerning deadlines and the allocation of financial resources.*' (Project manager 2, IT-consultancy)

As a consequence, the IT consultants considered their work hectic. In the interviews it was, for example, said that it is especially difficult to coordinate various timelines and meet the deadlines, because most employees work in several projects at once. In contrast, the R&D engineers I interviewed at the manufacturing enterprise maintained that being involved in several projects simultaneously is an asset for them, not a problem. How can this be explained? To answer the question, it is worth recapitulating here the main differences between the work cultures of these two organizations. First, whereas

the R&D staff had matured into a genuine team over the course of the past decade, the IT consultants belonged to a newly founded unit. Second, workers at the manufacturing enterprise had the advantage of sharing the same physical facilities, while the IT consultants were geographically distributed.

Of course, there is no denying that the nature of demanding R&D work is by necessity more relaxed than working in straightforward customer projects. At the manufacturing enterprise's R&D department, projects were long, up to two years typically, and the results of individual projects were often unpredictable. End products, however, had to be highly reliable, as I described in greater detail in Chapter Four, and therefore project deadlines could not be set in stone. The IT consultants, in contrast, were not in the business of developing new and untried technologies. Their job was to design and maintain computer systems and databases using already existing tools and technologies. Moreover, typical projects lasted usually no longer than three to six months.

However, the nature of the work in the manufacturing enterprise and IT-consultancy was similar enough to raise the suspicion that in the former case a stronger organizational culture and community spirit explains why the R&D staff's perceived job satisfaction was so good. Clearly this had undisputable advantages for their organization as a whole. Once again, the lesson to be learned is simple: on the basis of my observations, I cannot but stress the importance of close interpersonal collaboration especially in the context of knowledge-intensive organizations.

Also in the telecom operator, the distributed nature of the work caused problems, although the management was content with the overall team performance. My informants nevertheless complained that the burden of their work is divided unevenly among individual employees. The problem stemmed from the computer system in use in the organization, on the one hand, and from inadequate mutual adjustment, on the other. Most importantly, the members of the voice switching team are almost completely controlled by a fault register, in which customers' complaints are filed. The system also compiles statistics on the work process of individual workers, for example the duration of a given task. From a work process perspective, this kind of a control mechanism is deceptively simple and effective: when an alarm signalling a new fault starts flashing on the screen, whoever is available at the moment may choose to pick up the task. For the lack of a better term, the system could perhaps best be described as a digital assembly line.

However, as my informants revealed, there are numerous latent interfering factors, which make the system less than perfect in coordinating work. First, the nature of

the problems that the voice switching team encounters varies on a daily basis. As a natural consequence, more experienced workers usually are burdened with difficult tasks, whereas younger employees may feel afraid to take responsibility for anything but routine problems. Especially in the absence of a senior colleague available within a walking distance, a less experienced worker may feel compelled to disregard a difficult task in the hope that someone else will deal with it. In the interviews it was also pointed out that, due to personal or psychological reasons, some people are reluctant to ask for help and for this reason they have a tendency to disregard difficult tasks.

Secondly, the problem of shirking one's duty often rears its head in situations where group pressure is low. In the case of the telecom specialists, peer control, or the lack of it, clearly was a problem. As one of my informants put it:

> '*It is simply not fair if some persons work like mad and others don't care much about their responsibilities. In this job it is easy to shirk one's duty, because we don't see each other. One can remain invisible, so to speak, say that I'm kind of a busy now, I have other things going on*'. (Switch system specialist 3, Telecom operator)

In my interpretation, the telecom specialists had the same problem as the IT consultants: inadequate mutual adjustment. 'Virtual cooperation' was considered to hinder learning, collaborative problem-solving and the development of informal organizational culture. As a consequence, all this added up to a less than optimally balanced workload among individual workers.

To conclude this section, I should like to add that in an important respect the preceding analysis lends support to my discussion on telework in Chapter Five. It is difficult to find justification for the idea that time and space lose their relevance in an information society, however fashionable it would be to argue otherwise. In the IT-consultancy and the telecom company the availability of the latest technology was not an obstacle to communicating over a distance. The interviewees simply thought that no electronic medium could replace face-to-face interaction.

To my surprise, telework was virtually nonexistent among the IT consultants and telecom specialists interviewed. Given the autonomous nature of their work and the distributed character of their organizations, I suspected that working from home at least from time to time would have been 'natural' to my informants. Again, I found little evidence to feel optimistic about the future of telework: the interviewees were content with daily commuting and the flexibility of their working time, which allowed them to clock

in and out of the office rather freely as long as the required monthly working time was met.

Among the six IT consultants interviewed, only one had a formal telework contract. The software designer concerned said that she had first been teleworking from home, but later on a newspaper article had inspired her to move to a local telecottage (one of the few telecottages in Finland that have proved attractive). Although it was she who had presented the initiative to her employer, the management was cooperative: she was given a laptop and permission to start working from a place called the 'media point', a collective of several organizations and a few dozen individuals. According to her estimate, teleworking currently comprises about 40 per cent of her working time, while the rest is divided among customers, team meetings and various educational courses provided by her employer. She also contended that no other person in her unit is engaged in 'real' telework, with the exception of a couple of her colleagues who reportedly take work home occasionally.

The case of the voice switching team was even more surprising. Although the telecom specialists' work was largely independent of spatial boundaries, the mother company's top management was reluctant to allow telework. This is very odd for an enterprise that, along with its competitors, endorses services for mobile and home-based teleworking. The interviews revealed that there were many issues at stake, ranging from data security to occupational health and safety, but above all else unfounded fears and old-fashioned managerial thinking explained why the attitude towards teleworking was negative. According to my informants, the leader of the voice switching team had informally approved of occasional teleworking, but it was the company headquarters that was conservative. In the interviews the telecom specialists were asked the following questions:

> Do you have the possibility to work from home? Do you have a formal telework contract?
>
> 'Well, I have talked about this with my bosses. They have said that if you telework just one day and notify us in advance, it's ok. However, teleworking on a regular basis is out of the question, because the company headquarters doesn't allow that.'
> (Switch system specialist 3, Telecom operator)

This answer, of course, led me to inquire why the attitude towards teleworking is so negative. Interestingly, after considering such issues as teleworkers' occupational health and safety, the employee quoted above arrived at the conclusion that the management's

reluctance to allow teleworking stems from its fear of losing authority. He suspected that the top management might fear that telework could suddenly gain popularity (in an uncontrollable manner) if one person is allowed to work from home. Consequently, this could render traditional hierarchical supervision obsolete.[69] Clearly this was a sign of mistrust, which had a detrimental effect on workers' organizational commitment, a theme I address in the following section.

Motivating Knowledge Workers

As I argued in Chapter Two, competition for the expertise of top knowledge workers is now global. At an organizational level, the loss of just a few key workers may spell disaster, and those few who are the most difficult to replace will take advantage of their position. To put it simply, as more and more of what is valuable resides in the heads of people, organizations should realize that if the people leave, the value leaves as well. Therefore, the question of such motivational factors as monetary rewards, social fringe benefits and on-the-job learning are of utmost importance for any enterprise that is dependent on human talent rather than traditional production factors.

Clearly, without any intention of underplaying the significance of money, motivating knowledge workers is more complex than just rewarding them financially. It goes without saying that the human mind cannot be manipulated like a machine and therefore more discreet management tactics must be deployed. According to A.D. Amar, knowledge workers' motivation stems from three sources:

1. The intrinsic nature of the work: knowledge workers take great pride in being able to deal with challenging work tasks.

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[69] Since the interviews in the telecom operator were completed in June 2003, the company has initiated an organization-wide programme to map the possibilities and potential pitfalls of telework. In October 2004 I was asked to comment on their plan. As one of the consultants involved in the project explained to me in a personal e-mail (3.11.2004), his company is trying to establish a win-win situation in which the employer saves office space and benefits from the improved productivity of individual workers, while employees get the opportunity to enjoy more flexible working hours, reduced commuting-related problems and the comfort of working away from office distractions. However, later on, when we discussed the issue for the last time via e-mail (27.4.2005), he felt less enthusiastic about the possible benefits of the project. In just six months the telecom operator's HR staff had lost their enthusiasm for developing telework into a company-wide practice.

2. The concrete outcome of the job: it is important to provide knowledge workers feedback on the whole work process or whatever employees view as having a positive or negative effect on their work behaviour.

3. Finally, it is import to take into account the whole organizational system, which includes organizational policies, practices and culture as well as the material and economic environment in which the organization operates. (Amar 2004, 100)

The problem of putting all these pieces together surfaced repeatedly during the course of my case studies. Achieving and maintaining organizational commitment is a challenge no organization can afford to ignore. In this respect, the cases of the manufacturing enterprise, the telemarketing firm, the IT-consultancy and the telecom operator are of the most interest here.

The manufacturing enterprise is part of a major global corporation. Although the mother corporation is very modern, indeed high-tech, in many respects it remains faithful to the long traditions of industrial manufacturing. This is true most particularly of its wage and incentive practices. In line with the prevailing practice in its field, the manufacturing enterprise has a system of merit pay, which applies to over two-thirds of Finnish industrial workers today. The corporation has its own job evaluation and wage levelling systems, which are applied at most of its organizational levels. In national and especially international comparisons, the company's wage policy has proved to be quite moderate, however.

The pay system at the manufacturing enterprise is built around a set basic pay (for various pay groups) plus bonuses. Bonuses are paid out to individual workers, teams and departments. Finally, if the whole corporation turns in a good performance, all workers are rewarded. The vast majority of employees at the manufacturing enterprise are unionized, which applies to most other Finnish wage earners as well. Unions sign collective agreements, but at the local level unions have little influence on individual pay. The company's human resource manager stated that in their evaluation, a normal pay rise will keep people satisfied for a couple of months; after that it will all be forgotten. However, plans are currently in place for a new bonus system, namely an instant bonus. This will be paid to workers for excellent performance in a project or for a significant technical or process innovation; the manufacturing enterprise applies for numerous patents each year.

In the late 1990s, pay in the ICT sector was much higher than in other Finnish industries. Young specialists were hired straight from school and given excellent salaries.

In those days, the ICT sector was a far more attractive option than manufacturing enterprises were. The IT-consultancy, for example, was one of the most sought-after employers of the time. Reflecting on the situation at that time, the manufacturing enterprise's human resource manager pointed out that there are many firms that have to pay high salaries because that is all they can offer. On the one hand, the human resource manager admitted that it is important to keep a close eye on the development of monetary rewards in their sector; yet, on the other hand, she also stressed that recruiting and retaining competent workers is not only a matter of good pay; other aspects come into play as well and her firm offers these in contrast to other firms, who can only offer high pay. In her words, it is not only pay that keeps specialists working for the company:

> 'We must find the advantages that a major corporation can offer. We are investing in different kinds of leisure activities, sports and so on. All this is being paid for by the employer. We also have our own health insurance policy, provide child care services and so on.' (Human resource manager, Manufacturing enterprise)

Clearly investing in fringe benefits pays off: labour mobility has not been a major problem for the manufacturing enterprise. The manufacturing enterprise has been particularly active in seeking to create a strong corporate spirit, which largely explains the low level of labour turnover. In addition to the policies mentioned in the quotation above, the company organizes annual spring carnivals, Christmas parties, sports tournaments, and so on. Each department has its own traditions, and teams are active too. As a curiosity, it might be added that the latest hit among teams has been LAN game weekends: once in a while a group of 10–20 persons will gather together, go out to a country cottage, and spend a whole weekend playing computer games over a local area network! And this is no child's play. The average age of the personnel in the R&D department is well over forty!

The age of the company's personnel could in fact pose a problem in the future: there have been some difficulties in recruiting young newly graduated employees. Although motivating and retaining competent staff is important, for example through a fair pay system and through conscious attempts to cultivate community spirit, so too is the recruitment of new labour. In the case of the manufacturing enterprise, there are specialized professional labour markets for the recruitment of the labour power the company needs. Most of the company's employees are engineers, although the company also needs expertise from many other fields. For example, one of the R&D specialists interviewed was educated as an industrial designer. According to him, designing electronic

interfaces is a combination of aesthetics, usability and technical know-how. Nevertheless, a university-level education is required for the employees the manufacturing enterprise hires, with an emphasis on engineering degrees. Therefore, the main sites for the recruitment of new employees are technical universities, with students working on their diploma theses representing the primary targets. The principal competitors are companies within the ICT sector.

The main problem that the manufacturing enterprise has in recruitment is presented by its low wages: it is not easy to attract young employees with the wages on offer. A project manager who spoke at recruitment meetings said that the salary for newcomers or trainees is simply too low to be competitive. The company also has a somewhat outdated image that further complicates the task of recruitment. It was a well-known joke in the company that Nokia attracted all the best young engineers straight from university. Hence Nokia's slogan 'Nokia – Connecting People' was at the manufacturing enterprise reworded as 'Nokia – Collecting People'. The project manager interviewed told a compelling story, which illustrates the point:

> *'Recently there was one frustrating incident with a graduate student who would have liked to stay with the company after his graduation, but he chose not to because of the pay. Again, the human resource management is the one to blame. The graduate student had already been working for us for a while, I had invested in his training and also made plans about the technology he was supposed to work with. I had even been thinking how these investments would profit the company in the future. Then, everything fell apart because of no more than a fraction of a month's salary. I was quite angry about that for a long time. I even approached the company CEO saying that this is not the way things should be.'* (Project manager, Manufacturing enterprise)

Interestingly, the IT-consultancy's wage system was also quite moderate. The IT consultants had a set basic pay and relatively modest bonuses, which were paid to teams (or units) and distinguished individuals. According to my informants, the bonuses amounted to less than a month's salary. Hardly surprisingly, the interviewees were dissatisfied with the situation, given the fact that some smaller IT firms may reward their employees more generously. Moreover, the interviewees criticised the fact that large enterprises, such as their employer, usually offer lucrative stock options and other similar benefits only to the top executives, while ordinary rank-and-file employees and middle management are left aside:

> '*Many employees feel that they have very limited possibilities to influence their pay. Recently some stock option programme was launched, but the options were distributed only to the highest level of the corporate hierarchy. ... This has no meaning for our daily work here.*' (Team leader, IT-consultancy)

However, the team leader interviewed also realized that money alone is not enough to motivate the knowledge workers under his wings. Although the weakness of an informal organizational culture was a problem for the IT consultants, as we have already seen, the team leader was explicit about its importance. He said that he is doing his very best to foster collaboration in order to keep his staff committed:

> '*It is only natural for people to put money first, but it is a dead end. Last year we had only two team meetings, this year we plan to gather together on a monthly basis. We are trying to establish a feeling of togetherness. ... Then, we have both formal and informal clubs and other sorts of recreational activities.*' (Team leader, IT-consultancy)

Without a doubt, something other than monetary rewards keeps the R&D specialist as well as the IT consultants motivated. As I have remarked earlier, none of the organizations studied could be described as dysfunctional. How then can we explain the perceived job satisfaction of my informants?

The explanation is simple. Especially in knowledge-intensive organizations, the possibility of continuous on-the-job learning is crucial for organizational commitment. The tasks in R&D at the manufacturing enterprise require highly specialized professional skills. After the adoption of the project organization, the division of labour became less predetermined and jobs were quite closely defined following the needs of individual customer assignments. This, among other things, has led to a growing need for further education, mainly in-firm training. Other pressures acting in the same direction have included the steady growth of international operations as well as changes in product markets, underlining the importance of language skills and further knowledge of foreign cultures.

The planning of in-house training is based in part on discussions between supervisors and workers, which had become more important in the wake of recent organizational changes. Although no one denied the importance of training, the employees, however, did not always agree on the need for these discussions, which gave the basic orientation for the need for further education. On the other hand, the project manager interviewed emphasized the importance of knowing all his employees well and he saw no

other way to achieve this knowledge except through continuous development discussions. Workers probably experienced these discussions, at least in part, as attempts to control their behaviour by placing additional demands on them.

The company organizes and pays for its employees' courses and other forms of further training, which are attended during working hours. The employees were pleased with the opportunities they had for further training and indeed made good use of them. Supervisors also had educational tasks in the in-firm training. For example, the project manager who criticised his employer's conservative wage policy provided training for his employees. He also mentioned that he has provided training for his subcontractors. He himself had received further training at Finland's leading private institute of leadership. New social skills and cultures and ways of communicating in different countries were mentioned as examples of the new areas covered in training.

The company's human resource manager also indicated that employees were highly motivated to improve their skills and qualifications. As a rule, the training programmes were specially tailored to the employees' needs, except for basics such as product education. The main problem with regard to organizing in-firm training was finding the necessary time, given the increased time pressures and the element of unpredictability common to all projects. This made advance planning virtually impossible.

Also in the case of the IT-consultancy, challenging tasks and the possibility to develop professional competencies explain why my informants were satisfied with their jobs, in spite of the problems described above. For example, the team leader said explicitly that the opportunity to engage in continuous on-the-job learning is the main reason he applied for his current job in the first place (earlier he had worked in a considerably smaller consulting firm, which could not provide as extensive educational opportunities as his current employer).

In the IT-consultancy, education and career advancement are closely tied together. The consultancy promotes intra-organizational career movement by investing in an educational system that encourages individuals to prepare and follow an annual learning plan. Like the manufacturing enterprise, the IT-consultancy has a specific 'corporate academy', which organizes extensive and systematic education. The academy itself does not provide actual teaching to any significant extent, but it maps employees' educational needs and purchases appropriate services from outside consultants. The academy also compiles and distributes educational material on the corporate intranet.

However, employees in the IT-consultancy (as well in the manufacturing enterprise) were quite critical of the potential for e-learning. My informants implied that

even good educational material tends to remain less than optimally used if it is merely available electronically. In itself there is, of course, nothing wrong with e-learning, but the point is that ICTs cannot substitute for traditional teaching methods. One of my informants even went on to say that having a traditional library at his disposal would be of great benefit. Somewhat paradoxically, even in the field of computer systems, a substantial body of professional literature is available only in print.

Recruitment at the IT-consultancy was not markedly different from that of the manufacturing enterprise. The IT-consultancy recruited new employees straight from universities, but also from competitors. Unlike the manufacturing enterprise, the IT-consultancy had no problems with its image, despite the fact that it had (and at this writing still has) the same problem as most other IT firms: profitability and mounting pressures to cut back on labour costs.

In contrast to the above examples, the pay system at the telemarketing firm is highly individual. It is based on two indicators: experience and sales. All salespersons have a basic salary. However, there is also a generous personal provision that is dependent on how much an employee has sold during the past month and a joint company bonus, which is based on the combined sales of all teams. In this respect the system comes close to traditional piece-based systems going back to the times of F.W. Taylor. Clearly the personal provision is the main means to motivate individual workers, as the following quote illustrates:

> '*Our pay system, which is based on an individual provision, is an important motivating factor. The more you sell, the more money you make. Another important factor is the tenure of work history. Your responsibilities as well as rewards increase as you grow older with the company. ... The fact is that the demands placed on individual workers are high but, on the other hand, rewards are on a par with all that hard work.*' (Sales negotiator, Telemarketing firm)

At the telemarketing firm, the incentives are based on an ideal career path. New employees start out as junior salespersons. After a certain period of time and after having achieved the required sales targets, employees may be promoted to the position of senior salesperson. In this position, employees are entitled to extension studies at a private marketing institute. The next step is to become a sales manager (i.e., sales team leader). All promotions are based on experience in the company and sales results. Interestingly, union membership among employees at the telemarketing firm is low. This is explained by their young age; most employees are in their twenties or early thirties. However, the

situation has probably changed since the interviews were completed at the beginning of 2001. As a consequence of the crisis of the 'new economy', unionization has become a more attractive option. Until recently, one could say that the 'new economy' was the only non-unionized sector in Finland.

At the telecom operator, to my surprise, pay incentives were very modest, virtually nonexistent. The company is a good example of a straightforward bureaucratic pay system (at least as far as ordinary rank-and-file employees such as my informants are concerned). In the unit concerned, all employees in the same organizational position get the same pay regardless of individual differences in productivity. Although a company-wide bonus system was applied as well as an optional team bonus, these had proved to be insignificant. The interviewees were not dissatisfied with their basic salary *per se*, but the homogeneity of the pay system and the absence of any meaningful fringe benefits were considered frustrating. One of my most outspoken informants was clearly sarcastic when he was asked about monetary rewards:

> '*Our team was rewarded for its good performance last year. The reward was some 40 euros. It makes me wonder, how should I spend the money? Oh well, we got a free T-shirt, too.*' (Switch system specialist 4, Telecom operator)

The above quotation pretty much says it all. Even in the ICT sector, which is often considered to be the most dynamic branch of the Finnish economy, all organizations are not created equal.

Vanishing Authority?

As a final note, in one interesting respect the IT-consultancy differed from all other cases included in my study. All interviewees in the consultancy clearly hesitated for a moment when they were asked what their *formal* title or occupational position was, not because they had any concrete reason not to disclose this information, but because the nature of their tasks was arguably more independent and autonomous than knowledge work in general, almost completely free from a hierarchic division of labour. The following quotes illustrate the point:

What is your formal position in your organization, what is your title?

'That's a good question! In simple terms I am called a team leader. … Yet I don't have any exact title, I don't even have a business card!' (Team leader, IT-consultancy)

'As a matter of fact, I don't know what my formal title is. I guess that in most occasions I introduce myself as a project manager, but this is not set in stone. It depends: a consultant or project manager.' (Project manager 2, IT-consultancy)

Although the IT consultants were dependent on collaboration, the teams in which they worked were self-managing with very little hierarchical decision-making. The interviewees simply did not think of themselves as belonging to a certain level in their respective organization and thus the interviewer's question came as a surprise.

The same thing is happening in many other workplaces, where new information technology is shaping organizational structures (Kivimäki 2004, 182). Due to the increasingly abstract nature of work, hierarchical relationships are in a process of change. Perhaps the deceptively trivial quotations above reveal the double-edged nature of teamworking that I have dealt with in my analysis. At best, knowledge work in teams is democratic and free of the coercive management tactics of Taylorism, as I described in greater detail in Chapter Four. However, problems may arise when authority is called for, and at some point it surely is required in every type of organization. Even the most democratic organizations need leadership, someone who takes responsibility when priorities must be set without the presence of mutual agreement.

To repeat my thesis from Chapter Four, organizing is about ruling out alternative possibilities for action, not the other way around. Vanishing authority is the downside of the current vogue for teamwork. Teamwork's strength lies in its flexibility, but at the same time sole reliance on mutual adjustment may ignore responsibility, if authority remains completely absent. For example, the project manager quoted above said that employees in his position do not have much *de facto* authority; their power is limited to writing a project plan and determining the division of labour. After the launch of the project they have very little influence over the work process of their subordinates or the resources at their disposal:

'If you want to allocate more people, money or other resources to your project, all decisions must be accepted by higher executives. Arguably, a project manager is merely a watchdog, who barks if his team doesn't meet its goals in a given time

span. ... Unfortunately, the most important job of a project manager is to write a good project plan.' (Project manager 2, IT-consultancy)

The problem is, so to speak, that a manager responsible for highly individual knowledge workers can bark but not bite, if the work does not progress. The project manager interviewed suggested that his organization should develop more efficient means to supervise the work process. However, he did not imply that management should resort to coercive tactics, but rather managers should let their presence be seen and heard in informal daily activities. '*We should rely less on formal project plans and more on informal cooperation and casual meetings organized on a regular basis* ', he concluded, with the implication that during the course of a project the division of labour should be negotiated over and over again in order to avoid an uneven distribution of the workload.

Indeed, Richard Sennett – one of the most vociferous critics of 'flexible capitalism' – is right in arguing that in the worst-case scenario teamwork may prove counterproductive if it is used merely to conceal responsibility. Clearly this was not the case with the IT-consultancy no more than with any other case organization depicted in this study. Nevertheless, Sennett's critique is spot-on:

> 'People still play games of power in teams, but the emphasis on soft skills of communication, facilitation, and mediation changes radically one aspect of power: authority disappears, authority of the sort which self-confidently proclaims, "This is the right way!" or "Obey me, because I know what I'm talking about!" The person with power does not justify command; the powerful only "facilitate," enable others. Such power without authority disorients employees, they still feel driven to justify themselves, but now there is no one higher up who responds. Calvin's God has fled.' (Sennett 1998, 109)

Sennett's attack is directed against mainstream management gurus for failing to give due consideration to the costs and disadvantages that teamwork and indeed any organizational structure imposes. Especially as the group size increases, the problem of coordinating communication arises: it becomes more and more difficult to distribute responsibility equally; people may be afraid of expressing opinions in front of their subordinates or seniors; and the team may always divide into informal subgroups. Even such traditional social divisions as gender often inhibit democratic participation at team meetings.

However, regardless of the importance of recognizing these problems, in his criticism Sennett goes to the extreme and fails to acknowledge the positive side of teams.

One could even interpret his account as a nostalgic yearning for traditional Tayloristic bureaucracy. In contrast, the aim of my analysis here has not been intended either to celebrate or refute ongoing organizational changes. Rather, I have tried to take into account both the pros and cons of team-based knowledge work for the simple reason that all organizational configurations have advantages and disadvantages. The practical implication to be drawn from my analysis is also simple and hardly surprising: if a consultant touts his or her ideas as the answer to all problems inherent in your organization, show the consultant the door and kindly ask for your money back!

Table 6.2. Organizational Characteristics of the Case Organizations.

	Manufacturing enterprise/ Construction planning office/ IT-consultancy	*Telemarketing firm*	*Wood-processing factory/ Accounting office*	*Telecom operator*
Teams	Teams as an integral part of the labour process	Teams as a form of competition	No official teams	Group work with incidental co-operation
Pay system	Set basic pay plus bonus	Piece work	Set basic pay plus bonus	Rigid monthly salaries with insignificant bonus
Recruitment	Professional-technical labour markets	Semi-professionals straight from school	Professional-technical labour markets	Professional-technical labour markets
Control	High autonomy with result control	Technical/material incentives	High autonomy with result control	'Digital assembly line' with high result control
Commitment	Team-mediated identification to the organization	Miracle made with money	Family atmosphere of a small organization	Controversial: professional conscientiousness keeps the organization functional
Culture	Communities of practice, mixture of autonomy and control	New business based on monetary incentives	Mature business, cautious policy of organizational reforms	Flexible bureaucracy

Table 6.2 summarizes the organizational characteristics of the case organizations I have analysed above. It highlights the main similarities and differences between my cases.

Chapter 7

Lessons from Finland

To conclude my analysis, I am now ready to draw together the threads of my argument. In addition to summarizing the main findings of my research, I present my tentative lessons from the Finnish experience as well as highlight the main challenges the country will face in the coming decade.

A Plea for Realism

Our society today, early on in the new millennium, is characterized by constant and accelerating change, epitomized by the rapid development of ICTs and the continuing globalization of the economy. Whether we like it or not, these currents are reflected in our everyday life, the work we do, as well as in our role as citizens. The world of work has seen not only the growth of atypical employment and stress through increasing demands to meet the challenge of global competitiveness, but also the unparalleled accumulation of wealth for those regions, organizations and individuals who have successfully adopted the principles of the emerging high-skills economy on which the future of our epoch rests. Unfortunately, these developments seem to spell a growing trend of inequality and polarization between the 'haves' and 'have-nots' of the information age (Pyöriä 2003a).

Of course, it is by now almost a cliché to conclude an academic study by making the casual observation that the world around us is in a constant state of flux.[70] Especially the rhetoric of a global information society seems so widespread today that it risks becoming a platitude. Lay people but also highly influential academics, politicians and corporate leaders in prestigious positions have a tendency to emphasize change rather than continuity with the past. This is quite understandable. Who wouldn't want to be the first to anticipate an epochal change and enjoy the kudos of being a prophet? It seems that every generation shares a somewhat naïve belief that they are precisely the ones who are standing at a crossroads on the time-line of societal development, living on the edge of the old and the new. Indeed, as British sociologists Kevin Robins and Frank Webster (1999) have pointed out, 'it is a common conceit to imagine that one's own times are of unprecedented historical importance' (p. 63).[71] In this respect my generation is hardly any different from the previous ones, no more than I can claim my analysis to be thoroughly unbiased.

However, from the point of view of sociology and other related sciences of man, we need to bear in mind that the *raison d'être* of practically this whole scholarly pursuit of ours is centred around the methods of observing, describing and making sense of social change. Although methodological disputes of this order of magnitude are beyond the scope of the present volume, there is no escape from the recognition that the social sciences were born out of, and still gain their analytical momentum from, explaining and understanding the evolution of modern societies. Suffice it to say here that on the most general level, the object of social scientific inquiry is social action, which presupposes social change; the presumption of constant flux is thus more or less inscribed on most of the work that is undertaken by scientists in these contested fields of academic inquiry.

Nevertheless, it is good to keep in mind the critique by Robins and Webster as we evaluate the latest fads and fashions in the social sciences. It is all too easy to fall into the trap of proclaiming the end of an era and the beginning of another in the never-

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[70] Arguably it was Marx who popularized the phrase 'constant flux' in the mid-19th century, referring to the changing class structure of the United States. According to Marx 'classes have not yet become fixed but continually change and interchange their elements in constant flux' (*ref.* Erikson & Goldthorpe 1992, 29).

[71] Even Messrs Robins and Webster, despite their sane and logical analysis, could be criticized for falling into the trap of not practising what they preach. To take just one example, there is a certain irony in the title of their book *Times of the Technoculture: From the Information Society to the Virtual Life* (1999). The title has probably been designed by the publisher to attract buyers, but it is clearly in conflict with the authors' criticism that exaggerating the social changes of one's own times is a common form of conceit.

ending race of labelling social phenomena in seemingly novel ways – hence my plea for realism.

Human Capital Counts

Consider ever-changing managerial currents. Theorists of work organizations and management are particularly notorious for inventing neologism after neologism, encouraged by their close affiliation with business consultants who are ceaselessly seeking new labels under which to sell their services. One is hard put to keep up with the breathtaking pace at which new 'conceptual innovations' – such as knowledge management, just to name one recent example – are being introduced as a panacea to organizational problems.

Yet, there is very little evidence of any profound change in the most basic prerequisites of organizing work and building healthy and productive work environments. What remains stable is human behaviour, as Groth (1999), one of the all too rare voices of reason in the field of organization studies, correctly remarks: 'Our natural abilities and dispositions have hardly changed at all in historic times; our basic social habits and the way we prefer to pattern interpersonal relationships are also remarkably stable'. As a consequence, Groth concludes: 'We therefore have every reason to believe that major parts of existing organizational and psychological theory are valid also in the age of information technology' (p. 5).

Especially in Chapters Four and Five, which deal with knowledge work teams and distributed work arrangements, we saw how the basic laws of interpersonal relationships still remain the foundation of well-designed workplaces. Creating a strong atmosphere of trust and commitment is ultimately the most robust route to maintaining a sustainable competitive edge, rather than betting on the latest managerial quick-fix. My analysis also indicates that information technology bears little direct relevance to knowledge workers' performance, because informational labour is highly dependent on collaborative problem solving requiring face-to-face interaction. However, if used properly, modern information systems can indirectly contribute to creating more space for interpersonal interaction by eliminating routine communication. In this respect, IT simply continues the long trend of the automation and mechanization of work.

Of course, I am well aware that there is nothing revolutionary in these observations. Following in the footsteps of Mayo and his Hawthorne studies, conducted at the turn of the 1920s–1930s, the human relations movement emphasized the benefits of

human-centred management tactics. More recently, some of the best-known management theorists of the 1980s, such as Thomas Peters and Robert Waterman, endorsed the idea that managers should concentrate on cultivating strong organizational cultures (see Peters & Waterman 1982). According to the above views, culture is an organizational variable that can be shaped by proper management behaviour that emphasizes cooperation and group cohesion. My firm contention indeed is that the basic tenet of organizing work in teams is one part of existing organizational theory that truly has stood the test of time and continues to have lasting value. Therefore, my practical suggestion to managers is to pay less attention to the latest technology and more attention to human relations.

Telework, the theme I discuss in Chapter Five, is a case in point. One of the greatest myths about information technology is that it kills distance. With the help of ICTs – the thinking goes – work could easily be distributed across time and space (Angell 2000; Cairncross 1997). Nothing could be further from the truth. As we have seen, in information societies people still commute to work, concentrate in and around urban centres and prefer to make a clear distinction between work and family. The economy itself, despite the ongoing trend of globalization, also continues to depend on territorial boundaries. This is most clearly seen in firms' tendency to form clusters to gain strategic advantages. When similar firms agglomerate, several benefits may occur ranging from knowledge spillovers to the formation of new businesses within the cluster. Even more importantly, as Richard Florida (2005) puts it, clusters attract talent: 'companies cluster in order to draw from concentrations of talented people who power innovation and economic growth' (p. 29). Thus, both from the point of view of organizations and the economy and society at large, human capital counts.

This having been said, there is no denying that the environment in which today's enterprises operate is radically different from the times enterprises lived through just a few decades ago. Without any intention to exaggerate recent economic and labour market changes, one cannot ignore the fact that stiffening global competition is at once threatening to make employment relations more contingent and thereby proper teamwork more difficult than before. If employees are forced to orient themselves towards the external labour market and prepare themselves to shuffle between jobs on short notice, can this spell anything else than the erosion of organizational commitment or, as Sennett (1998) puts it, the corrosion of an individual's character? That is, since the dawn of capitalism work has been a commodity, but now salaried employees are expected to assume the attitude of an entrepreneur, commodify and sell their expertise

wherever it is valued, and thus adapt their behaviour to a market model – this is the message that politicians and mainstream media are conveying to us everywhere. As we saw in Chapter Six, especially in the case of knowledge workers, market pressures seem to act as a central control mechanism over the work process rather than individual freedom – yet, at the same time, knowledge workers are expected to be driven by their intrinsic creativity and indeed artistic passion for their work!

For good reason, the contradictory work situation of the white-collar middle class has stirred much public interest of late.[72] Indeed, wage labourers are becoming more and more conscious of working and living in a world that is fundamentally different from that into which many of them were born. Not only those who are lacking in formal qualifications and credentials, but also highly educated knowledge workers occupying professional and managerial positions, must pay the price of global competition, albeit very differently. An often-heard phrase 'there is no such thing as a secure job' has become an unpleasant threat for a growing part of the working population. Admittedly, the labour market position and future prospects of top-notch knowledge workers are much better than for rank-and-file employees, but this often implies yielding to lifelong learning, flexibility and short-term project work. The key here is people's subjective experience of change. Although there is a significant degree of stability and order in the structure of the labour markets, subjective perceptions of ever-more fragile working life may turn into a self-fulfilling prophecy. If people are indoctrinated into believing that there is nothing but constant flux, why should employers bother to value long-term employment?

On the other hand, as I continue my criticism in Chapter Six, the old problems related to hierarchical work organization and coercive management practices continue to persist in many traditional enterprises (see also Antila & Ylöstalo 2002). In this respect Finland, one of the most innovative producers of ICTs, has hardly made full use of its existing resources, regardless of the high level of know-how in the country. At the same time, as globalizing markets demand more and more effort from companies to maintain their competitive edge, the change has affected different organizations unevenly. Even though the Finnish ICT cluster, evolved around Nokia, is well and truly dynamic, and the emerging fields of biotechnology and life sciences also hold great promise, the development of new flexible ways of working and the efficient use of information

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[72] For example Juha Siltala, whose recent book *The Short History of the Deterioration of Working Life* (2004) opened up a fierce debate in Finland, argues that work in the information society is all but uncertainty and flux. Although Siltala presents his views in a very pointed way, it is hard to deny that individuals are paying a high price of growing competitiveness.

technology has progressed much more slowly in most other branches of the economy, both in the public and private sectors. In many traditional enterprises work is still organized under the ghostly influence of Taylorism and in public administration the realization of such catchwords as 'e-democracy' and 'e-governance' remains on the horizon.[73]

Yet, my educated (and admittedly optimistic) guess is that change towards leaner and more flexible organizational structures is inevitable across all economic activities. Although we are not yet in a position to proclaim the end of bureaucracy, hierarchical organizations of all types are finding it increasingly difficult to justify their existence. Faceless bureaucracy is simply not the most fertile ground for knowledge work, on which the majority of contemporary organizations has grown dependent. Instead, knowledge work requires an environment that supports both autonomous and shared knowledge-creation and learning as well as strengthening the organizational commitment of employees (Kolehmainen 2004, 83). It is my contention that in this regard Finland, though a small and geographically peripheral country, is a case in point. As a conclusion to my analysis, I am now ready to draw together the tentative lessons from Finland as well as highlight the main challenges for the country.

The Information Society and the Welfare State

Like many times before in its history, a social structural change lies ahead for Finland: the same welfare mechanisms that have helped Finland to produce highly educated and adaptive citizens are now in need of reorganization. In the face of increasingly global competition for informational labour and high-performing enterprises, pressures to cut back taxation and thus public spending are building up, perhaps even marking the end of the welfare state as we know it.[74] The paradox here is that to a large extent the success of the Finnish economy can be attributed to strong and universal welfare mechanisms. In the future, however, Finland needs to learn how to do more with less.

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[73] Following the OECD (2003a), the terms 'e-democracy' and 'e-government' can be defined as the use of ICTs, and particularly the Internet, as a means to achieve better government and the deeper engagement of citizens.

[74] For example, in the second meeting of the Tampere Forum, held in Tampere, Finland, on the 19th of August 2003, the Nobel-winning economist James M. Buchanan declared the demise of the welfare state. Some of the most influential Finnish politicians, however, maintained that there is no universal social law that says that global competitiveness and universal welfare mechanisms cannot be combined.

This is probably the most decisive challenge that the Finnish information society must overcome in order to prosper.

On the positive side of the coin, flexibility is one of the inherent strengths that a small state may possess over a larger one. In this respect, the Finnish case points to the importance of a solid educational base for a nation's adaptability to large-scale social changes. Finland urbanized only about 40 years ago, but since then started quickly to specialize in technology-centred industries. At the same time, Finland also began to follow other Nordic countries in their efforts to build a democratic welfare state. Universal elementary education and increasing opportunities to acquire training at vocational schools and especially at universities were essential components of this project, without which today's situation would not be conceivable. Today, with a view to nurturing its ability to update and renew itself, Finland continues to invest heavily in education and R&D while emphasizing extensive and systematic cooperation between publicly funded research institutions and private enterprises. In short, education and continuous innovation and learning are amongst the most highly valued assets in Finnish society. This is the social background that has to be kept in mind when evaluating the success of the Finnish economy.

Finland's recent move towards the forefront of internationally competitive information societies can thus be seen as a continuation of the country's rapid modernization process, which I describe in more detail in Chapter Two. For good reason, this development has attracted much international attention of late, and Finland continues to be heralded as one of the brightest examples of the 'new economy', fighting above its weight in a lot of areas. According to Swedish sociologist Mats Benner (2003), the Scandinavian countries have managed the transition to the 'new economy' well, but Finland clearly stands out in comparison to its neighbours, 'with its concerted effort to move from a raw materials-based growth pattern into knowledge-intensive production, while not deviating from the established welfare and employment policies' (p. 147). In a similar vein, Castells has argued that Finland has simultaneously established itself as the leading information society and, with minor adjustments, has managed to keep the main structures of its welfare state fundamentally unchanged (Castells 2000, 72; Castells & Himanen 2002, 156). The OECD (2004, 1) has also contended that Finland represents one of the few examples of the new economy taking hold in Europe.

More critical analysis, however, shows that while the Finnish information society can be described as unique and perhaps even progressive in character, it is also more vulnerable than it is often made out to be. The foundation of the Finnish economy is

strong, at least in comparison to most other EU members, the technological infrastructure in the country is very modern, and accordingly most occupations and jobs, where feasible, have been computerized. And yet, the positive side of the change has been exaggerated. From the point of view of the society at large, Finland is not a 'high-tech wonderland' where social problems are nonexistent. For example, unemployment remains stubbornly high, foreign investors and skilled professionals are difficult to attract to the country, the current level of state ownership is among the highest in the OECD and the rapid ageing of the population coupled with wage earners' desire to retire early pose serious challenges for the future.

Especially the ageing of the population, which occurs in Finland more rapidly than in any other European country, may become a true acid test for the national economy. In this respect, the year 2005 marked a decisive watershed: for the first time the number of people leaving the labour market exceeded the number of newcomers and, as statistics indicate, this trend will escalate towards the end of the decade. Against this background, OECD's future scenario is especially bleak: if serious measures on the part of the government are not taken, demographic developments, which over past decades have been broadly neutral, could reduce the growth rate of GDP per capita by ¼ of a percentage point per annum over the remainder of this decade, and by almost one percentage point over the next decade. This could imply that in 2010–2020 the average annual GDP growth would amount to no more than one per cent (OECD 2004, 1–2), which hardly suffices to sustain the current level of public spending.

Of course, the above prognosis is merely a simplified scenario, yet it reflects concrete structural rigidities in Finnish society.[75] There are certain weaknesses in the labour market, which pose a serious threat to the future standard of living. Although conducive to social equality, a centrally set wage bargaining system coupled with high taxation and employer contribution rates are among the most often criticized factors hindering an increase in labour market participation and entrepreneurship. However, in order to balance inevitable demographic changes and sustain the welfare state, Finland should boost its employment rate, which at this writing is close to 67 per cent, eight percentage points below the government's official objective.

The two horns of the dilemma can be described in this way: while the availability of expert labour for international high-tech firms needs to be secured, for example by

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[75] For example, the OECD fails to take into account the fact that senior citizens are not only beneficiaries but also consumers. Therefore a significant amount of retirement allowances are being returned to the circulation of the national economy just as efficiently as earned income (Parkkinen 2004).

making immigration a more attractive option, it is of equal importance to retain traditional manufacturing jobs in the country as well as to create new employment opportunities for the less skilled. In the foreseeable future the ICT sector will continue to generate a major proportion of export revenues, but due to ever more efficient production methods and global outsourcing of labour, there are no new jobs in sight in this sector in Finland. Instead, the real demand for labour is on the increase in various in-person services, which must be produced on a local basis (e.g., health care services for the elderly). The formation of new small and medium-sized enterprises is the key here. Because the recession of the early 1990s clearly marked the end of expanding public spending, a premium should be placed on creating incentives to foster entrepreneurship including self-employment. The number of entrepreneurs and enterprises in Finland remains roughly one-third below the EU average, posing a major bias for the national economy.

In addition to the complications above, it is worth acknowledging that no nation can expect to maintain a technological advantage infinitely, a reality that receives surprisingly little attention for example in Castells' analysis. Surely pioneers often reap many strategic advantages, as Castells and Himanen (2002) correctly presume in their book on the Finnish information society, but this is not always the case. Although Castells' idea is simple and appealing, says Dan Steinbock (2004a, 8), it is also false, since all successful first-mover advantages can easily deteriorate into first-mover disadvantages, as evidenced by the failure of WAP (wireless application protocol) in the late 1990s. Thus, even a head start in R&D may prove costly, if followers and imitators learn from pioneers' mistakes and in the process save their scarce resources for marketing and further development of already existing technologies.

Moreover, as I argue in Chapter Two, quoting Eisenstadt (1985), a major problem of a small state is that it may grow too dependent upon one type of international market. In Finland, the collapse of Soviet trade was one of the main causes of the economic disaster of the early 1990s. Today, the sheer size of Nokia is of concern to many critics. Although the company has consistently outperformed its competitors, it remains highly uncertain whether or not Finland can translate this benefit into a sustainable competitive advantage. At the other end of the spectrum, a further problem is the fact that newborn enterprises must enter international competition early on in order to grow. The small size of the domestic market seriously limits the prospects of any growth-oriented business unless enterprises are 'born global'.

Most importantly, however, the future success of the Finnish ICT cluster is not only a question of technological edge. The field of information and communications technologies is currently going through a phase of normalization and in the process it is becoming an ordinary customer-oriented business. In this respect the bursting of the dotcom bubble brought home an important lesson: even in the so-called new economy the 'old laws' of competition apply as fully to the ICT-producing industries as to the rest of the economy. On the one hand, intensifying global rivalry is leading to an increasing number of mergers and acquisitions. On the other hand, stiffening local competition is forcing enterprises to value their customer relationships above other business objectives. To manage the transformation successfully Finland needs marketing skills, social and organizational innovations, and a workforce committed to life-long long learning even more than in the past: 'these are the "technologies" that will count in the twenty-first century' (Dordick & Wang 1993, 27–28). Simply put, an information society cannot live on material values alone – social innovations are also called for.

By now, I should have made my point abundantly clear: the glamorous success stories that have come out of the ICT sector are just a part of the Finnish information society – though admittedly an indispensable segment of the national economy. Nokia, for instance, which became one of the most desired brands in the world during the 1990s, is certainly not the whole story of the Finnish 'ICT miracle'. According to my interpretation, the symbiosis of basic social infrastructure and entrepreneurship has made it possible for a company like Nokia to find its niche and succeed in global markets.

To recapitulate my point from Chapter Two, the expansion and reform of the education system, on the one hand, and the development of distinctive national innovation policy, on the other, with its concerted effort to encourage private-public sector cooperation, are of particular relevance here. Due to the high level of education in the country and the Finnish 'inborn' appreciation of high technology, both in research labs and in real life, Nokia has been able to conduct most of its R&D work on its home turf. As a consequence, local technical universities and their research and teaching capabilities have provided fertile soil for mutual projects without which some of Nokia's main innovations would never have seen the light of day.[76]

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[76] To take just one concrete example, the Communicator, one of Nokia's flagship products, combining a mobile phone with modern office tools such as word processing, e-mail and a Web browser, was developed in close collaboration with the Tampere University of Technology (see Steinbock 2001, 242–243; 2003, 366–367). The Tampere University of Technology has also played an important part in basic research leading to the revolution of mobile communications.

The Public Sector in Need of a Reform

One of the most important lessons to be learned from Finland is that the welfare state is the antithesis neither of knowledge-intensity nor of a functional market economy. Although considerably less flexible and more bureaucratic than the business realm, the public sector in Finland is actively involved in the development of the information society, including its own administrative structures, the cooperation between universities and private enterprises representing just the tip of the iceberg.

According to some commentators, Finland is among the few countries that have made outstanding efforts to put government information on-line and create a more open governmental structure (Ducatel *et al*. 2000, 8). Finland's reputation for pioneering public on-line services has also brought officials from around the world to learn from its experiences (OECD 2003b, 1). Indeed, as I remark in Chapter Three, knowledge work and technological know-how are scattered among all branches of the Finnish economy. One may even go so far as to argue that the hardest and most stable core of the Finnish information society lies in teaching, in research as well as in various jobs in the public sector, which employs roughly every second knowledge worker in the country (Blom *et al*. 2001, 42). Interestingly, this finding is consistent with Bell's (1973, 15) theory, according to which the growth of health, education, research and government services is the most decisive element for a post-industrial society.[77]

Nonetheless problems and future challenges abound. For example, utilizing the electronic identification of Finnish citizens, which could provide the ultimate platform for various e-services, is still in its infancy, even though the Population Register Centre has provided digital IDs and a national authentication infrastructure since 1999 (since September 2003 only IDs incorporating a microchip have been issued). According to a recent OECD (2003b) report, the Finnish government introduced the technology without conducting proper market demand analysis or developing services advanced enough to meet user needs. The government has also failed to understand that people's behav-

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The Tampere region has had a key role in Nokia's R&D in digital signal processing, which is the foundation of virtually all practical mobile-phone applications.

[77] As Blom *et al*. (2001) emphasize, lending support to Bell's ideas, the majority of knowledge workers have in fact nothing to do with the new economy. Most knowledge workers in Finland are specialists in education, social work, health care and public administration. For example, no less than 42 per cent of knowledge workers are employed in education (18 %) and social services (24 %), whereas only one knowledge worker in ten (9 %) is employed in the communications and media sector. This is not at all paradoxical if we recall that public services are labour-intensive and require high educational qualifications.

ioural patterns change slowly. As a result, ministries and agencies have been as reluctant or unable to make use of the system as ordinary citizens. The importance of this example lies in its universality. As the OECD report bluntly contends, 'technical solutions should follow rather than anticipate demand for services' (p. 3). Unfortunately, amid the technological hype of the latter half of the 1990s, the public sector was as guilty of neglecting end-users' opinions as vendors providing ICTs. The utilization of digitalized social services in Finland as well as elsewhere has therefore progressed much more slowly than expected simply because inadequate attention has been paid to surveying people's needs prior to developing new applications (see also OECD 2003a).

On the other hand, politicians, civil servants and other public administrators have been sluggish to renew their own organizations and encourage cooperation among different agencies. They have not fully realized that the seamless flow of customer data is as important for public services as it is for enterprises. This is unfortunate because organizational alignment with the help of a common information infrastructure could foster productivity, for example, in the administration of health care, which according to the most vociferous critics is in a state of fiscal crisis in Finland. Consider the volume of paperwork. In a typical hospital hundreds of paper files are produced on a daily basis and sent to patients or other organizations via traditional mail. Again, technology as such does not provide the answer but, if used properly and with insight, fully integrated databases providing all the necessary customer details could reduce duplication, speed up decision-making and help different government institutions to function as a single network, thereby eliminating much of the need for useless overlapping communication. As Groth (2003b, 13) sees it, hospitals are among the organizations where the potential for much more integrated software solutions is particularly ripe now. For the time being, however, the development of a unified and accessible data source for Finnish medical professionals remains on the horizon because medical districts have implemented local systems, most of which do not communicate with each other at all! The problem lies in Finland's highly decentralized governmental structure. Although the high level of autonomy enjoyed by Finnish municipalities has certain benefits, ICT investments should be centralized.

This is not to say that the development of real e-government in any part of the public sector can be reduced to the mere political will to share and cooperate. There are a number of technological and social problems concerning, for instance, data security and usability that need to be solved before computer networks can be fully utilized in public administration and before citizens are well and truly equipped to use on-line ser-

vices. The explosive growth of viruses and dubious junk mail spreading through the Net is but one indicator of our society's vulnerability. It should also be borne in mind that in the foreseeable future the Internet cannot substitute for existing services; rather it can only augment them, although it certainly does provide an increasingly important service outlet. Along with such traditional social cleavages as an individual's class position, income level or place of residence, a significant number of disadvantaged people still lack the possibility to make proper use of even the most basic Internet applications. Despite its highly developed and open information infrastructure, Finland is facing the same challenge as other information societies: we are still far away from a situation in which the efficient use of ICTs covers all groups of citizens and regions without compromising the principles of privacy and democracy. Especially the unemployed, the elderly and people living in remote rural areas are in danger of being marginalized. To overcome this challenge is important because the most disadvantaged people generally have high levels of interaction with government, yet they also have the lowest levels of access to ICTs and therefore miss out on the potential benefits these technologies can provide (OECD 2003a, 4).

While the digital divide is by now an established topic in information society studies, a related but much less publicized question concerns the disparity between the provision and use of ICTs. In the case of Finland, this issue is highly problematic. In spite of Finland having fared very well as an innovative producer of ICTs, prominent Finnish economists have pointed out that Finland has been less successful in exploiting the productivity benefits that these technologies could provide for the economy at large (Jalava & Pohjola 2002; Rouvinen & Maliranta 2003). Whereas in the US the *use* of ICTs has been associated with positive effects both on the levels of macro-economy and individual firms, in Finland these benefits have been primarily linked to ICT *provision*. As is well-known, Nokia and its subcontractors have been a tremendous boost to the Finnish economy: at the beginning of the 1990s, Finland was one of the least ICT-specialized industrial countries; now Finland ranks amongst the top providers of ICTs in the world – a mere 15 years ago few would have predicted this development.

However, in comparison to other EU countries and the US in particular, the amount of investments made in ICTs in Finland does not stand above the average level.[78] This is important because the consensus among economists has it that the long-

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[78] On a related note, the overall level of investments made by Finnish companies is fairly low. As a matter of fact, Finnish companies' desire to invest in Finland has continued to dwindle since the late 1970s, reflecting the change towards a less capital-intensive production. This phenomenon is partly explained by the fact that R&D spending does not show in final investment

term advantages of information technology are related to the scale and depth of its use rather than its provision or, as economists would say, 'there is no discernible systematic relationship between the size of the ICT-producing industry and the ICT contribution to output growth' (Colecchia & Schreyer 2002, 416). In other terms, the premium should always be on how ICTs are integrated into concrete organizational processes, because in the long run specializing in the production of ICTs arguably does not provide a sufficient condition for sustainable economic growth.

The public sector in particular should look for novel ways in which to increase productivity. This is especially crucial in view of the fact that Finland has little hope of sustaining the current standard of welfare services without adjusting its economy to a fiscal policy that is more stringent than in the past. Although there is no intrinsic reason why the Finnish information society and the welfare state could not continue to coexist in a mutually supportive relationship, Finland is not immune to the realities of global competition no more than it is sheltered from political influences pouring in from outside its borders.

Today many governments are said to vigorously pursue a neo-liberal restructuring programme uncritically endorsing the virtues of privatization, deregulation and the violent downsizing of the public sector. A high level of taxation in particular is thought to discourage work effort as well as to inhibit entrepreneurship and economic growth, rendering Finland vulnerable to brain drain. Estonia, for example, markets itself as a rapidly modernizing tax haven, offering a lucrative business environment for enterprises willing to locate there. At this writing, some major Finnish companies have already made plans to re-locate their head offices if the government does not make a commitment to lower their taxes considerably (in November 2003 the Finnish government introduced a large-scale tax reform programme, which soon earned the nickname *Lex Nokia*, but we are not yet in a position to evaluate whether or not the reform proves to be sufficient in the long term).

Furthermore, the most recent economic downturn following the turn of the millennium has induced a growing number of high-tech enterprises to transfer routine operations to countries where labour costs are cheaper than in Finland. In China, for example, labour costs are a mere fraction of those in advanced economies. In effect, there

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figures. However, this is far from the whole truth. At the same time as the rate of investments has declined, many Finnish companies have made better profits than ever, thanks in large part to moderate wage policies, yet they have directed their record profits to shareholders, acquisitions and foreign operations (see Pitkänen & Sauramo 2005). This is important because employment cannot improve if companies do not invest in their home turf.

is no guarantee that even Nokia will remain a predominantly Finnish company. At the end of 2001 Nokia's former CEO Jorma Ollila made a public statement that his company might move its headquarters out of Finland unless the government takes firm measures to lower taxes in the country. Ollila's concern stemmed from the fact that a high-tech enterprise of Nokia's magnitude cannot afford to lose out in the competition for skilled foreign labour. In Nokia's corporate news release dated October 2001, Ollila said that 'we love this country, but we must make rational decisions on the basis of competitive circumstances' (*ref*. Steinbock 2003, 297). Since the above-mentioned news release, Nokia has indeed opened up new production facilities in Asia and transferred some headquarter functions to the US, even though a large part of the company's core operations still remain in Finland.

Obviously, these kinds of trends reflecting a global capitalist restructuring of production relations and market specialization spell increasing risks for the future of the welfare state, perhaps even indicating a gradual erosion of the ideals of solidarity and egalitarianism. In many important respects the future of Nokia and Finland are tied together. As long as Nokia finds its home turf sufficiently fruitful ground for investments such as conducting most of its R&D work in Finland, so do its subcontractors. If, however, Nokia initiates a large scale migration of its headquarter functions and business units, the suppliers will follow: 'as a result, all will continue to invest in the business, but no longer in Finland primarily' (Steinbock 2004b, 87–88).

In these tumultuous circumstances, the most decisive challenge for the Finnish welfare state is to utilize and redistribute its limited public resources more and more efficiently for the simple reason that, due to economic and political pressures, the country has little hope of sustaining its high tax burden in the long run. To continue without any reforms whatsoever would require unrealistically strong economic growth. A more probable future scenario is that steps taken by the EU aimed at harmonizing taxes among the member states will gradually bring taxation in Finland close to the EU average. At the same time, however, as the memory of the recession of the early 1990s wanes, the majority of politicians and citizens alike will continue to fight against the downsizing of welfare mechanisms.

Only time will tell if these two contradictory demands can be combined. In any event, all this adds up to a much less rosy vision of Finland than what is often conveyed to the outside world. When we consider the imminent ageing challenge as well as the other structural problems highlighted above, it is hard to escape the conclusion that to portray Finland as the model example of an information society is a gross simplifica-

tion. Indeed, as the OECD contends, Finland's recent economic performance has been impressive but largely driven by the ICT sector, while there is much room for improvement on most other segments of the society. According to the OECD, Finland should:

– reduce the tax wedge on labour income to strengthen work incentives
– reduce the use of early retirement pathways
– reduce the scale of public ownership, especially raising private provision of publicly-funded services
– promote greater flexibility in centralized wage determination to expand employment opportunities
– taper unemployment benefits with duration to encourage job search and reduce the unemployment trap (OECD 2005a, 24; 72)

Clearly there is a need for adjustment in current policies, but I doubt that the recommendation to taper unemployment benefits would have much practical value. Suffice it to say here that the OECD misses the big picture and falls victim to a classic incentive problem. What comes first, the OECD seems to imply, is people's motivation to seek new employment opportunities, and once the unemployed have been 'activated', then, jobs will follow. The OECD fails to see the grim reality behind statistics. As I briefly remark in Chapter Three, in the current situation those who are out of work simply do not have the competencies required by potential employers. If unemployment benefits were tapered, this would merely speed up the polarization of Finnish society.

The Future of Knowledge Work

What conclusions, then, can we draw concerning the present state and future of knowledge work? In closing, I suggest that the rise of knowledge work has not marked the end of a stratified society. As Jeff Hearn (2004, 205) has reminded, in spite of people living in an increasingly technologically networked world, information societies are still societies, retaining all the features of previous phases of societal development: power relations, authority, inequalities, hierarchies, inclusion and exclusion, social networks, and so on.

As for example Blom *et al*. (2001; 2002) have shown, there are not only important continuities with the past but also clear tendencies towards growing social disparities, perhaps indicating that a new class society is in the making – the denial of class by

some major social critics is simply most untimely. Other traditional social divisions have not been eroded either. For example, labour markets in Finland and elsewhere remain divided along gender lines. The world of work is very different for a female office clerk than it is for a male professional occupying a supervisory or managerial position. In spite of the fact that women and men are employed equally as often in knowledge work in Finland, the uneven distribution of managerial and supervisory power continues to reproduce gender differences.

It is clear that the most optimistic visions of knowledge work have not come true. Although Finland has adjusted itself quite successfully to the demands of global capitalism – thanks in large part to its highly dynamic ICT sector – this development has not been achieved without increasing social contradictions and problems. The rapid informationalization of the Finnish economy and society has not had the same sort of egalitarian effects as industrialization did in the 1960s. On the contrary, it seems that the unfolding structural changes currently underway are giving rise to ever deeper social divisions and inequality. Finland today is characterized by much greater social structural rigidity than it was in the 1960s. Although the expansion of knowledge work has opened up some new avenues for upward social mobility, the current situation can by no means be compared to the societal upheavals of the 1960s. One of the most important lessons that can be drawn from the Finnish experience is that while the informationalization of modern societies may increase material wealth, it is far from certain whether this development will foster equity and overall social well-being. There are two important premises for my argument.

First, as Blom *et al*. (2001; 2002) argue, knowledge workers have a relatively high level of formal education, which facilitates their upward career mobility. Also the skill profile of knowledge workers is often more transferable than it is for other wage-earner groups. This is important because expert labour in general is expected to be engaged in continuous on-the-job learning and thereby to keep up its ability to adapt and change. In this respect knowledge workers have a clear advantage over the rest of the wage working population.

Second, knowledge work is very much a middle-class phenomenon. Knowledge workers have an upper white-collar or entrepreneurial background far more often than other wage-earner groups. It is also quite common for the main breadwinners in the family background of knowledge workers to have occupied managerial positions. Most importantly, originally middle-class knowledge workers who have taken up a position in the core of the current middle class are highly successful in defending their positions

and the prestige embedded in them. Knowledge work not only requires extensive education but also diverse cultural skills, both of which are typically middle-class resources. Whereas education can be highly specific, cultural capital such as knowledge of foreign languages or experience in appearing in public is highly transferable, providing an important advantage for middle-class knowledge workers.

In other words, at least in the present situation, knowledge work would seem to involve a quite significant accumulation of social and cultural assets. As a consequence, it is more and more difficult for people in working-class positions to get ahead. Although a definitive conclusion remains a task to be left for future research, it may be projected that avenues for both career advancement and upward intergenerational mobility are tapering.

The outcome of my analysis can be interpreted as follows: now that the most rapid growth of knowledge work is over, it is likely that this newly emerged social division of labour will be absorbed into the old struggles for power and prestige among different social strata. In the US informational labour rose to prominence well before the turn of the millennium, and therefore it cannot be considered an alternative to the dominant social order (Kling 1990). Now, the same is happening elsewhere – the information society has entered a developmental stage in which its key asset, i.e. informational labour, is starting to reproduce itself. Unfortunately, this seems to spell a growing trend of inequality and marginalization, which may cause high follow-up costs. On global and national levels not only the digital divide but also other, more traditional social divisions are likely to widen between those who are capable of dealing with the new demands of working life and those who only marginally can. The risk of polarizing workers into 'core' and 'disposable' segments of the labour force, to borrow Castells' terms, is a threat that needs to be taken seriously (see especially Castells 1996, 272 and *passim*).

On the other hand, knowledge work itself involves some deep-seated contradictions, reflecting the fact that informational labour is as subordinate to the marketplace as ever in the history of paid work. Although knowledge work offers opportunities for career advancement as well as high autonomy and considerable monetary rewards, it also involves high levels of stress and high expectations to meet the demands of the transient labour market situation that characterizes the current phase of capitalist development in all advanced economies. In this respect, the recession of the early 1990s was a decisive watershed for Finland: it was a lesson in how to utilize the workforce more efficiently and flexibly with a view to raising productivity standards (Julkunen & Nätti 1999). As a

consequence of the economic restructuring of the 1990s, especially working time in Finland today is highly flexible both institutionally and in practice. Yet the question remains whether or not this flexibility is sustainable in the long run. As I remark in Chapter Six, increasing problems resulting from the erosion of normal working hours have been observed. Especially those whose labour market value is high tend to suffer from working unsocial hours and the marginalization of private life. Hardly surprisingly, the length of working days, mental strain as well as time and performance pressures are highest among knowledge workers.

All in all, knowledge work is at once rewarding and extremely demanding. The environment in which such work is done is often more creative and autonomous than is true for other types of work, but at worst it may stretch the tolerance of the individual worker to its absolute limits. As some of the most highly acclaimed critics of American society have observed, many individuals on the fast track of career advancement have seen the demands of the job ruin their family life and make nonsense of the meaning of leisure (see, e.g., Hochschild 1997, Sennett 1998). This is also a potential risk elsewhere although, for the sake of comparison, it might be added that hardly any European country is considered as competitive in spirit as the United States. However, in this respect the future may indeed turn out to be very American.

Closing Remarks

This book grew out of a realization that we are in the midst of a large-scale process of social and cultural transformation – in which new forms of work and organizations assume a pivotal role – but also out of understanding that we are not yet in a position either to comprehend or conceptualise the change fully. The theoretical and conceptual framework applied in this study is just one among many different options, open to objections and alternative interpretations. In addition to presenting different estimates on the growth of informational labour in Finland, as well as reviewing data for other countries, I have made an attempt not only to justify my position but also to criticize and problematize the concepts I employ.

It is up to the reader to draw the conclusion whether or not existing evidence support the various theories of post-industrialization and informationalization. As Alistair Duff (2000) correctly remarks, no amount of statistics, nor any level of sophistication in measuring methods, can possibly supply an answer as to the point at which information societies come into being, because that is a matter not for *discovery* but for *decision*.

Therefore, Duff continues, 'one must look at all the available data … and then decide whether or not they are probative of, or perhaps just suggestive of, a new social formation' (p. 126). Keeping these methodological limits in mind, my aim has not been to provide either ready-made conclusions or an exhaustive account of all the changes that are going on in the modern workplace, but rather to give the reader a general overarching picture of some of the most important trends affecting contemporary work organizations.

The way I have defined and understood knowledge work rests on the qualitative transformation of work. In particular, I have wanted to emphasize the growing importance of symbolic and educational skills that characterize the evolution towards the information society at the level of work and organizational processes. It is my contention that these currents, comparable in scope and consequences to the Industrial Revolution, lie at the heart of tomorrow's society.

References

Adami, Louise M. (1999) Autonomy, Control and the Virtual Worker. In Jackson, Paul Ed. (1999) *Virtual Working: Social and Organisational Dynamics*. Pp. 131–149. London, Routledge.

Adler, Paul S. (2001) Market, Hierarchy, and Trust: The Knowledge Economy and the Future of Capitalism. *Organization Science* 12(2): 215–234.

Aichholzer, Georg (1998) A Social Innovation in Its Infancy. Experiences with Telework Centres. In Jackson, Paul & van der Wielen, Jos M. Eds. (1998) *Teleworking: International Perspectives. From Telecommuting to the Virtual Organisation*. Pp. 293–302. London, Routledge.

Alapuro, Risto (1988) *State and Revolution in Finland*. Berkeley, University of California Press.

Alasoini, Tuomo (1998) Kohti huipputiimejä – tuotantotyön organisaatiomallit murroksessa. *Aikuiskasvatus* 18(2): 98–103.

Alasoini, Tuomo (2000) Matkalla kohti oppivia organisaatioita? Tiimityö ja tuotannollinen verkostoituminen Suomessa tietoyhteiskunnan kynnyksellä. *Hallinnon Tutkimus* 19(1): 6–18.

Alasoini, Tuomo *et al*. (1994) *Manufacturing Change. Interdisciplinary Research on New Models of Operation in Finnish Industry*. Tampere, University of Tampere – Work Research Centre.

Alasuutari, Pertti (1995) *Researching Culture. Qualitative Method and Cultural studies*. London, Sage.

Alestalo, Matti (1986) *Structural Change, Classes and the State. Finland in an Historical and Comparative Perspective*. Helsinki, University of Helsinki – Research Group for Comparative Sociology.

Allardt, Erik (1989) Finland as a Nordic Society. In Engman, Max & Kirby, David Eds. (1989) *Finland: People, Nation, State*. Pp. 212–226. London, Hurst & Company.

Alvesson, Mats (1990) On the Popularity of Organizational Culture. *Acta Sociologica* 33(1): 31–49.

Alvesson, Mats (1995) *Management of Knowledge-Intensive Companies*. Berlin, Walter de Gruyter.

Alvesson, Mats (2001) Knowledge Work: Ambiguity, Image and Identity. *Human Relations* 54(7): 863–886.

Alvesson, Mats (2002) *Understanding Organizational Culture*. London, Sage.

Amar, Amar D. (2002) *Managing Knowledge Workers. Unleashing Innovation and Productivity*. Westport, CT., Quorum Books.

Amar, Amar D. (2004) Motivating Knowledge Workers to Innovate: A Model Integrating Motivation Dynamics and Antecedents. *European Journal of Innovation Management* 7(2): 89–101.

Angell, Ian (2000) *The New Barbarian Manifesto. How to Survive the Information Age*. London, Kogan Page.

Antila, Juha & Ylöstalo, Pekka (2002) *Proaktiivinen toimintatapa. Yritysten ja palkansaajien yhteinen etu?* Helsinki, Ministry of Labour.

Anttila, Timo (2005) *Reduced Working Hours. Reshaping the Duration, Timing and Tempo of Work*. Jyväskylä, University of Jyväskylä – Jyväskylä Studies in Education, Psychology and Social Research.

Aoyama, Yuko & Castells, Manuel (2002) An Empirical Assessment of the Information Society: Employment and Occupational Structures of G-7 Countries, 1920–2000. *International Labour Review* 141(1–2): 123–159.

Archibugi, Daniele & Lundvall, Bengt-Åke Eds. (2001) *The Globalizing Learning Economy*. Oxford, Oxford University Press.

Armstrong, Nicola José de Freitas (1999) Flexible Work in the Virtual Workplace: Discourses and Implications of Teleworking. In Felstead, Alan & Jewson, Nick Eds. (1999) *Global Trends in Flexible Labour*. Pp. 43–60. London, MacMillan.

Arter, David (1989) Finland: A Typical Post-industrial State? In Engman, Max & Kirby, David Eds. (1989) *Finland: People, Nation, State*. Pp. 227–243. London, Hurst & Company.

Auer, Peter & Cazes, Sandrine Eds. (2003) *Employment Stability in an Age of Flexibility. Evidence from Industrialized Countries*. Geneva, International Labour Organization.

Bakke, John Willy (1993) A Nordic Approach to Teleworking. In Pekkola, Juhani Ed. (1993) *Telework – A New Touch. Flexiwork Perspectives in the European and Nordic Labour Markets*. Pp. 73–81. Helsinki, Ministry of Labour.

Bakke, John Willy & Julsrud, Tom Erik (1999) Telework Research: Setting the Scene. *Telektronikk* (95)4: 4–9.

Barley, Stephen R. & Kunda, Gideon (2001) Bringing Work Back In. *Organization Science* 12(1): 76–95.

Baumol, William J. (2002) *The Free Market Innovation Machine. Analyzing the Growth Miracle of Capitalism*. Princeton, N.J., Princeton University Press.

Baumol, William J. & Bowen, William G. (1966) *Performing Arts – The Economic Dilemma. A Study of Problems Common to Theater, Opera, Music and Dance*. Cambridge, Mass., The MIT Press.

Beck, Ulrich (1999) Goodbye to All That Wage Slavery. *New Statesman* 5 March, Pp. 25–27.

Bélanger, France (1999) Workers' Propensity to Telecommute: An Empirical Study. *Information & Management* 35(3): 139–153.

Bélanger, France & Collins, Rosann Webb (1998) Distributed Work Arrangements: A Research Framework. *The Information Society* 14(2): 137–152.

Bélanger, France & Collins, Rosann Webb & Cheney, Paul H. (2001) Technology Requirements and Work Group Communications for Telecommuters. *Information Systems Research* 12(2): 155–176.

Bélanger, Jacques & Edwards, Paul K. & Wright, Martyn (2003) Commitment at Work and Independence from Management. A Study of Advanced Teamwork. *Work and Occupations* 30(2): 234–252.

Bell, Daniel (1973) *The Coming of Post-Industrial Society. A Venture in Social Forecasting*. New York, Basic Books.

Bell, Daniel (1979) The Social Framework of the Information Society. In Dertouzos, Michael L. & Moses, Joel Eds. (1979) *The Computer Age. A Twenty-Year View*. Cambridge, Mass., The MIT Press.

Benner, Chris (2002) *Work in the New Economy. Flexible Labor Markets in Silicon Valley*. Oxford, Blackwell.

Benner, Mats (2003) The Scandinavian Challenge. The Future of Advanced Welfare States in the Knowledge Economy. *Acta Sociologica* 46(2): 132–149.

Bentley, Kaye & Yoong, Pak (2000) Knowledge Work and Telework: An Exploratory Study. *Internet Research: Electronic Networking Applications and Policy* 10(4): 346–356.

Beruvides, Mario G. & Koelling, Patrick C. (2001) An Investigation of the Work Characteristic Composition in Blue-Collar, White-Collar, and Knowledge Work. *International Journal of Human Resources Development and Management* 1(2–4): 283–303.

Beyerlein, Michael M. & Johnson, Douglas A. & Beyerlein, Susan T. Eds. (1995) *Knowledge Work in Teams*. Vol. II of *Advances in Interdisciplinary Studies of Work Teams*. Greenwich, Connecticut, JAI Press.

Blackler, Frank (1995) Knowledge, Knowledge Work and Organizations: An Overview and Interpretation. *Organization Science* 16(6): 1021–1046.

Blom, Raimo (2004) Introduction to Part Six (Surveillance). In Webster, Frank Ed. (2004) *The Information Society Reader*. [With the assistance of Raimo Blom, Erkki Karvonen, Harri Melin, Kaarle Nordenstreng and Ensio Puoskari]. Pp. 297–301. London, Routledge.

Blom, Raimo & Melin, Harri & Pyöriä, Pasi (2000) Tietotyön lumo ja realiteetit. *Yhteiskuntapolitiikka* 5(65): 422–433.

Blom, Raimo & Melin, Harri & Pyöriä, Pasi (2001) *Tietotyö ja työelämän muutos. Palkkatyön arki tietoyhteiskunnassa*. Helsinki, Gaudeamus.

Blom, Raimo & Melin, Harri & Pyöriä, Pasi (2002) Social Contradictions in Informational Capitalism: The Case of Finnish Wage Earners and Their Labor Market Situation. *The Information Society: An International Journal* 18(5): 333–343.

Blom, Raimo & Melin, Harri & Nikula, Jouko & Rantalaiho, Liisa (1992) *The Scope Logic Approach to Class Analysis. A Study of the Finnish Class Structure*. Aldershot, Avebury.

Boisot, Max H. (1998) *Knowledge Assets. Securing Competitive Advantage in the Information Economy.* Oxford, Oxford University Press.

Boland, Richard J. Jr. & Tenkasi, Ramkrishan V. (1995) Perspective Making and Perspective Taking in Communities of Knowing. *Organization Science* 6(4): 350–372.

Boris, Eileen & Daniels, Cynthia R. Eds. (1989) *Homework. Historical and Contemporary Perspectives on Paid Labor at Home.* Urbana, University of Illinois Press.

Braverman, Harry (1974) *Labor and Monopoly Capital. The Degradation of Work in the Twentieth Century.* New York, Monthly Review Press.

Brown, John Seely & Duguid, Paul (1991) Organizational Learning and Communities-of-Practice: Toward a Unified View of Working, Learning and Innovation. *Organization Science* 2(1): 40–57.

Brown, John Seely & Duguid, Paul (2000) The Persistence of Paper. *Across the Board* 37(8): 27–30. (September).

Brown, Phillip & Lauder, Hugh (2001) *Capitalism and Social Progress. The Future of Society in a Global Capitalism.* Basingstoke, Palgrave.

Burton-Jones, Alan (1999) *Knowledge Capitalism. Business, Work, and Learning in the New Economy.* Oxford, Oxford University Press.

Büssing, André (1998) Teleworking and Quality of Life. In Jackson, Paul & van der Wielen, Jos M. Eds. (1998) *Teleworking: International Perspectives. From Telecommuting to the Virtual Organisation.* Pp. 144–165. London, Routledge.

Böckerman, Petri (2002) Overtime in Finland. *Finnish Economic Papers* 15(1): 36–54.

Cairncross, Frances (1997) *The Death of Distance. How the Communications Revolution Will Change Our Lives.* London, Orion Business Books.

Campbell, Alistair (1999) Knowledge Management in the Web Enterprise. Exploiting Communities of Practice. In Jackson, Paul Ed. (1999) *Virtual Working: Social and Organisational Dynamics.* Pp. 21–32. London, Routledge.

Cardinali, Richard (1998) Viewpoint: Death of the Knowledge Worker. *Logistics Information Management* 11(3): 156–159.

Carnoy, Martin (2000) *Sustaining the New Economy. Work, Family, and Community in the Information Age.* New York, Russell Sage Foundation.

Castells, Manuel (1996) *The Rise of the Network Society.* Vol. I of *The Information Age. Economy, Society and Culture.* Oxford, Blackwell.

Castells, Manuel (1997) *The Power of Identity.* Vol. II of *The Information Age. Economy, Society and Culture.* Oxford, Blackwell.

Castells, Manuel (1998) *End of Millennium.* Vol. III of *The Information Age. Economy, Society and Culture.* Oxford, Blackwell.

Castells, Manuel (2000) Information Technology and Global Capitalism. In Hutton, Will & Giddens, Anthony Eds. (2000) *Global Capitalism.* Pp. 52–74. New York, The New Press.

Castells, Manuel (2001) *The Internet Galaxy. Reflections on the Internet, Business, and Society.* Oxford, Oxford University Press.

Castells, Manuel & Aoyama, Yuko (1994) Paths Towards the Informational Society: Employment Structure in G-7 Countries, 1920–1990. *International Labour Review* 133(1): 5–33.

Castells, Manuel & Himanen, Pekka (2002) *The Information Society and the Welfare State. The Finnish Model.* Oxford, Oxford University Press.

Champy, James (1995) *Reengineering Management. The Mandate for New Leadership.* London, HarperCollins.

Choi, Thomas Y. & Varney, Glenn H. (1995) Rethinking Knowledge Workers: Where Have All the Workers Gone? *Organization Development Journal* 13(2): 41–50.

Christensen, Kathleen E. Ed. (1988) *The New Era of Home-Based Work. Directions and Policies.* Boulder, Westview Press.

Clegg, Chris W. & Waterson, Patrick E. & Axtell, Carolyn M. (1996) Software Development: Knowledge-intensive Work Organizations. *Behaviour & Information Technology* 15(4): 237–249.

Colecchia, Alessandra & Schreyer, Paul (2002) ICT Investment and Economic Growth in the 1990s: Is the United States a Unique Case? A Comparative Study of Nine OECD Countries. *Review of Economic Dynamics* 5(2): 408–442.

Coleman, James (1990) *Foundations of Social Theory*. Cambridge, Mass., The Belknap Press of Harvard University Press.

Collins, David (2000) *Management Fads and Buzzwords. Critical-Practical Perspectives*. London, Routledge.

Cooke, Philip (2002) *Knowledge Economies. Clusters, Learning and Competitive Advantage*. London, Routledge.

Cortada, James W. Ed. (1998) *Rise of the Knowledge Worker*. Boston, Butterworth-Heinemann.

Coulson-Thomas, Colin (1991) IT and New Forms of Organization for Knowledge Workers: Opportunity and Implementation. *Employee Relations* 13(4): 22–32.

Cross, Rob (2000) Looking Before You Leap: Assessing the Jump to Teams in Knowledge-based Work. *Business Horizons* 43(5): 29–36. (September–October).

Cutcher-Gershenfeld, Joel *et al*. (1998) *Knowledge-Driven Work. Unexpected Lessons from Japanese and United States Work Practices*. Oxford, Oxford University Press.

Cuvillier, Rolande (1974) Intellectual Workers and Their Work in Social Theory and Practice. *International Labour Review* 109(4): 291–317.

Dangler, Jamie Faricellia (1994) *Hidden in the Home. The Role of Waged Homework in the Modern World-Economy*. Albany, State University of New York Press.

Daniels, Kevin & Lamond, David & Standen, Peter (2001) Teleworking: Frameworks for Organizational Research. *Journal of Management Studies* 38(8): 1151–1185.

Darr, Asaf (2003) Control and Autonomy among Knowledge workers in Sales: An Employee Perspective. *Employee Relations* 25(1): 31–41.

Davis, Gordon B. (2002) Anytime/Anyplace Computing and the Future of Knowledge Work. *Communications of the ACM* 45(12): 67–73.

Davis, Gordon B. & Collins, Rosann Webb & Eierman, Michael A. & Nance, William D. (1993) Productivity from Information Technology Investment in Knowledge Work. In Banker, Rajiv D. & Kauffman, Robert J. & Mahmood, Mo Adam Eds. (1993) *Strategic Information Technology Management: Perspectives on Organizational Growth and Competitive Advantage*. Harrisburg, PA., Idea Group Publishing.

Davis, Norman (1996) *Europe. A History*. Oxford, Oxford University Press.

Depickere, Astrid (1999) Managing Virtual Working. Between Commitment and Control. In Jackson, Paul Ed. (1999) *Virtual Working: Social and Organisational Dynamics*. Pp. 99–120. London, Routledge.

Despres, Charles & Hiltrop, Jean-Marie (1995) Human Resource Management in the Knowledge Age: Current Practice and Perspectives on the Future. *Employee Relations* 17(1): 9–23.

Devine, Kay Stratton & Taylor, Laurel & Haryett, Kathy (1997) The Impact of Teleworking on Canadian Employment. In Duffy, Ann & Glenday, Daniel & Pupo, Norene Eds. (1997) *Good Jobs, Bad Jobs, No Jobs. The Transformation of Work in the 21st Century*. Pp. 97–116. Toronto, Harcourt Brace.

Di Martino, Vittorio & Wirth, Linda (1990) Telework: A New Way of Working and Living. *International Labour Review* 129(5): 529–554.

Dordick, Herbert S. & Wang, Georgette (1993) *The Information Society. A Retrospective View*. Newbury Park, Sage.

Drucker, Peter F. (1969) *The Age of Discontinuity. Guidelines to Our Changing Society*. London, Heinemann.

Drucker, Peter (1993) *Post-Capitalist Society*. Butterworth-Heinemann, London.

Drucker, Peter F. (1999) Knowledge-Worker Productivity: The Biggest Challenge. *California Management Review* 41(2): 79–94.

Ducatel, Ken & Webster, Juliet & Herrmann, Werner (2000) Information Infrastructures or Societies? In Ducatel, Ken & Webster, Juliet & Herrmann, Werner Eds. (2000) *The Information Society in Europe. Work and Life in an Age of Globalization*. Pp. 1–17. Lanham, Rowman & Littlefield.

Duff, Alistair S. (2000) *Information Society Studies*. London, Routledge.

Duffy, Ann & Glenday, Daniel & Pupo, Norene Eds. (1997) *Good Jobs, Bad Jobs, No Jobs. The Transformation of Work in the 21st Century*. Toronto, Harcourt Brace.

Duxbury, Linda & Neufeld, Derrick (1999) An Empirical Evaluation of the Impacts of Telecommuting on Intra-Organizational Communication. *Journal of Engineering and Technology Management* 16(1): 1–28.

Eisenstadt, Shmuel N. (1985) Reflections on Centre-periphery Relations and Small European States. In Alapuro, Risto & Alestalo, Matti & Haavio-Mannila, Elina & Väyrynen, Raimo Eds. (1985) *Small States in Comparative Perspective. Essays for Erik Allardt.* Pp. 41–49. Oslo, Norwegian University Press.

Ekholm, Peter (2001) A Farewell to Neoliberalism? *The Finnish Economy and Society* 17(1): 81–86.

Eliasson, Gunnar *et al.* (1990) *The Knowledge-Based Information Economy.* Stockholm, The Industrial Institute for Economic and Social Research.

Elliott, Robert K. & Jacobson, Peter D. (2002) The Evolution of the Knowledge Professional. *Accounting Horizons* 16(1): 69–80.

Ellison, Nicole B. (1999) New Perspectives on Telework. *Social Science Computer Review* 17(3): 338–356.

Engelbrecht, Hans-Jürgen (2000) Towards a Knowledge Economy? Changes in New Zealand's Information Work Force 1976–1996. *Prometheus* 18(3): 265–282.

Engelbrecht, Hans-Jürgen (2001) Statistics for the Information Age. *Information Economics and Policy* 13(3): 339–349.

Erikson, Robert & Goldthorpe, John H. (1992) *The Constant Flux. A Study of Class Mobility in Industrial Societies.* Oxford, Clarendon Press.

Felstead, Alan & Jewson, Nick (2000) *In Work, At Home. Towards an Understanding of Homeworking.* London, Routledge.

Fincham, Robin Ed. (1996) *New Relationships in the Organized Professions. Managers, Professionals and Knowledge Workers.* Aldershot, Avebury.

Finnish National Fund for Research and Development (1998) *Quality of Life, Knowledge and Competitiveness. Premises and Objectives for Strategic Development of the Finnish Information Society.* Helsinki, Sitra – Finnish National Fund for Research and Development.

Fisher, Kimball & Fisher, Mareen Duncan (1998) *The Distributed Mind. Achieving High Performance Through the Collective Intelligence of Knowledge Work Teams.* New York, Amacom.

Flood, Patrick & Turner, Thomas & Hannaway, Conor (2000) *Attracting and Retaining Knowledge Employees: Irish Knowledge Employees and the Psychological Contract.* Dublin, Blackhall/Irish Management Institute.

Flood, Patrick C. & Turner, Thomas & Ramamoorthy, Nagarajan & Pearson, Jill (2001) Causes and Consequences of Psychological Contracts among Knowledge Workers in the High Technology and Financial Services Industries. *International Journal of Human Resource Management* 12(7): 1152–1165.

Florida, Richard (2002) *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life.* New York, Basic Books.

Florida, Richard (2005) *Cities and the Creative Class.* London, Routledge.

Florida, Richard & Tinagli, Irene (2004) *Europe in the Creative Age.* London, Demos. http://www.demos.co.uk/EUCIfinal_pdf_media_public.aspx (19.2.2004).

Frenkel, Stephen J. & Korczynski, Marek & Donoghue, Leigh & Shire, Karen A. (1995) Re-Constituting Work: Trends Towards Knowledge Work and Info-normative Control. *Work, Employment and Society* 9(4): 773–796.

Frenkel, Stephen J. & Korczynski, Marek & Shire, Karen A. & Tam, May (1999) *On the Front Line. Organization of Work in the Information Economy.* Ithaca, Cornell University Press.

Fruin, Mark W. (1997) *Knowledge Works. Managing Intellectual Capital at Toshiba.* Oxford, Oxford University Press.

Gaimon, Cheryl (1997) Planning Information Technology-Knowledge Worker Systems. *Management Science* 43(9): 1308–1328.

Garnham, Nicholas (2001) 'Information Society' as Theory or Ideology. A Critical Perspective on Technology, Education and Employment in the Information Age. *Information, Communication & Society* 3(2): 139–152.

Gershuny, Jonathan (1978) *After Industrial Society? The Emerging Self-service Economy.* London, MacMillan.

Gillespie, Andrew & Feng, Li (1994) Teleworking, Work Organisation and the Workplace. In Mansell, Robin Ed. (1994) *The Management of Information and Communication Technologies – Emerging Patterns of Control.* Pp. 261–272. London, Aslib.

Gouldner, Alvin W. (1979) *The Future of Intellectuals and the Rise of the New Class. A Frame of Reference, Theses, Conjectures, Arguments, and an Historical Perspective on the Role of Intellectuals and Intelligentsia in the International Class Contest of the Modern Era.* London, MacMillan.

Gray, Mike & Hodson, Noel & Gordon, Gil (1993) *Teleworking Explained.* Chichester, John Wiley & Sons.

Grint, Keith (1998) *The Sociology of Work. An Introduction.* 2nd Edition. Cambridge, Polity Press.

Gripenberg, Pernilla (2004) Virtualizing the Office: Micro-level Impacts and Driving Forces of Increased ICT Use. In Heiskanen, Tuula & Hearn, Jeff Eds. (2004) *Information Society and the Workplace. Spaces, Boundaries and Agency*. Pp. 103–124. London, Routledge.

Groth, Lars (1999) *Future Organizational Design. The Scope for the IT-based Enterprise.* Chichester, John Wiley & Sons.

Groth, Lars (2003a) Good Management: The Simple Key to Successful IT Implementations. *Economic Trends* 1/2003, 7–10. (January–February).

Groth, Lars (2003b) Theory and Practice Intertwined: An Interview with Lars Groth. [By Pasi Pyöriä]. *Economic Trends* 1/2003, 11–13. (January–February).

Haapala, Pertti (2005) History of Tampere: The Very Long Road to Informational City. In Kasvio, Antti & Anttiroiko, Ari-Veikko Eds. (2005) *e-City. Analysing Efforts to Generate Local Dynamism in the City of Tampere.* Tampere, Tampere University Press.

Haddon, Leslie (1998) The Experience of Teleworking. A View from the Home. In Jackson, Paul & van der Wielen, Jos M. Eds. (1998) *Teleworking: International Perspectives. From Telecommuting to the Virtual Organisation*. Pp. 136–143. London, Routledge.

Haddon, Leslie (1999) Approaches to Understanding Teleworking. *Telektronikk* (95)4: 29–38.

Haddon, Leslie & Brynin, Malcolm (2005) The Character of Telework and the Characteristics of Teleworkers. *New Technology, Work and Employment* 20(1): 34–46.

Haddon, Leslie & Silverstone, Roger (1994) Telework and the Changing Relationship of Home and Work. In Mansell, Robin Ed. (1994) *The Management of Information and Communication Technologies – Emerging Patterns of Control*. Pp. 234–247. London, Aslib.

Hammer, Michael (1996) *Beyond Reengineering. How the Process-Centered Organization is Changing Our Work and Our Lives*. New York, HarperBusiness.

Hammer, Michael & Champy, James (1993) *Reengineering the Corporation. A Manifesto for Business Revolution.* London, Nicholas Brealey.

Hammersley, Martyn & Atkinson, Paul (1995) *Ethnography. Principles in Practice.* 2nd Edition. London, Routledge.

Hanhike, Tiina (1998) Telework and Teleworkers at Siemens and Siemens Nixdorf in Finland. In Suomi, Reima & Jackson, Paul & Hollmén, Laura & Aspnäs, Mats Eds. (1998) *Teleworking Environments. Proceedings of the Third International Workshop on Telework. September 1–4, 1998, Turku, Finland*. Pp. 370–379. Turku, Turku Center for Computer Science.

Harvey, David (1990) *The Condition of Postmodernity. An Enquiry into the Origins of Cultural Change*. Oxford, Blackwell.

Hayes, Niall (2001) Boundless and Bounded Interactions in the Knowledge Work Process: The Role of Groupware Technologies. *Information and Organization* 11(2): 79–101.

Hayes, Niall & Walsham, G. (2001) Participation in Groupware-mediated Communities of Practice: A Socio-political Analysis of Knowledge Working. *Information and Organization* 11(4): 263–288.

Hayman, Alison & Ellison, Tony (2000) Human Elements in Information System Design for Knowledge Workers. *International Journal of Information Management* 20(4): 297–309.

Hearn, Jeff (2004) Information Societies are Still Societies. In Heiskanen, Tuula & Hearn, Jeff Eds. (2004) *Information Society and the Workplace. Spaces, Boundaries and Agency*. Pp. 205–208. London, Routledge.

Heath, Christian & Luff, Paul (2000) *Technology in Action*. Cambridge, Cambridge University Press.

Heikkilä, Asko (1996) Labour Legislation and Social Security with Regard to Telework. In Luukinen, Ari Ed. (1996) *Directions of Telework in Finland. Report by the Finnish Experience with Telework Project*. Pp. 31–50. Helsinki, Ministry of Labour.

Heiskanen, Tuula & Hearn, Jeff Eds. (2004) *Information Society and the Workplace. Spaces, Boundaries and Agency.* London, Routledge.

Helle, Minna (2004) *Etätyö.* Helsinki, Edita.

Helminen, Ville & Ristimäki, Mika & Oinonen, Kari (2003) *Etätyö ja työmatkat Suomessa.* Helsinki, Ympäristöministeriö – The Finnish Ministry of the Environment.

Henwood, Doug (1996) Work and its Future. *Left Business Observer* 72, April. http://www.panix.com/~dhenwood/Work.html (23.8.2000).

Hernesniemi, Hannu & Lammi, Markku & Ylä-Anttila, Pekka (1996) *Advantage Finland. The Future of Finnish Industries.* Helsinki, ETLA – The Research Institute of the Finnish Economy.

High Technology Finland 2006 Helsinki, Facte – The Finnish Academies of Technology.

Hietala, Marjatta & Kaarninen, Mervi (2005) The Foundation of an Information City – Education and Culture in the Development of Tampere. In Kasvio, Antti & Anttiroiko, Ari-Veikko Eds. (2005) *e-City. Analysing Efforts to Generate Local Dynamism in the City of Tampere.* Tampere, Tampere University Press.

Hilton, Margaret (2001) Information Technology Workers in the New Economy. *Monthly Lebor Review* 124(6): 41–45. (June).

Himanen, Pekka (2001) *The Hacker Ethic and the Spirit of the Information Age.* [With a prologue by Linus Torvalds and epilogue by Manuel Castells]. New York, Random House.

Hirsjärvi, Sirkka & Hurme, Helena (1995) *Teemahaastattelu.* 7. painos. Helsinki, Yliopistopaino.

Hobsbawm, Eric J. (1994) Age of Extremes. *The Short Twentieth Century 1914–1991.* London, Abacus.

Hochschild, Arlie Russell (1997) *The Time Bind. When Work Becomes Home and Home Becomes Work.* New York, Metropolitan.

Horibe, Frances (1999) *Managing Knowledge Workers. New Skills and Attitudes to Unlock the Intellectual Capital in Your Organization.* Toronto, John Wiley & Sons.

Hull, Richard (2000) Knowledge and the Economy: Some Critical Comments. *Economy & Society* 29(2): 316–331.

Hustich, Ilmari (1966) Finland Economically, Politically, and Geographically. In *Finland in Focus 1966.* [Translated from Finnish by Donald Fields]. Pp. 9–16. Helsinki, Sanoma Osakeyhtiö.

Huuhtanen, Pekka (1996) Psychosocial Perspective to Telework: Challenges and Risks. In Rantanen, Jorma Ed. (1996) *Work in the Information Society. Proceedings of the International Symposium, 20–22 May 1996, Helsinki, Finland.* Pp. 160–174. Helsinki, Finnish Institute of Occupational Health, Research Reports 8.

Huws, Ursula (1991) Telework: Projections. *Futures* 23(1): 19–31.

Huws, Ursula & Korte, Werner B. & Robinson, Simon (1990) *Telework. Towards the Elusive Office.* Chichester, John Wiley & Sons.

Häikiö, Martti (1992) *A Brief History of Modern Finland.* Helsinki, University of Helsinki – Lahti Research and Training Centre.

Häikiö, Martti (2002) *Nokia – The Inside Story.* Helsinki, Edita.

Härmä, Mikko (2003) Are Long Working Hours a Health Risk? *Scandinavian Journal of Work, Environment & Health* 29(3): 167–169.

ICT Cluster Finland Review 2005 Helsinki, Tieke – Finnish Information Society Development Centre.

Ito, Youichi (1981) The '*johoka shakai*' Approach to the Study of Communication in Japan. In Wilhoit, Cleveland G. & de Bock, Harold Eds. (1981) *Mass Communication Review Yearbook.* Vol. 2. Pp. 671–698. Beverly Hills, CA., Sage.

Jackson, Paul (1999) Introduction. From New Designs to New Dynamics. In Jackson, Paul Ed. (1999) *Virtual Working: Social and Organisational Dynamics.* Pp. 1–16. London, Routledge.

Jackson, Paul & van der Wielen, Jos M. (1998) Introduction. Actors, Approaches and Agendas: From Telecommuting to the Virtual Organisation. In Jackson, Paul & van der Wielen, Jos M. Eds. (1999) *Teleworking: International Perspectives. From Telecommuting to the Virtual Organisation.* Pp. 1–17. London, Routledge.

Jackson, Paul Ed. (1999) *Virtual Working: Social and Organisational Dynamics*. London, Routledge.

Jackson, Paul & Suomi, Reima Eds. (2002) *eBusiness and Workplace Redesign*. London, Routledge.

Jackson, Paul & van der Wielen, Jos M. Eds. (1998) *Teleworking: International Perspectives. From Telecommuting to the Virtual Organisation*. London, Routledge.

Jalava, Jukka & Pohjola, Matti (2002) Economic Growth in the New Economy: Evidence from Advanced Economies. *Information Economics and Policy* 14(2): 189–210.

Janz, Brian D. & Colquitt, Jason A. & Noe, Raymond A. (1997) Knowledge Worker Team Effectiveness: The Role of Autonomy, Interdependence, Team Development, and Contextual Support Variables. *Personnel Psychology* 50(4): 877–904.

Joncher, Charles (1983) Information Resources and Economic Productivity. *Information Economics and Policy* 1(1): 13–35.

Jones, Gareth R. (1998) *Organizational Theory. Text and Cases*. 2nd Edition. Reading, Mass., Addison-Wesley.

Julkunen, Raija & Nätti, Jouko (1999) *The Modernization of Working Times. Flexibility and Work Sharing in Finland*. University of Jyväskylä, SopHi.

Julkunen, Raija & Nätti, Jouko & Anttila, Timo (2004) *Aikanyrjähdys. Keskiluokka tietotyön puristuksessa*. Tampere, Vastapaino.

Julsrud, Tom Erik (1999) The Silent Transformation of the Workplace. Distribution of Norwegian Teleworkers 1995–1998. *Telektronikk* (95)4: 10–21.

Julsrud, Tom Erik (1999) Quest Editorial. *Telektronikk* (95)4: 3.

Jussawalla, Meheroo & Ebenfield, Helene Eds. (1984) *Communication and Information Economics. New Perspectives*. Amsterdam, North-Holland.

Jussawalla, Meheroo & Lamberton, Donald M. & Karunaratne, Neil D. Eds. (1988) *The Cost of Thinking: Information Economies of Ten Pacific Countries*. Norwood, N.J., Ablex.

Kaajas, Sani & Miikkulainen, Krista & Troberg, Eliisa (2001) *Tietotyöntekijöiden motivaatio ja sitoutuminen organisaatioonsa. Kyselytutkimusraportti*. Helsinki, LTT-Tutkimus.

Kalela, Jorma *et al*. Eds. (2001) *Down from the Heavens, Up from the Ashes. The Finnish Economic Crisis of the 1990s in the Light of Economic and Social Research*. Helsinki, VATT – Government Institute for Economic Research.

Kalthoff, Otto & Nonaka, Ikujiro & Nueno, Pedro (1997) *The Light and the Shadow. How Breakthrough Innovation is Shaping European Business*. Oxford, Capstone/Roland Berger Foundation.

Kasesmaa, Eija-Liisa (2003) *Mobile Messages. Young People and a New Communication Culture*. Tampere, Tampere University Press.

Kasvio, Antti (2001) The Emergence of 'Information Society' as a Major Social Scientific Research Programme. In Karvonen, Erkki Ed. (2001) *Informational Societies. Understanding the Third Industrial Revolution*. Pp. 19–47. Tampere, Tampere University Press.

Kasvio, Antti (2005) What Information Society? In Kasvio, Antti & Anttiroiko, Ari-Veikko Eds. (2005) *e-City. Analysing Efforts to Generate Local Dynamism in the City of Tampere*. Pp. 619–643. Tampere, Tampere University Press.

Kasvio, Antti & Anttiroiko, Ari-Veikko Eds. (2005) *e-City. Analysing Efforts to Generate Local Dynamism in the City of Tampere*. Tampere, Tampere University Press.

Katz, Raul L. (1986) Measurement and Cross-National Comparisons of Information Work Force. *The Information Society* 4(4): 231–277.

Katzenbach, Jon R. & Smith, Douglas K. (1993) *The Wisdom of Teams. Creating the High-Performance Organization*. Boston, Mass., Harvard Business School Press.

Katzenstein, Peter J. (1985) *Small States in World Markets. Industrial Policy in Europe*. Ithaca, Cornell University Press.

Kautto, Mikko (2001) *Diversity among Welfare States. Comparative Studies on Welfare State Adjustment in Nordic Countries*. Helsinki, Stakes – National Research and Development Centre for Welfare and Health.

Keinänen, Päivi (2001) Informaatiosektori tilastoissa – eräs määrittely yritys. *Hyvinvointikatsaus* 3/2001, 19–21.

Kelloway, Kevin E. & Barling, Julian (2000) Knowledge Work as Organizational Behavior. *International Journal of Management Reviews* 2(3): 287–304.

Kerr, Clark & Dunlop, John T. & Harbison, Frederick H. & Myers, Charles A. (1960) *Industrialism and the Industrial Man. The Problems of Labor and Management in Economic Growth*. Cambridge, Mass., Harvard University Press.

Khadria, Binod (1999) *The Migration of Knowledge Workers. Second-Generation Effects of India's Brain Drain*. New Delhi, Sage.

King, John Leslie & Frost, Robert L. (2002) Managing Distance over Time: The Evolution of Technologies of Dis/Ambiguation. In Hinds, Pamela & Kiesler, Sara Eds. (2002) *Distributed Work*. Pp. 3–26. Cambridge, Mass., The MIT Press.

Kinnunen, Ulla & Mauno, Saija & Nätti, Jouko & Happonen, Mika (1999) Perceived Job Insecurity: A Longitudinal Study Among Finnish Employees. *European Journal of Work and Organizational Psychology* 8(2): 243–260.

Kivimäki, Riikka (2004) In Search of Boundaries: Changing Boundaries in and through Teleworking. In Heiskanen, Tuula & Hearn, Jeff Eds. (2004) *Information Society and the Workplace. Spaces, Boundaries and Agency*. Pp. 178–190. London, Routledge.

Kling, Rob (1990) More Information, Better Jobs? Occupational Stratification and Labormarket Segmentation in the United States' Information Labor Force. *The Information Society* 7(2): 77–107.

Klinge, Matti (1997) *A Brief History of Finland*. Helsinki, Otava.

Koistinen, Pertti & Sengenberger, Werner Eds. (2002) *Labour Flexibility. A Factor of Economic and Social Performance of Finland in the 1990s*. Tampere, Tampere University Press.

Kolehmainen, Sirpa (2004) The Dynamics of Control and Commitment in IT Firms. In Heiskanen, Tuula & Hearn, Jeff Eds. (2004) *Information Society and the Workplace. Spaces, Boundaries and Agency*. Pp. 83–102. London, Routledge.

Kopomaa, Timo (2000) *The City in Your Pocket. Birth of the Mobile Information Society*. [Translated from Finnish by Tomi Snellman]. Helsinki, Gaudeamus.

Korte, Werner B. & Gareis, Karsten (2001) e-Work in Europe – Indicators for Measuring Adaptability of Work Arrangements. In *Report of the 8th European Assembly on New Ways to Work. 12.–14.9.2001 Finlandia Hall, Helsinki, Finland*. Pp. 46–65. Helsinki, Ministry of Labour.

Korte, Werner B. & Robinson, Simon & Steinle, Wolfgang J. Eds. (1988) *Telework: Present Situation and Future Development of a New Form of Work Organization*. Amsterdam, Elsevier Science Publishers.

Koski, Heli & Rouvinen, Petri & Ylä-Anttila, Pekka (2002) ICT Clusters in Europe: The Great Central Banana and the Small Nordic Potato. *Information Economics and Policy* 14(2): 145–165.

Kumar, Krishan (1978/1986) *Prophecy and Progress. The Sociology of Industrial and Post-Industrial Society*. Harmondsworth, Penguin.

Kumar, Krishan (1995) *From Post-Industrial to Post-Modern Society. New Theories of the Contemporary World*. Oxford, Blackwell.

Kuo, Eddie C.Y. & Low, Linda (2001) Information Economy and Changing Occupational Structure in Singapore. *The Information Society* 17(4): 281–293.

Kuusi, Osmo Ed. (1996) *Innovation Systems and Competitiveness*. Helsinki, ETLA – The Research Institute of the Finnish Economy.

Kvale, Steinar (1996) *InterViews: An Introduction to Qualitative Research Interviewing*. Thousand Oaks, Sage.

Lamberton, Donald M. (1982) The Theoretical Implications of Measuring the Communication Sector. In Lamberton, Donald M. & Jussawalla, Meheroo Eds. (1982) *Communication Economics and Development*. Pp. 36–59. New York, Pergamon Press.

Lamberton, Donald M. Ed. (1971) *Economics of Information and Knowledge. Selected Readings*. Harmondsworth, Penguin.

Lamberton, Donald M. & Jussawalla, Meheroo Eds. (1982) *Communication Economics and Development*. New York, Pergamon Press.

Landry, Charles (2000) *The Creative City. A Toolkit for Urban Innovators*. London, Earthscan.

Lave, Jean & Wenger, Etienne (1991) *Situated Learning. Legitimate Peripheral Participation*. Cambridge, Cambridge University Press.

Lavikka, Riitta (1997) *Big Sisters: Spacing Women Workers in the Clothing Industry. A Study on Flexible Production and Flexible Women.* Tampere, University of Tampere – Research Institute for Social Sciences.

Lavoie, Marie & Roy, Richard & Therrien, Pierre (2002) A Growing Trend Toward Knowledge Work in Canada. *Research Policy* 31(8): 1–18.

Lehto, Anna-Maija & Sutela, Hanna (2004) *Uhkia ja mahdollisuuksia. Työolotutkimusten tuloksia 1977–2003.* Helsinki, Tilastokeskus.

Leidner, Robin (1988) Home Work: A Study in the Interaction of Work and Family Organization. In Simpson, Richard L. & Simpson, Ida Harper Eds. (1988) *Research in the Sociology of Work.* Vol. 4. *High Tech Work.* Pp. 69–94. Greenwich, Connecticut, JAI Press.

Lewis, Suzan (2001) Problems of Work and Everyday Life Among the New Knowledge Workers. In Kasvio, Antti *et al.* Eds. (2001) *People, Cities and the New Information Economy. Materials from an International Conference in Helsinki, 14.–15. December 2000.* Pp. 64–73. Helsinki, Palmenia.

Lundqvist, Mats A. (1996) *Organizing Product Development – Formalizing the Informal in Interdependent Knowledge Work.* Göteborg, Department of Operations Management and Work Organization, Chalmers University of Technology, Sweden.

Luukinen, Ari Ed. (1996) *Directions of Telework in Finland. Report by the Finnish Experience with Telework Project.* Helsinki, Ministry of Labour.

Lyon, David (1986) From 'Post-Industrialism' to 'Information Society': A New Social Transformation? *Sociology* 21(4): 577–588.

Lyon, David (1988) *The Information Society: Issues and Illusions.* Cambridge, Polity Press.

Lyon, David (2001) *Surveillance Society. Monitoring Everyday Life.* Buckingham, Open University Press.

Machlup, Fritz (1962) *The Production and Distribution of Knowledge in the United States.* Princeton, N.J., Princeton University Press.

Maclup, Fritz (1980) *Knowledge and Knowledge Production.* Vol. I of *Knowledge: Its Creation, Distribution, and Economic Significance.* Princeton, N.J., Princeton University Press.

Machlup, Fritz & Kronwinkler, Trude (1975) Workers Who Produce Knowledge: A Steady Increase, 1900 to 1970. *Weltwirtschaftliches Archiv* 111(4): 752–759.

Maddison, Angus (1982) *Phases of Capitalist Development.* Oxford, Oxford University Press.

Maddison, Angus (1991) *Dynamic Forces in Capitalist Development. A Long-Run Comparative View.* Oxford, Oxford University Press.

Mann, Sandi & Holdsworth, Lynn (2003) The Psychological Impact of Teleworking: Stress, Emotions and Health. *New Technology, Work and Employment* 18(3): 196–211.

Mansell, Robin & Steinmueller, Edward W. (2000) *Mobilizing the Information Society. Strategies for Growth and Opportunity.* Oxford, Oxford University Press.

Martin, Paul & Metcalfe, Mike (2001) Informing the Knowledge Workers. *Reference Services Review* 29(4): 267–275.

Martin, Stana B. (1998) Information Technology, Employment, and the Information Sector: Trends in Information Employment 1970–1995. *Journal of the American Society for Information Science* 49(12): 1053–1069.

Masuda, Yoneji (1981) *The Information Society as Post-Industrial Society.* Washington, D.C., World Future Society.

Mattelart, Armand (2003) *The Information Society. An Introduction.* [Translated from French by Susan G. Taponier & James A. Cohen]. London, Sage.

May, Christopher (2002) *The Information Society. A Sceptical View.* Cambridge, Polity Press.

May, Tam Yeak-Mui & Korczynski, Marek & Frenkel, Stephen J. (2002) Organizational and Occupational Commitment: Knowledge Workers in Large Corporations. *Journal of Management Studies* 39(6): 775–801.

Mayo, Elton (1933) *The Human Problems of an Industrial Civilization.* New York, MacMillan.

Mayo, Elton (1945) *The Social Problems of an Industrial Civilization.* Boston, Mass., Harvard University Graduate School of Business Administration.

McDermott, Richard (1995) Working in Public – Learning in Action: Designing Collaborative Knowledge Work Teams. In Beyerlein, Michael M. & Johnson, Douglas A. & Beyerlein, Susan T. Eds. (1995) *Knowledge Work in Teams.* Vol. II of *Advances in Interdisciplinary Studies of Work Teams.* Pp. 35–59. Greenwich, Connecticut, JAI Press.

McLaughlin, Janice & Rosen, Paul & Skinner, David & Webster, Andrew (1999) *Valuing Technology. Organisations, Culture and Change*. London, Routledge.

Megill, Kenneth A. (2004) *Thinking for a Living: The Coming Age of Knowledge Work*. München, K.G. Saur.

Melin, Harri (1990) Managers and Social Classes. In Clegg, Stuart R. Ed. (1990) *Organization Theory and Class Analysis. New Approaches and New Issues*. Pp. 211–232. Berlin, Walter de Gruyter.

Miles, Ian (2002) Knowledge-Intensive Business Services: From Professional to Technological Knowledge. *Economic Trends* 2/2002, 34–36. (March–April).

Mills, C. Wright (1951/1956) *White Collar. The American Middle Classes*. New York, Oxford University Press.

Mintzberg, Henry (1983) *Structure in Fives. Designing Effective Organizations*. Englewood Cliffs, N.J., Prentice Hall.

Mohrman, Susan A. & Cohen, Susan G. & Mohrman, Allan M. Jr. (1995a) *Designing Team-Based Organizations. New Forms for Knowledge Work*. San Francisco, Jossey-Bass.

Mohrman, Susan A. & & Mohrman, Allan M. Jr. Cohen, Susan G. (1995b) Organizing Knowledge Work Systems. In Beyerlein, Michael M. & Johnson, Douglas A. & Beyerlein, Susan T. Eds. (1995) *Knowledge Work in Teams*. Vol. II of *Advances in Interdisciplinary Studies of Work Teams*. Pp. 35–59. Greenwich, Connecticut, JAI Press.

Monk, Peter (1989) *Technological Change in the Information Economy*. London, Pinter.

Morawski, Witold & Seppänen, Paavo (1978) Industrialization and Modernization. In Allardt, Erik & Wesolowski, Wlodzimierz Ed. (1978) *Social Structure and Change. Finland and Poland. Comparative Perspective*. Pp. 17–52. Warszawa, Polish Scientific Publishers.

Morgan, Gareth (1997) *Images of Organization*. 2nd Edition. London, Sage.

Moss Kanter, Rosabeth (1989) *When Giants Learn to Dance. Mastering the Challenges of Strategy, Management, and Careers in the 1990s*. New York, Simon & Schuster.

Mouzelis, Nicos (1995) *Sociological Theory: What Went Wrong? Diagnosis and Remedies*. London, Routledge.

Mueller, Michael J. *et al*. (1995) Telephone Operators as Knowledge Workers: Consultants who Meet Customer Needs. In *Proceedings of the SIGHI Conference on Human Factors in Computing Systems, 1995, Denver, Colorado, The United States*. Pp. 130–137. New York, ACM Press/Addison Wesley.

Myllyntaus, Timo (1990) The Finnish Model of Technology Transfer. *Economic Development & Cultural Change* 38(3): 625–643.

Myllyntaus, Timo (1991) *Electrifying Finland. The Transfer of a New Technology into a Late Industrialising Economy*. Basingstoke, MacMillan.

The New York Times International (6.2.2002) Not in Finland Anymore? More Like Nokialand. [By Alan Cowell]. P. A3.

Nandhakumar, Joe (1999) Virtual Teams and Lost Proximity. Consequences on Trust Relationships. In Jackson, Paul Ed. (1999) *Virtual Working: Social and Organisational Dynamics*. Pp. 46–56. London, Routledge.

Nass, Clifford I. (1988) Work, Information, and Information Work: A Retrospective and Prospective Framework. In Simpson, Richard L. & Simpson, Ida Harper Eds. (1988) *Research in the Sociology of Work*. Vol. 4. *High Tech Work*. Pp. 311–333. Greenwich, Connecticut, JAI Press.

Newell, Sue & Robertson, Maxine & Scarbrough, Harry & Swan, Jacky (2002) *Managing Knowledge Work*. Basingstoke, Palgrave.

Newman, Rhona & Newman, Julian (1985) Information Work: The New Divorce? *The British Journal of Sociology* 36(4): 497–515.

Ngwenyama, Ojelanki K. (1998) Groupware, Social Action and Organizational Emergence: On the Process Dynamics of Computer Mediated Distributed Work. *Accounting, Management and Information Technologies* 8(2–3): 127–146.

Nieminen, Hannu & Saarela, Pekka & Kantanen, Mari (2000) Teollisuustuotannon automaatiojärjestelmien ergonomia. *Työ ja ihminen* 14(2): 118–124.

Nieminen, Mika (2005) *Academic Research in Change. Transformation of Finnish University Policies and University Research during the 1990s*. Helsinki, The Finnish Society of Sciences and Letters.

Nilles, Jack M. (1998) *Managing Telework. Strategies for Managing the Virtual Workforce.* New York, John Wiley & Sons.

Nilles, Jack M. & Carlson, Roy F. Jr. & Gray, Paul & Hanneman, Gerhard J. (1976) *The Telecommunications-Transportation Tradeoff. Options for Tomorrow.* New York, John Wiley & Sons.

Nonaka, Ikujiro & Takeuchi, Hirotaka (1995) *The Knowledge-Creating Company. How Japanese Companies Create the Dynamics of Innovation.* Oxford, Oxford University Press.

Nordic Information Society Statistics 2002 Helsinki, Nordic Council of Ministers.
http://www.stat.fi/tk/yr/tietoyhteiskunta/nordic_iss_02.pdf (19.1.2003).

Nordic Information Society Statistics 2005 Copenhagen, Nordic Council of Ministers.
http://www.stat.fi/tk/yr/tietoyhteiskunta/nordic_information_society_2005.pdf (7.3.2006).

Nätti, Jouko & Anttila, Timo & Väisänen, Mia (2004) Knowledge Work, Working Time and Use of Time in Households. Paper Presented at *The 26th IATUR Annual Conference on Time Use Research*, 27–29 October 2004, Rome, Italy.

OECD (1981) *Information Activities, Electronics and Telecommunications Technologies. Impact on Employment, Growth and Trade.* Vol. I. Paris, Organisation for Economic Co-operation and Development.

OECD (1997) Is Job Insecurity on the Increase in OECD Countries? In *Employment Outlook. July 1997.* Pp. 129–160. Paris, Organisation for Economic Co-operation and Development.

OECD (1999) *The Economic and Social Impact of Electronic Commerce. Preliminary Findings and Research Agenda.* Paris, Organisation for Economic Co-operation and Development.

OECD (2003a) *The E-Government Imperative: Main Findings.* [OECD Policy Brief]. Paris, Organisation for Economic Co-operation and Development.
http://www.oecd.org/dataoecd/60/60/2502539.pdf (3.10.2003).

OECD (2003b) *E-Government in Finland: An Assessment.* [OECD Policy Brief]. Paris, Organisation for Economic Co-operation and Development.
http://www.oecd.org/dataoecd/20/50/13314420.pdf (30.9.2003).

OECD (2003c) *OECD Economic Survey of Finland, 2003.* [OECD Policy Brief]. Paris, Organisation for Economic Co-operation and Development.
http://www.oecd.org/dataoecd/40/34/2492040.pdf (28.10.2004).

OECD (2004) *OECD Economic Survey of Finland, 2004.* [OECD Policy Brief]. Paris, Organisation for Economic Co-operation and Development.
http://www.oecd.org/dataoecd/21/33/33772557.pdf (28.10.2004).

OECD (2005a) *Economic Policy Reforms. Going for Growth.* Paris, Organisation for Economic Co-operation and Development.

OECD (2005b) *Innovation Policy and Performance: A Cross-country Comparison.* Paris, Organisation for Economic Co-operation and Development.

Okkonen, Jussi (2004) *The Use of Performance Measurement in Knowledge Work Context.* Tampere, e-Business Research Center.

O'Leary, Michael & Orlikowski, Wanda & Yates, JoAnne (2002) Distributed Work over the Centuries: Trust and Control in the Hudson's Bay Company, 1670–1826. In Hinds, Pamela & Kiesler, Sara Eds. (2002) *Distributed Work.* Pp. 27–54. Cambridge, Mass., The MIT Press.

Paakkolanvaara, Elli (1988) *Informaatioyhteiskunta ja informaatioammatit.* Helsinki, Statistics Finland.

Paavonen, Walter (1999) Telecottages and Other Work Centre Experiments. *Telektronikk* (95)4: 64–68.

Paija, Laura (2001) What is Behind the Finnish 'ICT Miracle'? *The Finnish Economy and Society* 17(3): 51–54.

Parkkinen, Pekka (2004) *Hoiva- ja hoitopalvelumenot tulevaisuudessa.* Helsinki, VATT – Government Institute for Economic Research.

Peiperl, Maury A. & Arthur, Michael B. & Anand, N. Eds. (2002) *Career Creativity: Explorations in the Remaking of Work.* Pp. 35–57. Oxford, Oxford University Press.

Pekkola, Juhani (1997) Labour Market Position of Teleworkers and Employees in Information Occupations. Paper Presented at *The 2nd European Telework Festival*, 20–22 March 1997, Serre-Chevalier, Hautes Alpes, France.

Pekkola, Juhani (2002) *Etätyö Suomessa. Fyysiset, virtuaaliset, sosiaaliset ja henkiset työtilat etätyöympäristöinä.* Helsinki, Svenska handelshögskolan.

Pekkola Juhani Ed. (1993) *Telework – A New Touch. Flexiwork Perspectives in the European and Nordic Labour Markets.* Helsinki, Ministry of Labour.

Perelman, Michael (1998) *Class Warfare in the Information Age.* London, MacMillan.

Pesonen, Pertti & Riihinen, Olavi (2002) *Dynamic Finland. The Political System and the Welfare State.* Helsinki, SKS – Finnish Literature Society.

Peters, Thomas J. & Waterman, Robert H. Jr. (1982) *In Search of Excellence. Lessons from America's Best-run Companies.* New York, Harper & Row.

Piore, Michael J. & Sabel, Charles F. (1984) *The Second Industrial Divide. Possibilities for Prosperity.* New, York Basic Books.

Pitkänen, Ritva & Sauramo, Pekka (2005) *Pääoman lähtö. Suomalaisten yritysten kansainvälistyminen ja tulopolitiikka.* Helsinki, Palkansaajien tutkimuslaitos – The Labour Institute for Economic Research.

Poirier, René (1990) The Information Economy Approach: Characteristics, Limitations, and Future Prospects. *The Information Society* 7(4): 245–285.

Polanyi, Michael (1966) *The Tacit Dimension.* New York, Doubleday.

Pool, Ithiel De Sola & Inose, Hiroshi & Takasaki, Nozumo & Hurwitz, Roger (1984) *Communications Flows. A Census in the United States and Japan.* Amsterdam, North-Holland/University of Tokyo Press.

Porat, Marc Uri (1977) *The Information Economy: Definition and Measurement.* Vol. I. Washington, D.C., US Department of Commerce, Office of Telecommunications, Special Publication 77–12 (1), May.

Porat, Marc Uri (1978) Global Implications of the Information Society. *Journal of Communications* 28(1): 70–80.

Porter, Michael E. (1990) *The Competitive Advantage of Nations.* London, MacMillan.

Porter, Michael E. (2004) Global Competition, Clusters and Finland's Wireless Valley. In Steinbock, Dan (2004) *What Next? Finnish ICT Cluster and Globalization.* Pp. 13–17. Helsinki, Ministry of the Interior Finland.

Procter, Stephen & Mueller, Frank Eds. (2000) *Teamworking.* London, MacMillan.

Purser, Ronald E. & Montuori, Alfonso (1995) Varieties of Knowledge Work Experience: A Critical Systems Inquiry into the Epistemologies and Mindscapes of Knowledge Production. In Beyerlein, Michael M. & Johnson, Douglas A. & Beyerlein, Susan T. Eds. (1995) *Knowledge Work in Teams.* Vol. II of *Advances in Interdisciplinary Studies of Work Teams.* Pp. 35–59. Greenwich, Connecticut, JAI Press.

Pyöriä, Pasi (1999a) Informaatioyhteiskunnan visiot tulevaisuuden tutkimuksen haasteena. *Futura* 4(18): 25–34.

Pyöriä, Pasi (1999b) Teorianmuodostuksesta ja metateorian asemasta yhteiskuntatieteissä. *Tiedepolitiikka* 3(24): 23–34.

Pyöriä, Pasi (1999c) Yhteiskuntatieteiden legitimaatio tuloskriteerien kurimuksessa. *Tiedepolitiikka* 1(24): 13–20.

Pyöriä, Pasi (2000a) Kulttuurikritiikin käsitteestä, historiasta ja kohtalosta: viisi teesiä sosiologisen kerronnan muotokielestä. *Synteesi* 2(19): 17–26.

Pyöriä, Pasi (2000b) Sosiologian kaksi kriisiä. *Tiedepolitiikka* 2(25): 47–57.

Pyöriä, Pasi (2001a) Surveytutkijan ensikokemuksia kenttätyöstä. *Hyvinvointikatsaus* 2/2001, 63–65.

Pyöriä, Pasi (2001b) Tietotyössäkö tulevaisuus? *Hyvinvointikatsaus* 1/2001, 7–12.

Pyöriä, Pasi (2001c) Tietoyhteiskunta selviytymistarinana. *Yhteiskuntapolitiikka* 5(66): 499–500.

Pyöriä, Pasi (2002a) Tietotyö, työelämän muutos ja hyvinvointi. In Härmä, Mikko & Nupponen, Tarja Eds. (2002) *Työn muutos ja hyvinvointi tietoyhteiskunnassa.* Pp. 57–67. Helsinki, Sitra.

Pyöriä, Pasi (2002b) Tietotyöläiset kuplan puhkeamisen jälkeen. *Economic Trends* 2/2002, 18–20.

Pyöriä, Pasi (2003a) Eriarvoinen tietoyhteiskunta. In Melin, Harri & Nikula, Jouko Eds. (2003) *Yhteiskunnallinen muutos.* Pp. 193–205. Tampere, Vastapaino.

Pyöriä, Pasi (2003b) The Finnish Information Society: Progressive yet Vulnerable. *The Finnish Economy and Society* 2/2003, pp. 63–69.

Pyöriä, Pasi (2003c) Knowledge Work in Distributed Environments: Issues and illusions. *New Technology, Work and Employment* 18(3): 166–180.

Pyöriä, Pasi (2003d) Trend Towards Post-Bureaucratic Organisations? *Economic Trends* 6/2003, 22–25.

Pyöriä, Pasi (2004a) Etätyöstä ei ole syrjäseutujen pelastajaksi. *Kuntapuntari* 1/2004, 48–50.

Pyöriä, Pasi (2004b) Onko keskiluokka totuus suomalaisesta tietoyhteiskunnasta? *Työelämän tutkimus – Arbetslivsforskning* 1(2): 57–61.

Pyöriä, Pasi (2005a) The Concept of Knowledge Work Revisited. *Journal of Knowledge Management* 9(3): 116–127.

Pyöriä, Pasi (2005b) A Growing Trend Towards Knowledge Work in Finland. *The Finnish Economy and Society* 23(2): 83–89.

Pyöriä, Pasi (2005c) Hajautetun työn haasteet – esimerkkinä it-ala. *Työpoliittinen Aikakauskirja* 48(3): 48–59.

Pyöriä, Pasi (2005d) Information Technology, Human Relations and Knowledge Work Teams. *Team Performance Management: An International Journal* 11(3–4): 104–112.

Pyöriä, Pasi (2005e) Tietotyön kasvu ohittanut lakipisteensä: asiantuntijoita koulutetaan jo liikaa. *Tieto & trendit* 1/2005, 39–41.

Pyöriä, Pasi (2005f) Työelämän muutos tietoyhteiskunnassa. In Kasvio, Antti & Inkinen, Tommi & Liikala, Hanna Eds. (2005) *Tietoyhteiskunta: myytit ja todellisuus*. Pp. 155–172. Tampere, Tampere University Press.

Pyöriä, Pasi & Melin, Harri & Blom, Raimo (2005) *Knowledge Workers in the Information Society. Evidence from Finland*. Tampere, Tampere University Press.

Qvortrup, Lars (1998) From Teleworking to Networking. Definitions and Trends. In Jackson, Paul & van der Wielen, Jos M. Eds. (1998) *Teleworking: International Perspectives. From Telecommuting to the Virtual Organisation*. Pp. 21–39. London, Routledge.

Rantanen, Jorma & Lehtinen, Suvi (2000) Health and the Information Society. In Ducatel, Ken & Webster, Juliet & Herrman, Werner Eds. (2000) *The Information Society in Europe. Work and Life in an Age of Globalization*. Pp. 175–199. Lanham, Rowman & Littlefield.

Reich, Robert B. (1991) *The Work of Nations. Preparing Ourselves for 21st-Century Capitalism*. New York, Alfred A. Knoppf.

Resnick, Stephen A. & Wolff, Richard D. (1987) *Knowledge and Class. A Marxian Critique of Political Economy*. Chicago, The University of Chicago Press.

Rifkin, Jeremy (1995) *The End of Work. The Decline of the Global Labor Force and the Dawn of the Post-Market Era*. New York, G.P. Putnam's Sons.

Robertson, Maxine & Sørensen, Carsten & Swan, Jacky (2001) Survival of the Leanest: Intensive Knowledge Work and Groupware Adaptation. *Information Technology & People* 14(4): 334–352.

Robins, Kevin & Webster, Frank (1999) *Times of the Technoculture. From the Information Society to the Virtual Life*. London, Routledge.

Robinson, Sherman (1986) Analyzing the Information Economy: Tools and Techniques. *Information Processing & Management* 22(3): 183–202.

Roethlisberger, Fritz J. & Dickson, William J. (1939/1949) *Management and the Worker. An Account of a Research Program Conducted by the Western Electric Company, Hawthorne Works, Chicago*. [With the assistance and collaboration of Harold A. Wright]. Cambridge, Mass., Harvard University Press.

Rouvinen, Petri (2001) Finland on Top of the Competitiveness Game? *The Finnish Economy and Society* 17(4): 53–60.

Rouvinen, Petri & Maliranta, Mika (2003) ICT Boosts Productivity but is Not a Panacea. *The Finnish Economy and Society* 19(2): 58–62.

Royal, Carol & Althauser, Robert P. (2003) The Labor Markets of Knowledge Workers. Investment Bankers' Careers in the Wake of Corporate Restructuring. *Work and Occupations* 30(2): 214–233.

Rubery, Jill & Grimshaw, Damian (2001) ICTs and Employment: The Problem of Job Quality. *International Labour Review* 140(2): 165–192.

Rubin, Herbert J. & Rubin, Irene S. (2005) *Qualitative Interviewing: The Art of Hearing Data*. 2nd Edition. Thousand Oaks, Sage.

Rubin, Michael Rogers (1983) *Information Economics and Policy in the United States*. Littleton, Libraries Unlimited.

Rubin, Michael Rogers & Huber, Mary Taylor (1986) *The Knowledge Industry in the United States 1960–1980*. [With Elizabeth Lloyd Taylor]. Princeton, N.J., Princeton University Press.

Rubin, Michael Rogers & Taylor, Elizabeth (1981) The U.S. Information Sector and GNP: An Input-Output Study. *Information Processing & Management* 17(4): 163–194.

Ruhleder, Karen (1995) Computerization and Changes to Infrastructures for Knowledge Work. *The Information Society* 11(2): 131–144.

Sahraoui, Sofiana (2001) Harnessing Knowledge Workers' Participation for IT Planning Effectiveness: The Informational and Motivational Mediating Effects of Users' Microplanning Behaviour. *Behaviour & Information Technology* 20(1): 69–77.

Sassen, Saskia (2002) Towards a Sociology of Information Technology. *Current Sociology* 50(3): 365–388.

Savage, Mike & Egerton, Muriel (1997) Social Mobility, Individual Ability and Inheritance of Class Inequality. *Sociology* 31(4): 645–672.

Sayer, Andrew & Walker, Richard (1992) *The New Social Economy. Reworking the Division of Labor*. Oxford, Blackwell.

Scarbrough, Harry (1999) Knowledge as Work: Conflicts in the Management of Knowledge Workers. *Technology Analysis and Strategic Management* 11(1): 5–16.

Schement, Jorge Reina (1990) Porat, Bell, and the Information Society Reconsidered: The Growth of Information Work in the Early Twentieth Century. *Information Processing & Management* 26(4): 449–465.

Schement, Jorge Reina & Lievrouw, Leah (1984) A Behavioural Measure of Information Work. *Telecommunications Policy* 8(4): 321–334.

Schement, Jorge Reina & Curtis, Terry (1995) *Tendencies and Tensions of the Information Age. The Production and Distribution of Information in the United States*. New Brunswick, Transaction.

Schultze, Ulrike (2000) A Confessional Account of an Ethnography About Knowledge Work. *MIS Quarterly* 24(1): 3–41.

Schumpeter, Joseph A. (1942/1976) *Capitalism, Socialism and Democracy*. London, George Allen & Unwin.

Schienstock, Gerd (2001) Towards a European Information Economy. Convergence or Divergence? *Poiesis Prax* 1(1): 47–65.

Schienstock, Gerd (2005) Regional Competitiveness: A Comparative Study of Eight European Regions. In Kasvio, Antti & Anttiroiko, Ari-Veikko Eds. (2005) *e-City. Analysing Efforts to Generate Local Dynamism in the City of Tampere*. Pp. 93–129. Tampere, Tampere University Press.

Sellen, Abigail J. & Harper, Richard H.R. (2002) *The Myth of the Paperless Office*. Cambridge, Mass., The MIT Press.

Sennett, Richard (1998) *The Corrosion of Character. The Personal Consequences of Work in the New Capitalism*. New York, W.W. Norton & Company.

Shani, A.B. (Rani) & Sena, James A. & Stebbins, Michael W. (2000) Knowledge Work Teams and Groupware Technology: Learning from Seagate's Experience. *Journal of Knowledge Management* 4(2): 111–124.

Sheptycki, J.W.E. (1998) The Global Cops Cometh: Reflections on Transnationalization, Knowledge Work and Policing Subculture. *British Journal of Sociology* 49(1): 57–74.

Shifflet, Mark (2001) Information-Sector Growth in Market and Nonmarket Economies: A Comparative Case Study. *The Information Society* 17(3): 165–177.

Siltala, Juha (2004) *Työelämän huonontumisen lyhyt historia. Muutokset hyvinvointivaltioiden ajasta globaaliin hyperkilpailuun*. Helsinki, Otava.

Simpson, Richard L. & Simpson, Ida Harper Eds. (1988) *Research in the Sociology of Work*. Vol. 4. *High Tech Work*. Greenwich, Connecticut, JAI Press.

Singleton, Fred (1986) *The Economy of Finland in the Twentieth Century*. Bradford, University of Bradford.

Singleton, Fred (1998) *A Short history of Finland*. 2nd Edition. [Revised and updated by A.F. Upton]. Cambridge, Cambridge University Press.

Smith, Alan D. & Rupp, William T. (2002) Communication and Loyalty among Knowledge Workers: A Resource of the Firm Theory View. *Journal of Knowledge Management* 6(3): 250–261.

Soete, Luc (2001) ICTs, Knowledge Work and Employment: The Challenges to Europe. *International Labour Review* 140(2): 143–163.

Standen, Peter & Daniels, Kevin & Lamond, David (1999) The Home as a Workplace: Work-Family Integration and Psychological Well-Being in Telework. *Journal of Occupational Health Psychology* 4(4): 368–381.

Starbuck, William (1992) Learning by Knowledge-intensive Firms. *Journal of Management Studies* 29(6): 713–740.

Starbuck, William (1993) Keeping a Butterfly and an Elephant in a House of Cards: The Elements of Exceptional Success. *Journal of Management Studies* 30(6): 885–921.

Statistics Finland (1999) *On the Road to the Finnish Information Society II*. Helsinki, Statistics Finland.

Statistics Finland (2001) *On the Road to the Finnish Information Society III*. Helsinki, Statistics Finland.

Statistics Finland (2004) *On the Road to the Finnish Information Society IV*. Helsinki, Statistics Finland.

Steinbock, Dan (1998) *The Competitive Advantage of Finland. From Cartels to Competition?* Helsinki, ETLA – The Research Institute of the Finnish Economy.

Steinbock, Dan (2001) *The Nokia Revolution. The Story of an Extraordinary Company that Transformed an Industry*. New York, Amacom.

Steinbock, Dan (2003) *Wireless Horizon. Strategy and Competition in the Worldwide Mobile Marketplace*. New York, Amacom.

Steinbock, Dan (2004a) Pioneer Strategies are Not Enough. *Economic Trends* 4/2004, 7–10.

Steinbock, Dan (2004b) *What Next? Finnish ICT Cluster and Globalization.* Helsinki, Ministry of the Interior Finland.

Steinbock, Dan (2005) *The Mobile Revolution. The Making of Mobile Services Worldwide*. London, Kogan Page.

Steward, Barbara (2000) Changing Times: The Meaning, Measurement and Use of Time in Teleworking. *Time & Society* 9(1): 57–74.

Straub, Detmar & Karahanna, Elena (1998) Knowledge Worker Communications and Recipient Availability. Toward a Tasks Closure Explanation of Media Choice. *Organization Science* 9(2): 160–175.

Sulek, Joanne & Marucheck, Ann (1994) The Impact of Information Technology on Knowledge Workers. Deskilling or Intellectual Specialization. *Work Study* 43(1): 5–13.

Sullivan, Cath (2003) What's in a Name? Definitions and Conceptualisations of Teleworking and Homeworking. *New Technology, Work and Employment* 18(3): 158–165.

Suomi, Reima & Pekkola, Juhani (1998) Inhibitors and Motivators for Telework: Some Finnish Experiences. *European Journal of Information Systems* 7(4): 221–231.

Suomi, Reima & Pekkola, Juhani (1999) Management Rationalities and Virtual Working: Adjusting Telework to Different Organisational Cultures and Rationalities. In Jackson, Paul Ed. (1999) *Virtual Working: Social and Organisational Dynamics*. Pp. 121–130. London, Routledge.

Suomi, Reima & Luukinen, Ari & Pekkola, Juhani & Zamindar, Marya (1998) Telework – The Critical Management Dimension. In Jackson, Paul & van der Wielen, Jos M. Eds. (1998) *Teleworking: International Perspectives. From Telecommuting to the Virtual Organisation*. Pp. 329–336. London, Routledge.

Sveiby, Karl-Erik & Simons, Roland (2002) Collaborative Climate and Effectiveness of Knowledge Work – An Empirical Study. *Journal of Knowledge Management* 6(5): 420–433.

Syed, Jaffer R. (1998) An Adaptive Framework for Knowledge Work. *Journal of Knowledge Management* 2(2): 59–69.

Södergren, Birgitta (2002) Paths to Creativity for Knowledge-Intensive Workers. In Peiperl, Maury A. & Arthur, Michael B. & Anand, N. Eds. (2002) *Career Creativity: Explorations in the Remaking of Work*. Pp. 35–57. Oxford, Oxford University Press.

Taylor, Frederick Winslow (1911) *The Principles of Scientific Management*. New York, Harper & Brothers.

Taylor, Kit Sims (1998) The Brief Reign of the Knowledge Worker: Information Technology and Technological Unemployment. Paper presented at the International Conference on the Social Impact of Information Technologies, St. Louis, Missouri, USA, October 12.–14.1998. http://distance-ed.bcc.ctc.edu/econ/kst/BriefReign/BRwebversion.htm (23.6.2003).

Taylor, Philip & Mulvey, Gareth & Hyman, Jeff & Bain, Peter (2002) Work Organization, Control and the Experience of Work in Call Centres. *Work, Employment and Society* 16(1): 133–150.

Teo, Thompson S.H. & Lim, Vivien K.G. & Wai, Sook Har (1998) An Empirical Study of Attitudes Towards Teleworking among Information Technology (IT) Personnel. *International Journal of Information Management* 18(5): 329–343.

Thompson, Paul & Warhurst, Chris & Callaghan, George (2000) Human Capital or Capitalising on Humanity? Knowledge, Skills and Competencies in Interactive Service Work. In Prichard, Craig & Hull, Richard & Chumer, Mike & Willmott, Hugh Eds. (2000) *Managing Knowledge. Critical Investigations of Work and Learning.* Pp. 122–140. New York, St. Martin's Press.

Thompson, Paul & Warhurst, Chris Eds. (1998) *Workplaces of the Future*. London, MacMillan.

Tjosvold, Dean & Tjosvold, Mary M. (1995) Cross-Functional Teamwork: The Challenge of Involving Professionals. In Beyerlein, Michael M. & Johnson, Douglas A. & Beyerlein, Susan T. Eds. (1995) *Knowledge Work in Teams.* Vol. II of *Advances in Interdisciplinary Studies of Work Teams.* Pp. 1–34. Greenwich, Connecticut, JAI Press.

Toffler, Alvin (1971) *Future Shock*. London, Pan Books.

Toffler, Alvin (1980) *The Third Wave*. Toronto, Bantam Books.

Touraine, Alain (1969/1974) *The Post-Industrial Society. Tomorrow's Social History: Classes, Conflicts and Culture in the Programmed Society.* [Translated from French by Leonard F.X. Mayhew]. London, Wildwood House.

Touraine, Alain (1992/1995) *Critique of Modernity*. [Translated from French by David Macey]. Oxford, Blackwell.

Tovstiga, George (1999) Profiling the Knowledge Worker in the Knowledge-Intensive Organization: Emerging Roles. *International Journal of Technology Management* 18(5–8): 731–744.

Trahair, Richard C.S. (1984) *The Humanist Temper. The Life and Work of Elton Mayo*. New Brunswick, Transaction.

Trauth, Eileen M. (2000) *The Culture of an Information Economy. Influences and Impacts in the Republic of Ireland.* Dordrecht, Kluwer.

Vartia, Pentti & Nikinmaa, Timo (2004) What Do Competitiveness Comparisons Tell Us? *The Finnish Economy and Society* 22(4): 74–79.

Vartiainen, Matti & Kokko, Niina & Hakonen, Marko (2004) *Hallitse hajautettu organisaatio. Paikan, ajan, moninaisuuden ja viestinnän johtaminen*. Helsinki, Talentum.

Venkatesh, Alladi & Vitalari, Nicholas P. (1992) An Emerging Distributed Work Arrangement: An Investigation of Computer-Based Supplemental Work at Home. *Management Science* 38(12): 1687–1706.

Views on Finnish Technology 2006 Helsinki, Tekes – The National Technology Agency.

Wacjman, Judy (2002) Addressing Technological Change: The Challenge to Social Theory. *Current Sociology* 50(3): 347–363.

Warhurst, Chris & Thompson, Paul (1998a) Hands, Hearts and Minds: Changing Work and Workers at the End of the Century. In Thompson, Paul & Warhurst, Chris Eds. (1998) *Workplaces of the Future*. Pp. 1–24. London, MacMillan.

Warhurst, Chris & Thompson, Paul (1998b) Shadowland: The Real Story of Knowledge Work and Workers. Paper Presented at *The 16th Annual Labour Process Conference*, 7–9 April 1998, Manchester School of Management, UMIST, Manchester, England.

Waterson, Patrick E. & Clegg, Chris W. & Axtell, Carolyn M. (1997) The Dynamics of Work Organization, Knowledge and Technology During Software Development. *International Journal of Human-Computer Studies* 46(1): 79–101.

Weber, Max (1904–1905/1971) *The Protestant Ethic and the Spirit of Capitalism*. [Translated from German by Talcott Parsons]. London, Unwin University Books.

Weber, Max (1922/1968) *Economy and Society. An Outline of Interpretative Sociology.* Two Vols. [Edited by Guenther Roth and Claus Wittich]. Berkeley, University of California Press.

Webster, Frank & Robins, Kevin (1986) *Information Technology. A Luddite Analysis.* Norwood, N.J., Ablex.

Wellman, Barry *et al.* (1996) Computer Networks as Social Networks: Collaborative Work, Telework, and Virtual Community. *Annual Review of Sociology* 22(1): 213–238.

Wenger, Etienne (1998) *Communities of Practice. Learning, Meaning, and Identity.* Cambridge, Cambridge University Press.

Whutnow, Robert & Shrum, Wesley (1983) Knowledge Workers as a "New Class". Structural and Ideological Convergence among Professional-technical Workers and Managers. *Work and Occupations* 10(4): 471–487.

Wijayanayake, Janaka & Higa, Kunihiko (1999) Communication Media Choice by Workers in Distributed Environment. *Information & Management* 36(6): 329–338.

Winslow, Charles D. & Bramer, William L. (1994) *FutureWork. Putting Knowledge to Work in the Knowledge Economy.* New York, The Free Press.

Wired (September 1999) Just Say Nokia. [By Steve Silberman]. Pp. 134–149.

Womack, James P. & Jones, Daniel T. (1996) *Lean Thinking. Banish Waste and Create Wealth in Your Corporation.* New York, Simon & Schuster.

Womack, James P. & Jones, Daniel T. & Roos, Daniel (1990) *The Machine that Changed the World.* New York, Rawson.

Wright, Erik Olin (1978) *Class, Crisis and the State.* London, Verso.

Wright, Erik Olin (1997) *Class Counts. Comparative Studies in Class Analysis.* Cambridge, Cambridge University Press.

Yeatts, Dale E. & Hyten, Cloyd (1998) *High-Performing Self-Managed Work Teams. A Comparison of Theory and Practice.* London, Sage.

Yin, Robert K. (1989) *Case Study Research. Design and Methods.* Revised Edition. London, Sage.

Zamindar, Marya (1995) *Telework in Finland. Factors Behind Telework Use as Seen from an Employer Perspective.* Helsinki, Ministry of Labour.

Zamindar, Marya (1997) *Forecasting Flexibility. The Impact of Flexibility on Workers in Finland.* Helsinki, Ministry of Labour.

Zuboff, Shoshana (1988) *In the Age of the Smart Machine. The Future of Work and Power.* New York, Basic Books.