STS

senter for teknologi og samfunn

Trond Arne Undheim

What the Net can't do!
A critique of the idea of
nomadic knowledge production

STS-working paper 1/00

arbeidsnotat
working paper

What the Net can't do!

A critique of the idea of nomadic knowledge production

By Trond Arne Undheim

Research Fellow, Center for technology and society
Norwegian University of Science and Technology
email: trond.undheim@hf.ntnu.no

&

Research associate, UC Berkeley – Department of Sociology
Department of Sociology UC Berkeley
410 Barrows Hall Berkeley, CA 94720-1980
email: trondun@uclink.berkeley.edu

1

Abstract

Contemporary hype on the promise of wireless communications does not take into account the place-intensive nature of work. Internet changes work, but there's more to work than Internet. The nomadic worker - who is on the move, working 'anyplace', 'anytime' - is still far from a reality. Innovative work is social in nature, and social still means the possibility of face-to-face interaction. Face-to-face work is about transforming tacit knowledge. This process is a sort of convincing-work; first pitching the idea to someone, then stirring-up conceptual energy to «freeze» their attention. Knowledge occurs when we activate a hyperspace around our flow of informations. The fundamental 'place making' practices in what we label 'knowledge intensive encounter spaces' often rely on physical co-presence. Place-making depends on the extent to which the characteristics, opportunities and threats of the network society (Castells, 1996) are understood by the actors. Communication technology mediates, sustains, and alters the making of places but does not make it less important. The article provides a conceptual overview of visions and reality in today's high tech workplace, drawing upon fieldwork and available data on work-space relationships in innovation centers, and network regions in Silicon Valley, Norway, and Cambridge, UK (Castells, 1994, 1996; Saxenian, 1994, 1999, Thorvik & Undheim, 1998).

Introduction

If we are to believe the high tech marketing buzz, the Net can do anything these days. A new type of visionaries, storytellers and global nomads is emerging. This virtual class dominates the corporate scene. Their visionary ideas rule the territory. Together, these new globetrotters are changing the ways we think about work, community and life-style. But where virtual visions seem to mean the 'death of geography', these new patterns of mobility meet the challenge of maintaining real relationships and sustaining innovative work-environments. The ideas of CEOs in multinationals, cyber commentators, strategists and technologists are met by the nomadic experiences of today's knowledge workers.

The idea of a nomadic production of knowledge is appealing at first sight. The value of nomadic detachment has been a powerful argument of postmodern critical thinking for decades. Apparently, this leads to conceptual freedom of expression, and its unstability erases the pitfall of group thinking, ethnocentrism, and myopic perspectives. The Net is a convenient carrier of nomadic promise. The only problem is that to knowledge the Net is merely a mirror. And in many instances, not even that. The view that knowledge flows freely on the Net is to say that the process of tranfering information to knowledge is an issue of mere conversion. It is not. The scale is never the same, and the knowledge is sticky. It does not lend itself to being transferred. This is the essential problem behind any kind of knowledge work across virtual bandwidth.

Today's knowledge worker – the switcher and pitcher of knowledge in business and academia – is evidence of this. While his experience and outlook might be nomadic, his work-practice is not. His main activity is to «freeze» knowledge so that it can become useful. The issue is not where and how you access what amount of information, but how you process and pitch it in the right context. This is where the real test comes in. The knowledge worker is engaged in convincing work. In order to convince colleagues, customers, and capitalists alike, the Net is not enough!

The myth of nomadic knowledge work is among the most powerful tropes of contemporary society. Today, wireless communication, heralded as the ability to communicate anytime, anywhere - means pondering with clumsy devices like the Palm Pilot and other small handheld gadgets. Palm has sold 4 million units. This article tries, among other things, to describe why this is more than enough already, mapping out the sociological underpinnings of wireless communication technology, criticizing the notion of nomadic production of knowledge. Nomads, as we know, cannot accumulate, because they are running around. This is another problem for

those of us who could be seen as nomadic knowledge professionals. We just do not get enough time to think, to digest, and to relate our experience to what really matters. Knowledge work, therefore, often is more like knowledge production. When work is production, it is lifted out of the context of place as well as of personal experience. When this happens, we loose its crucial components. As Sennet (1998) claims, this contributes to the corrosion of character. We end up with «portable social skills», but no integrity.

In *The Dream Society*, «the workplace can be wherever you happen to be at any particular moment. We will be able to communicate anything, at any time, to any place – and we will be able to do so in full color. This is the technological background for the disappearance of the work-place as we know it. We can work at home, on the plane, aboard the yacht, and on vacation in Borneo. The geographical dimension to work has been abolished» (Jensen, 1999:130). The Nokia Wireless Future lab says that soon a customized data environment will follow you everywhere, they call it the 'personal bubble' (Wired magazine, October 1999). The long-range vision is that once we stop thinking of the phone as a handset with a keyboard, we envision «applications that bring the information close to our senses: eyeglasses, earphones, wearable wireless». Indeed, all these displays could be imputs, recording everything you see and hear, and shipping it all off to your personal server». Such is the tale of what incidentally could become the latest capitalist conquest – the conquest of the body (Hozic, 1999:21, citing Bukatman, 1993). Supposedly, we would want this. Supposedly, it would enhance our knowledge work. But the futurists just are not sure, and the technologies - well, they are still on a beta-level. In the meantime we are faced with the close to meaningless notion of work anytime, anywhere – applied to everything from deep, global thinkers to blue-collar carpenters. Magazines like Wired, Upside, Red Herring, Business 2.O, but also 'mainstream' corporate simplifiers like The Economist and Newsweek, are filled with ads and arguments in favor of wireless technology.

The day-to-day operation of knowledge workers is poorly understood, and has seldom been explored (Warre & Degoey, 1998:5). This is an opportunity we will undertake in the following. Key terms in the analysis are network society (Castells, 1996), social space and knowledge. Knowledge in the workplace is, as we will see, too often thought of either as an entity that could be described, codified and transferred, or as «in people's heads» – as if it could only exist there. A meaningful sociology of knowledge needs to be informed by views on what happens in «high touch» interaction, and in what ways this can be complemented. Thus, the importance of face to face interaction provides the main thrust of the argument. Activities like the informal exchange over the table during dinner, the exchange of business cards, eavesdropping during dinner, asking someone else to introduce you,

the use non-verbal cues, for instance flirt, all point to the high-touch phenomena of presence. Charisma, spirituality, and inspiration have powerful implications for the notion of knowledge worker, even if today we have a network society fuelled by the developments in information and communication technology (ICT).

"Knowledge worker", a phrase coined by Peter Drucker in the 1960s, is in some instances an oxymoron, since it implies that he who works with knowledge also is a worker. But a worker has a strong connotation in mainstream labor sociology – as something different from and even opposed to CEOs, or managers. Perhaps we rather should be using terms like networkers, switchers, or "symbolic analysts" (Reich, 1992).

What matters is not really which position in the hierarchy this person operates from, but what kind of switching power this person has. Someone with a large network of connections is powerful, no matter where he sits in the formal ladder. The networker does not only execute his power by 'who' he knows. The network society has new systemic properties, due to information technology. The networks are more closed, since they operate within ICT networks, and not in people's manual address books. But they are nevertheless social relationships.

It is at this point the sociology of social spaces (groups, communities, societies) become important. Social space is a function of the perceived glue that holds a community together. Community, we maintain, is a prerequisite for innovative knowledge work. No innovation occurs in isolation. Creating new social spaces would then mean new arenas for social interaction. New social spaces would mean significant action space where you invest your main energies and attach your identity, that is, define yourself against. It would also mean that this arena was shared by a substantial number of people, not only the technological forerunners.

Social knowledge space, in this sense, would be temporal suspension of individuality in a network synergy, a knowledge hyperspace. In a real virtual encounter, a stirring up of networks of flow, the actors experience moments of shared reality. Social space, then, must be mobilized, in order to transform tacit knowledge, assumptions, chance and creative elements into a conceptual whole. A knowledge hyperspace is a participant space, a social reality that exists only in the connections it provides.

Whether a new space necessarily needs to be perceived as an *extension* of existing spaces, is an open issue. Traditional social space theory, departing from Durkheim (1911) does not take for granted the physical presence of the social actors in the embodiment of the social. On the contrary, only in the times of ritual enactment, the physical presence of the social group is deemed crucial. At all other moments, time-

delay and spatial dispersion is expected and respected. A social space is defined by the actors within it, but not equally so by each actor. Space is partly a socio-physical, partly a socio-cultural construct. The importance of space as a perceived reality, as well as an emotional boundary, is what really counts. As such it is both a construct and attached to experience as a non-quantifiable entity.

The same argument holds for knowledge. Knowledge work has become a fond topic of management literature (Nonaka, 1998). Strategic consultants like McKinsey and Boston Consulting Group are selling their services on 'knowledge management'. With all the attention given to knowledge work, it is surprising that few studies, or company advertisements on the Web for that matter, go beyond stating the basic characteristics of knowledge work, its scope and its general features. Very few have actually described the process of *doing* knowledge work, especially successful knowledge work. In the following we will define successful knowledge work as something out of the ordinary, accomplishments and network formations that bring together a variety of perspectives and viewpoints, and the ability to go from thought to action. One could say this corresponds to an entrepreneurial way of conceptualizing knowledge work. It is also practice based. Knowledge is something that is performed - something procedural. But far from being only a feature of organizational units knowledge work could also be seen as the attribute of a type of network. Or, it could be personal, a *habitus*, a prescribed ways of handling issues, set out and conditioned by previous experiences, and conditioning future ones. Social theorist Bourdieu (1977) describes the mechanism of *habitus* as a process in which the subject is conditioned by and in turn conditions his own life-world structures.

The article will review the status of knowledge work from a variety of angles. We will ask what kinds of tasks they engage in, to acquire, process and communicate knowledge. We will look at the production of visions about knowledge work. We will also review actual knowledge work performance, focusing on 'emerging patterns'. All of this will have an emphasis on technology's ability to foster, and possibly change the notions of knowledge work.

High tech work as creative practice

The organization of work in the Information economy is undergoing dramatic changes. No longer based on bureaucratic capitalism, or even on theoretical knowledge, or IT as such, the emphasis is on the creation of knowledge. How knowledge is produced, and to what extent this is a social process is another question. It is one of those things that evade easy description by its very nature. Knowledge, in a way, is ephemeral. Stocking it up, like mere information, does not cut it. Knowledge work is a procedure based on a confluence of factors like available information, improvisation-skills, work routine and intuition. Knowledge work requires a 'feel-for-the-game'. The idea-intensive early phase of a start-up business cannot be copied via Xerox equipment, sent via Brother fax-machines, emailed and outsourced to wired agents in Alaska. Nomadic knowledge is no knowledge at all. While nomadic in perspective, it must be rooted in real places. Agents who will take it further still occupy and spend their main energy in physical, tangible places, looking to interact with their employees, customers and investors, even if their business is selling integrated circuits, or Cisco routers.

Earlier sociological research on the professional worker has focused on the proletarianizaiton of engineers, and on the vocation, position and possible «third culture» of intellectuals (Said, Bourdieu, 1992; Snow, 1959). From Business Schools we learn about knowledge management (Nonaka, 1998). This article takes a completely different perspective – what is the high tech knowledge worker actually *doing* these days, how is this related to Internet, and what kinds of *visions* exist for what knowledge workers should be doing and will be doing in the future. Thus we want to say something about advanced work practice in the midst of massive technological change, but with the constraints of being humans – an issue too long forgotten in technological circles, although it certainly is coming into vogue to focus on «soft skills».

Knowledge workers are professionals who use information as their main input and whose major products are distillations of that information. Looking at how management consultant firms define knowledge work, however, we find that they focus primarily on the management problem – how to facilitate, encourage and set up systems for knowledge transfer (which is no surprise). The problem with this, of course, is that the knowledge worker is individualistic, and expects to be, in order to be creative and perform his work. Like other nomads, knowledge workers impose sanctions on people who do not behave altruistically.

In fact, today's knowledge worker is like the hunter-gatherer of earlier civilizations. Selfishly focused on his own day to day needs, he has difficulty with taking care of his belongings, sees little interest in organizing his life, and prefers to search again rather than rely on some system (Berreby, 1999:52, quoting Sahlins, 1972). Like the nomadic Murngin people of Africa, he has freedom of movement as the ultimate value. «It is not unusual for a man to hunt avidly for a week and then do no hunting at all for two or three weeks», Richard Lee writes about the !Kung Bushmen. If we look at today's academic knowledge worker, we see this pattern quite frequently. Most graduate students go into periods of intense work, and then take time off, or are unable to work even when 'in office'. A similar argument, of course, goes for writers, who always have been recognized for having a nomadic work-style. But looking at strategists and CEOs, we find that even their cycles of productivity are sporadic and without confinement to specific office hours. An extreme way of illustrating this point is the following:

With his notion of flow, psychologist Mihaly Czikszentmihalyi (1990, 1996) has brought into play a notion of the creative process as a total experience where you loose time and place, are fully immersed in activity, and feel totally at ease with it. From his encounters with creative individuals in virtually every field of human endeavor, the quality of spaces merges with the ability of 'making space work', integrating the individual and the environment in the creative work process. Being in the right place is important, he says, for «certain environments have a greater density of interaction and provide more excitement and a greater effervescence of ideas». New York is still the best place for an aspiring artist to find out firsthand what is happening in the art world, what future trends other artists are talking about now. But New York is not the best place to learn oceanography, or economics, or astronomy». Creative people gravitate to these places to make their work succeed. Even the microenvironment matters. «For theoretical physicist Freeman Dyson, the stimulation of colleagues in neighboring offices is indispensable. Science, even more than art is a collective enterprise where information grows much faster in 'hot spots' where the thought of one person builds on that of many others» (Czikszentmihalyi (1990:130). «Successful environments of this type provide freedom and stimulation of ideas, coupled with a respectful and nurturant attitude toward potential geniuses, who have notoriously fragile egos and need lots of tender, loving care...the most important thing is to have a special space tailor-made to one's own needs, where one feels comfortable and in control» (op.cit:140).

Creative surroundings also include nature. But although the scientific evidence of the impact on the heady, thin air of the Rockies upon the Aspen conferences, or the hypnotic blue Tyrrhenian Sea out of Ravello on Wagner's music is lacking, common knowledge is that creative settings induce creativity. But how come, then, that most

people that have been to the Grand Canyon, do not come home to be creative and change the world with their new discoveries? The reason is that 'making space work for you' is a demanding exercise. The mere 'presence' is not enough. How one spends time in a setting, matters as well. Creative individuals 'give their surroundings a personal pattern that echoes the rhythm of their thoughts and habits of action» (op.cit:128). Taking a leisurely walk at the right time, is a common strategy. Psychologically, what happens is that the visual experience restores the balance between your everyday experience and the attention devoted to the problem at hand, integrating both in your fundamental experience, seducing one's attention, as it were, to follow novel and attractive patterns. Sometimes this even means bringing a 'symbolic supporting ecology', like a car, personal belongings, pictures, with you. However, a familiar microenvironment is most important during preparation type activities where concentration is needed. Typical such spaces in the past include the office, the laboratory, or the studio. The businessperson, the scientist, or the artist needs this type of non-distraction space to focus his attention.

This type of detailed enquiry shows to what extent interaction with the physical environment means to human problem solving and creativity. The implications for nomadic knowledge work are evident. The completely disembodied, digital nomad does not get the sensory experiences, flows of interaction and hence not the concentration needed to provide high quality, innovative knowledge work. On a personal level, this means that to be creative, review your options for life contexts, and shape your space. On the management level, it really means taking a laissez-faire attitude to knowledge workers, letting them shape their working style, place and modes their own way.

Knowledge flows rather freely among individuals who *want* to share it. This is not because they are forced to do it, but because it is beneficial in the longer run. If we consider how companies hire these days, we see they look for entrepreneurial personalities, but when they get them, most organizations do not take care of them, and adopt the systemic view of communication – that it somehow is an organizing principle you must force upon your employees: Communicate. Share. Multiply.

Defining trends in knowledge work

With this confusion, it seems appropriate to ask; what is knowledge work, anyway? What activities does it consist of? Drawing on Frenkel et.al. (1999), we will say the act of work has three elements; knowledge, creativity, and skills. In greater detail, we then find that:

- Knowledge can be theoretical, procedural or declarative.
- Creativity refers to original problem solving, where a new solution is developed
- Skills can be analytical, action-centered and social

We choose to focus more on the procedural knowledge, because this is the decisive factor that explains how professional routines are formed. These routines could be knowledge seeking habits that greatly influence the way work is conducted.

Such a conception of knowledge work is a fruit of the 1990s, although the basics of knowledge work, of course, have been known at least since the Greeks. But no matter the novelty of knowledge work as such, we can describe its characteristics with the following keywords:

- Creative
- Mobile
- Collaborative
- Customer-oriented
- Autonomous
- Competitive

Knowledge workers experience a high degree of on-the-job-learning, in addition to their formal education. This type of learning, however, is not systematic. Knowledge workers have complex, long-term involvement with clients, and they engage in continuous exchange of information and knowledge to both internal and external customers. Knowledge workers maintain in control over their work situation.

In order to do such work, knowledge worker must have:

- Social skills
- Theoretical and higher order contextual knowledge
- Analytical skills

Rewards include autonomy, little routinization, and most knowledge work is thus experienced as intrinsically satisfying, rewarding, or enabling. Downsides include stress, because of short time limits, competition and intense collaboration and contact with clients and co-workers. Typical knowledge workers would then be strategic consultants, research scholars, and IT professionals.

One way of tracing trends in knowledge work, is to have a look at what professional qualification and skills global corporations or networks demand when they advertise career opportunities. The World Economic Forum, for instance, wants a Relationship Manager in the Regional Affairs Team (October 1999) who has «a unique combination of communicative, conceptual and operational skills». Then, this is specified as «good communications and networking skills (spoken and written), research skills, analytical and synthesis capabilities, and the ability to understand the opinion of others». In addition to this, a specific type of *personality* is singled out as a fundamental asset. The keywords are «doer» (with entrepreneurial spirit), «event manager», «generalist», and «communicator» and «team player». If we look at a similar job-listing 10 years ago we find fewer of these terms, and more weight on formal qualifications as well as traditional business experience (certainly not entrepreneurial). This example, of course, is not selected randomly. The Regional Affairs Team is expected to conceptualize, build and execute the program of each Regional Summit. The team builds, maintains and continuously deepens the networks and communities of regional leaders. In other words, this is a typical global networking job.

So, there is no doubt, if we want to trace some recent trends in knowledge work, they would include the following:

- Complexity
- Cooperative learning
- Attention on social skills (communication, presentation and networking skills)

Work is becoming more complex, as a result of increasing customer focus and the constant use and implementation of new technology to be innovative. Thus, there is an emphasis on teamwork, project-work, learning and knowledge management (on both individual and organizational levels). Consequently, there is also more attention on social skills as listening, presenting, persuading, and negotiating.

In spite of these descriptive efforts, it remains clear that we have no clear understanding of how knowledge work is separate from other types of work. Especially, this is apparent when we try to understand the role that information and communication technology (ICT) plays. It is assumed that ICT informs knowledge

work, and that it does not merely automate it (Ware & Degoey, 1999). But this leaves the question open; does it really enhance knowledge practices? How does available technology match actual user practices? Very few studies have shown the usefulness of the Palm Pilot organizer on the global level, much the less shown how productivity has raised after the introduction of email, the Internet, the cell phone, or any other technology. In a way, the pencil, the paper, the filing cabinet, the telephone, books, written reports, journals – everything is a space enhancing technology, or was at some point, until it became commonplace. The evasive answer to whether technology ever enhances productivity is, of course, that this is hard to measure. But this should not take away the need to address this question.

Bypassing knowledge management

The business approach to knowledge work is centered on knowledge management. It is either centered on individualized measurement, like measurement of Intellectual Capital, or on directing knowledge flows in organizations. According to such a view, most of the critical knowledge is contained in the skills and expertise of so-called expert employees. «Expert employees are identified as those individuals that provide most of the intellectual horsepower of an organization. They are typically the ones that provide much of the higher added-value service to the organization. The human capital embedded in these employees is important because it is a source of innovation and strategic renewal whether it is from individuals' brainstorming in a research lab, daydreaming at the office, throwing out old files, re-engineering new processes, improving personal skills or developing new leads in a sales rep's little black book» (Bontis & Girardi, 1998). The essence of human capital is the sheer intelligence of each organizational member (Bontis, 1999).

In a recent, lucid contribution to the understanding of knowledge work, the authors ponder on the issue of *knowledge generators*, like strategists and product engineers. These workers actively engage in *transforming* information, and tend to be creative and imaginative, change tacit into explicit knowledge, have highly varied tasks and tasks of high complexity. Their information processing consists in acquiring, interpreting, storing and disseminating knowledge (Ware & Degoey, 1998:32). When acquiring information, the professional networks the worker is part of play a large role in focusing attention. Interpreting information (analyzing, synthesizing, linking, choosing, deciding, planning), might well be the most innovative part of knowledge work, and also the activity that is least dispersed among what we commonly call 'knowledge workers' (op.cit:13).

Knowledge work is more than focusing attention. Knowledge workers pitch their ideas, or create a pitch out of other people's ideas. Their task is to convince, convey messages, and combine thoughts into worldviews. All of this requires a context, a physical playground.

The most important thing we can read out of both Bontis & Girardi and Ware & Degoey's studies is what they say about the work-practice of creative work. That is, the range of issues they explore. For, as they claim, while it is clearly 'important to understand all the sources of information and knowledge that are available to knowledge workers' (W&D, op.cit:21), it is certainly even more important to know how the worker then *chooses* among these sources, what organizing principles he operates around. But what the expert employee *does* when he performs his expertise, often remains a mystery, and is little studied, as Ware & Degoey (1998:5) rightfully claim. When studied, they only take the individual perspective but without specifying the interaction between these groups. Lacking in these studies, including those above, is the wider sociological implications of the changing nature of work, as well as a comprehension of the social synergy effects between individual intellectual performances.

The most obvious way of thinking about knowledge management in organizational theory is to focus on knowledge transfer within a large organization. Such an organization, it is assumed, needs to be able to shift knowledge to where there is a need, and obtain synergy effects of their combined expertise. In the literature, procedural knowledge seems to emerge as the most relevant way of describing what it is that constitutes quality performance in an organization, or a specific organizational expertise. Procedural knowledge is about organizational routines and 'how things are done' (Lee, 1999, citing Cohen & Bacdayan, 1994). This is also the way firms market themselves. Thus, for instance, McKinsey, Deloitte, Andersen Consulting and AT Kearney all claim to have their 'own methodology' that is unique and helpful to customers. (Deloitte consulting, for example, claim they have «A very different approach, for very different results». If we look at how this method is spelled out, however, we find that it is hard to describe, much the less understand. The statement that «Deloitte Consulting offers its clients a very different approach, because of a highly respectful, flexible, and collaborative working style that allows an unmatched ability to transfer knowledge and skills and generate employee buy-in», taken from their Web-site, is little more than play with words.[1]

The actual creation and transfer of procedural knowledge is, in a strict sense, little studied (Lee, 1999). In a study of management consultants, Hope (1999) found that

---

[1] http://www.dc.com/about_us/index.asp

'method' seems to be a tacit presumption about 'how we work here in this firm', rather than a set of prescribed rules for knowledge-generation. Some firms, like Ernst & Young use a lot of energy to codify knowledge in databases, while strategy consulting firms such as Bain, Boston Consulting Group, and McKinsey focus on a dialogue between individuals, not computerized knowledge objects. The latter group of firms, who share deep strategic knowledge – a process that is time-consuming, expensive and slow - emphasizes on building networks of people. They believe in sharing knowledge face-to-face, but also over the telephone, by email, and via videoconference (Hansen & Nohria, 1999). Ernst & Young, for instance, evaluate the «contribution to and utilization of the knowledge asset of the firm, and Bains evaluates partners on the basis of the degree of high-quality person-to-person dialogue. One big problem they all have is that the incentive to return a call from a colleague at the other end of the world is not all that great. Although some firms have tried to set this up, knowledge sharing incentives remains a focal issue (Hansen & Nohria, 1999).

Interestingly, the focus on managing and stimulating traditional organizations entrepreneurial (Teece, 1999) leads to a belief that *only* organizations that are entrepreneurial could stimulate entrepreneurship. That is, neglecting the fact that the reason some innovators innovate is that they are 'dissatisfied with status quo', and are actually stimulated to 'step out' of a rigid environment to create a new context for themselves, and then try to attract followers outside work. The case of Franz Kafka, a Czech writer who worked in a bank during the day, but wrote world literature at nighttime (The Process, The Castle), is only one example. Essentially, most start-ups have entrepreneurs who have had to work against opposition. In this light, most management literature on managing innovation, and the like, could be more entertaining than useful.

We have said that the understanding of how knowledge is created, and how technology, social and cultural factors come into play in this process has been poorly explored in the literature. But it would be unfair to say that such initiatives do not exist. Some of these arguments are coming to the stage under flags like: Knowledge creation as *ba* (Nonaka, 1999), Knowledge ecology (Davenport and Prusak, 1997), or collective intelligence (de Kerckhove, 1997). Together with the professional Internet actors, these helped get attention to the threefold credo of the 1990s - communication, connectivity, and convergence. This synergistic effort carried out jointly by the communication industry visionaries, Wired magazine and increasingly everyone else was helped, incidentally, by sociologist Castells' (1996) notion of the Network society. Here, we will only use a few lines on each, and then focus on the most promising, which is Castells' approach.

Nonaka (1998, 1999) rightly picks the concept of place (using the Japanese word *ba)* as a key to understand how knowledge is created. Distinguishing between originating, dialoguing, systemizing and exercizing *ba*, he tries to sketch out the contours of how tacit and implicit knowledge interact in, and at the boundaries of organizations. To his advantage, one could say that he tries to decode knowledge transfer processes in its spatial contexts. His efforts to describe socialization, externalization, combination and internalization (providing his term 'SECI process') are interesting, but his view of the 'shared context of knowledge creation' is highly deficient. Mainly because it presupposes that 'love and care' is better than 'challenge and reward', without specifying the interaction of these elements. A great problem, also, is that his descriptions do not immediately translate into individual examples. It remains something of an abstract Japanese collective philosophy, and is also, in the end, too focused on the realm of the traditional organization. Rather, it would be fruitful to spell out the implications of a more extreme view of the knowledge creating potentials of a new understanding of network dynamics. This withstanding, Nonaka's thoughts have had immense critical acclaim after his celebrated book *The knowledge creating company* from 1995.

Knowledge ecology has a useful discussion of how knowledge brokers are needed to effectively transfer knowledge between domains within and outside of organizations, completing the knowledge ecology, as it were, a system of related knowledge patterns across fields. Knowledge brokers, whether intra-firm or as complete inter-firm go-betweens participate in the practices of several communities, and not only mediate, but actually sell knowledge between them (Seely Brown & Duguid, 1998:103).

In *Connected Intelligence*, Derrick de Kerckhove speculates on the consequences of massive global networking - and what might happen if it reaches a critical mass of independent "connected intelligence." Will the sum total of people's connected intelligence be vastly more intelligent than any one person's intelligence could hope to be? Kerckhove is a strong believer in virtual reality. He uses the phrase, " virtual common," to explain the ability to have meetings in any place at any time, and therefore broadening the business world and affecting the economy in a drastic way. "The Internet gives us access to a live, quasi-organic environment of millions of human intelligences perpetually at work on anything and everything with potential relevance to anyone and everybody. It is a new cognitive condition I call "webness" or "connected intelligence" (de Kerckhove, 1997). Regardless of his current fame in Wired and other devotee audiences, this speculation, which is what it is, hardly has any bearing. That the Web somehow is making everyone 'act together', or represent some 'connected intelligence' is beyond doubt far from where we are today. He is, also, entrenched in the 'stock of knowledge' paradigm, maybe without knowing.

15

These nomadic approaches (Nonaka, 1999; Davenport and Prusak, 1997; de Kerckhove, 1997; Castells, 1996) share the view that knowledge is an entity. Whether structuralist or merely collectivistic, they do not see how they are part of a zeitgeist. Marketing of the three apparently interrelated concepts of communication, connectivity & convergence is, as we started to point out early on in this article, a synergistic effort carried out jointly by the communication industry visionaries, Wired magazine and increasingly everyone else. There seems no be no way around it. It is as if something is invented out of the blue. It is not. Behind this shift of focus there is a powerful societal trend: the religion of communication. The communicative paradigm, or the idea that everything is, or will eventually be, connected, has many proponents – both inside business and academia. What arose in the 1990s as a commonly felt need to 'go global' among a certain industrial elite now is an idea pervasive across sectors. Currently it saturates every discussion of communication within business and academic circles. Both the most powerful industrial visionaries, like Bill Gates, and shrewd academic thinkers like Manuel Castells, have strong belief in the network as an organizing principle of society.

But while the network society metaphor has obvious strengths, it stresses space over place to the extent that place disappears. This is a classic structuralist pitfall.

Criticizing Castells' view of Communication

Castells (1996:244) claims the nature of work has changed because of the network society. «Be in the network, and you can share and, over time, increase your chances. Be out of the network, or become switched off, and your chances vanish since everything that counts is organized around a World Wide Web of interacting networks» (Castells, 1998). He argues for the fundamental distinction between the networkers, the networked, and the switched-off workers. The *networkers* is our top-category of knowledge workers, who »set up connections on their initiative (for example joint engineering with other departments of companies), and navigate the routes of the network enterprise». Especially if these networkers are the actual *deciders*, that is, they make the decision in the last resort - this is a powerful position. The *networked* are people to whom the networks are performed upon – being part of them does not give them a real influence. The switched-off workers are totally outside of the action, they are not part of any significant networks, and, as Castells maintains, it is close to impossible to «get back in».

These networks are flexible in nature, so that they might transcend the ability of adaptation of the 'weaker' individuals within them. Castells explains: «So, ultimately, networks -- all networks -- come out ahead by restructuring, even if they change their composition, their membership, and even their tasks. The problem is that people, and territories, whose livelihood and fate depend on their positioning in these networks, cannot adapt so easily. Capital disinvests, software engineers migrate, tourists find another fashionable spot, and global media close down in a downgraded region. Networks readapt, bypass the area (or some people), and reform elsewhere, or with someone else. But the human matter on which the network was living cannot so easily mutate. It becomes trapped, or downgraded, or wasted. And this leads to social underdevelopment, precisely at the threshold of the potentially most promising era of human fulfillment» (Castells, 1998).

A particular group of networkers are the digital nomads. Digital nomads are, in a sense, people who are »here, there, and everywhere» in the World, depending on where they 'need' to be. Sometimes they are really »nowhere» or at least not anywhere or anybody in particular - constantly connecting and de-connecting to the Net and other networks without real need, or want, to settle down. This also implies limited ability, will or need to comply with rules, social regulations, pay taxes, and participate in other society building elements). In difference from other nomads, these technological nomads do not appear in groups, but rather as atomized individuals, constantly travelling in cyberspace, but also in geographical space – between cities, and people, without investing the whole of their identity in anything, sweeping the stage everywhere they go. Typical examples are corporate top executives in TNCs, MNCs, governments or top-notch researchers, or professors. No wonder, digital nomads have been labeled easy to reach but difficult to track (Makimoto & Manners, 1997).

Following Castells, in addition to other knowledge worker skills, there are specific network skills:

- Controlling the space of flows (of capital, information, technology, organizational interaction, networks, sounds, symbols, images)
- Initiating new flows (by start-up companies, articles, spreading the word, investments, manipulation of information)

Both of these involve interpersonal intelligence (Gardner), social intelligence & emotional intelligence (Goleman), teamwork skills, and leadership skills. But one could wonder how much of this depends on the »communicational paradigm», and how much is just good-old marxist theory of power-relations? Did not some people

decide for others in 1850 also? How can the Internet provide such a powerful change of communications patterns, if the users themselves always have a say?

The other fundamental objection to Castells is his structuralist bias. In *The rise of the network society* (1996), Castells claims the meaning of informational societies lie in the fact that they are "increasingly structured around a bipolar opposition between the Net and the Self". It is unclear in this quote whether he is talking about the Net as the Internet, or the net as the flow of networks. Maybe the difference is not so great. According to Castells there is a structural schizophrenia between function (the Net) and meaning (the Self). In the emerging societies, self only has meaning when viewed together with the network that sustains it. On the one hand, of course, this has always been the case, especially if we consider for a moment the extreme constructivist argument. In *The social construction of reality* (1967), Berger & Luckmann claim social reality is established, maintained and changed through the functions of externalization, interiorization and objectivation. The result is that the self only exists when "playing the rules of the game", to borrow an expression from Bourdieu, as when the self is immersed in social activity, or actively assessing such activity.

On the other hand, this is an extreme thesis. If networks are all that counts, what then about the not so connected individuals? Are they less human, less of a "self"? In a strictly strategic sense they are, because they have less access, less possibilities, less space of expression. And "the self" is only maintained by social practice, thus the completely isolated social being is an oxymoron.

But Castells has other features in mind, such as the international division of labor. He tries to drive home a thesis that says all networks are global in their reality or their target. How? By showing how the division of labor now does not take place between countries but between economic agents in different positions (Castells, 1997:147). They are producers of high value (informational labor), producers of high volume (lower-cost labor), producers of raw materials (natural endowments) and redundant producers (devalued labor). Not only that, but the unit is no longer the individual, but the network. A common cultural code, a virtual culture of the ephemeral serves as the ethical foundation of the "spirit of informationalism" (and we hear Weber ringing in our ears). It is Schumpeter meets Weber, a culture of "creative destruction".

No wonder, these developments, to Castells, amount to nothing less than a revolution in the way humans communicate with each other. His reading of the Informational Superhighway is a serious one, but has the striking effect of both dissecting the hype and reinserting it in new ways. His statements resound and

restate those of the visionaries of the communication industry. At one point we learn that: "The potential integration of text, images and sounds in the same system, interacting from multiple points, in chosen time (real or delayed) along a global network, in conditions of open and affordable access, does fundamentally change the character of communication" (Castells, 1997:328).

But what is so new about these networks? Is it the dynamics, the intensity, the quantity, the inevitability of participation if you do not want to be excluded? Here Castells borders on taking a deterministic attitude. In some ways, it also goes against Castells own arguments about regional dynamics in his earlier works (1994). Now, it seems, he buys the whole myth of nomadic knowledge work, claiming its global, pervasive and unavoidable nature. Out of this, a new culture is emerging, a culture of *real virtuality*. Where switching TV channels between commercials, and then between programs becomes to surf the Net in endless communication flows, the users continually mould own mosaics. The networks are new ways of organizing labor, spare-time, economy, culture and ultimately - a way of life. Taking the Internet as example, in 1973 there were 25 computers connected, through the 1970s it could only support 256 computers, in the 1980s it was still limited to a few thousand users (Castells, 1996:351). In January 1999, the Norwegian tabloid Dagbladet reports that 390.000 Norwegian households (out of 1 million) have access to the Internet. Worldwide, Wired magazine (October 1999) claims there are 100 million US Internet users and a total of 205 million worldwide. Which, incidentally, only amounts to 2,4 % of the world's population.

But this culture is, as far as a work culture, definitely place-bound. The vast majority of knowledge workers are, as Castells himself, conditioned by the places they populate. And not by the places they visit. I believe this is analogous to the long-known differerence between the voyeur and the villager. However global the village, you can only really relate to a few local villages in a lifetime. They still serve as the main orientating perspective – however global, connected and wonderful the switcher's reality seems. The Net is not enough!

In a recent book about the changing nature of work, called *On the Front Line,* authors claim both Bell (1974) and Castells (1996) underscored the importance of customer sovereignty in knowledge work experience (Frenkel et.al, 1999:265). The characterizing feature of the knowledge worker, they say, is his regular contact with actual or prospective customers. But not only customers, the knowledge worker communicates with more and more enitities. He is a symbolic analyst with an active relationship to a variety of knowledge intense environments like universities, cities and global cities (positioned in place, region, or globe). Knowledge creates and maintains social relationships, and can not be stocked up in either virtual or real

form. Stocked knowledge is merely information, however classified and organized it may be.

It is true that we are moving towards the network society, where the unit no longer is the individual, but the network. On the other hand, some very basic limitations still count. As we will show, the importance of technology can not overshadow the social stimuli that are inherent to creative work. First, most innovative work occurs in the proximity of urban centers, both because innovation thrives in a diverse environment, and because innovative workers prefer stimulating environments. Thus, as Castells (1996) observes, while global cities are no particular cities, since outskirts of Los Angeles might be more resembling tribal Africa, parts of LA are globally connected, and part of a global city that encompasses New York, Tokyo, and London. But while global city is a clever metaphor, too, it is misleading. There is little unity of perspective among the surface-cosmopolitan financial switchers who work in New York, take the weekend in Paris and have meetings in London every Monday. Their perspective might be global in financial terms, but very surely limited in cultural, social and creative terms. Discovering the global city as a structural unit of trade is Castells' merit, together with Saskia Sassen, who actually coined the term (1996). But their conclusions say little about real life knowledge work. The vision of 'digital nomads' who are workers 'on the move' and can work 'anyplace' and anytime is exaggerated. This leads to the question: where are these visions coming from? Who has the interest in producing them? Who gains from these statements being true?

Nomadic visions - place-bound people

In the following we will look at two things, where these visions start, and what the possible problems with such visionary conceptions are.

The nomadic visions come from a specific group among high tech switchers in Castells' network society, and could not be taken to apply to everyone. Take wireless communications. Let's face it. What are the needs that gave birth to these technologies? The answer is the rise of a class of global knowledge workers, mobile executives, CEOs, travelers, globetrotters who are spending more and more time on-the-move. They waste time on airplanes, airports, buses, ferries, in taxis, in traffic in general, in commute. According to the optimistic estimate by HP, their handheld scanner has the potential market of about 58 million 'mobile professionals' in the United States and Europe who need to copy, fax and capture documents while on the go. But as former editor of PC Magazine, Lawrence J. Magid writes, «it is more likely to appeal to a niche market, such as insurance agents and claim adjusters, loan officers, auditors and others who work in the field».[2] But although Magid might be right about this particular product, the industry, most of the time, actually manages to sustain itself on the vision that this force of millions of workers are totally needy of technology to perform their job.

All of this is, of course, supported by a crowd of hungry management writers, greedy business school strategists, tech-savvy business magazines, and the whole system of 'state-of-the-art' people who keep up their game, have to invent new gadgets, and stay 'innovative'. So the momentum is there, and these road warriors «need all the support they can get». «Fortunately there are a slew of high-tech tools that can help – from handheld computers with built in wireless modems to blazingly fast notebook PCs to smart phones that can make calls [sic], send emails, and surf the Web».[3] Some of these products have strong brand names, like Palm, Iridium, and Nokia - others are emerging – like Delphi, and Xircom. There is going to be a war between the 3 main players on the PDA market ('personal digital assistant'), between 3Com, Psion and Microsoft on one hand and the main players in the mobile market, Ericsson, Nokia and Motorola, on the other. So the commercial stakes are high.

Although most of these products are sold on the promise of something 'bigger and better' in the future, almost like the fairytale, some high-tech savvy people actually spend a lot of time trying to learn how to use all of these devices. According to

---

[2] «HP Breathes life back in to handheld scanner», by Lawrence Magid, in Microtimes, October 5, 1999.
[3] Long advertisement article for various high-tech firms and Delta Airlines, in Wired magazine October 1999, written by Wire-to-Wire, a marketing communications firm based in San Francisco.

3Com, who has acquired Palm Computing, the market for handheld computers will continue to grow – adding to the $570 million in annual sales and *4 million units shipped* as of October 1999.

If we look at some of the visionaries' talk about the changing nature of work, we find some ecstatic statements about new types of collaboration:

> Drawing upon the "new paradigm" in his book *Shared Minds* and his recent follow-up entitled *No More Teams*, Mr. Schrage describes collaboration as "the process of shared creation where no Physical Presence or Continual Communication is Required. «Collaborations do their work both simultaneously and asynchronously in settings that range from the formal, such as laboratories and meeting rooms, to the informal, such as pubs and restaurants. Consequently, neither physical presence nor continual communication is required by collaborations; although there must be a continuity to their interactions. The shared goal serves as an arbiter in determining the shape, the settings, and the communications of a collaboratorium. Collaborators do not maintain constant communication. Instead they focus on trying to create a rhythm, a tempo, and a flow of communication that prevents them from interfering with one another while assuring that events are proceeding apace».
> (http://www.dtic.mil/summit/ma01_2.html, September 28 1999).

The same Schrage is among the cyber commentators who claim that the metaphor of «Information Superhighway» blurs the real changes going on. Schrage, a research associate at MIT, an expert on collaborative design and a leading commentator on innovation issues, offers a set of ideas that ask people to rethink how the new media explosion is truly affecting individuals, organizations and, indeed, our society, focusing on digital relationships:

> «If technology has been changing relationships as long as human beings have been creating technologies, what's the special significance of this new generation of digital technologies? Why are we now in the midst of a relationship revolution, rather than just further evolution? Primarily because these technologies do more than create new kinds of networks, they've created new kinds of networks between networks. What is the Internet but a network of networks? What are companies like Federal Express and Visa and American Airlines but organizations that connect physical networks to digital networks to human networks to create new forms of economic value? New kinds of relationships between networks create new kinds of relationships between people. That is the essential tension of the revolution taking place. Along every meaningful dimension, these technologies permit individuals and institutions alike to sculpt new facets of interaction. Intimacy, anonymity, trust, openness, access, passion, negotiation, hierarchy, coordination and collaboration can all be mediated, monitored and managed via networks ostensibly designed to carry bits.» (The Relationship Revolution, The Merrill Lynch Forum,
> http://www.merrilllynch.com/woml/forum/relation.htm (September 28 1999).

Some of these visions depend upon the thought that human beings around the world not only will be connected to the Internet on a day-to-day basis, when they want, but that they actually will be connected all the time. This can happen either by wireless connections or by physically attaching themselves to electronic networks. One of these visionaries is Bill Gross, CEO of idealab: "Everybody's going to be connected

live to the Internet somehow all day long," Gross says. "This is too powerful to not have with you everywhere you go. Twenty years down the road or maybe even five years down the road, we'll have a chip in our body when we're born." Bill Gross of idealab! to USA Today, June 8, 1999.

While all of this might sound overwhelming, we must not forget that main-stream American publications like Newsweek and Times Magazine embrace the Internet revolution. The front page of Newsweek in September 1999 marked a milestone in this sense. Devoting the front page, and special issue to «E-life – how the Internet is changing our lives», they really have bought the whole package. Apparently, the world is changing, so get on the roller coaster the sooner the better.

Summing up, both visionaries and academics unite in stating the impact of the network society. But the former category rules the ground. Visionaries are important for their sociological impact upon the cultural imagination of the Information Age professionals. Their views become perpetuated in the media through a constant bombardment of images, sounds and visions. That is, they speak to their own. Incidentally, such aggressive advertising is especially present in innovation intense social environments like Silicon Valley. The question we would like to ask is this. What makes seemingly intelligent people embrace the Internet as a generic, unstoppable technological force when we *know*, let's face it, that most technologies ultimately are human driven, maintained, and negotiated?

The pleasure of convincing work

Innovative learning mostly occurs in connection with what I call *the knowledge intensive space of places*, or the compound of available sites of knowledge at a given time, space and place, with the possibility of face-to-face interaction and space-making (without going out-of-budget, or out-of-range of everyday knowledge activity). Typically, libraries, bookstores, innovation centers, clusters, or parts of cities provide incentives to create such spaces. For, while knowledge cannot necessarily be stored, as information can, it exists more so as potential knowledge in some places.

Knowledge workers, however global in outlook, are bounded in particular places. They are human beings that need attention, care, inspiration and motivation. The free-agent nation, the notion of free-floating professionals, is wonderful, but not so shiny. The real workers are where the action is. They give their employer face time.

The possibility of face-to-face interaction is crucial to knowledge creation and successful knowledge work. Face-to-face work is about transforming tacit knowledge. This process is a sort of convincing-work; first pitching the idea to someone, then stirring-up conceptual energy to «freeze» their attention. Knowledge occurs when we activate a hyperspace around our flow of informations. The term hyperspace is used to bypass the passive notion of tacit knowledge, inherited from Polyani, but too passive to convey the practice of today's high tech professionals. They move around informations, often using Internet and other advanced communications, but cannot move around knowledge that easily. This is not only because knowledge is tacit or unspoken, but also because knowledge is only relevant if it convinces others. Physical co-presence is therefore important to create the type of intensity in time and space needed for knowledge transfer. But co-presence in itself is not enough. Effective knowledge workers know it. Pitching work – the constant pushing, refining and shortening of messages – is crucial, and will require both online and offline spacemaking.

Knowledge is only a relationship between networks, or between networks and switchers (powerful individuals who stand at the intersection of network flows, and can initiate and stop such flows). Therefore, the creation of powerful social spaces, that is, shared spaces of true interaction (while they might be temporary or ephemeral) is essential to generate knowledge. Many of these spaces, however, are places, too. Or, they are rooted in place-bound practices. Even most so-called virtual encounters take place with the two separate places in mind. The time for a reaction against visionary talk about Internet as the total solution is way overdue. Both research and practice so far show that virtual teams need to build a relationship by face-to-face encounters *before* they can collaborate effectively (McDermott, 1999:104), and often need to reinforce this relationship *during* knowledge work processes (Riain, 2000), as well as *after* such processes are over. The Net is not enough!

A typical knowledge-intensive encounter-space is the business incubator. A relatively new concept, business incubation essentially offers shared office services, access to equipment, flexible leases and expandable space — all under one roof. That's the technocratic side of it. Another is the access to relevant networks, the business advice and the social dynamics of several start-ups coming together to share perspectives, and use each other's networks. Business incubation has grown markedly, both in the US and abroad. From 12 North American programs in 1980, there are about 600 in 1999, according to the National Business Incubation Association[4].

---

[4] http://www.nbia.org

So, what to make of these growing numbers? Does that necessarily mean that sharing physical space enhances network space and productivity? Decidedly not, but it is hard to prove. However, evaluations of such arrangements, whether called innovation centers, incubators, business parks or what not, show that in order to acquire the true dynamics of knowledge sharing, the most attention should be paid towards enhancing social space, both formally and informally (Thorvik & Undheim, 1998). This could be done in various ways, but most important is adequate leadership (as described above), as well as designed informal encounter-spaces within the complex.

Above we have delineated several reasons why space matters, drawing on everything from individual creative drive, to creative environments and knowledge intensive encounter-spaces, to regional development, urbanity and network economy. In general terms we can explain the space-making efforts in knowledge intensive encounter-spaces as a confluence of several factors:

- Sustained effort (made possible through presence, so that you can try again, insist, return another time)
- Continued stimuli (while it is true that most people have access to the Net, most people don't use it to gather information on technology and the work place)
- Unexpected events, opportunities and pressures (upcoming conferences, meeting people, challenges to hold lectures)
- The urban complexity (diversity, stimuli, multicultural, foreign)
- The human factor (all these discoveries were pleasant, fun, engaging, and not in any way alienating, like a computer search could be)
- Proximity or access to switchers (who facilitate tapping on to the right networks)
- The effervescence of 'place' as a symbolic and as a *de facto* motivator

Innovative work, knowledge work, whatever you want to call it, mostly occurs in knowledge intensive space-places, or in connection with them, and the creative individuals who participate to sustain them thrive in such environments, and equally benefit from being on the borders of such environments. Curiously, our research shows think tanks, innovation centers, and CEOs all use face-to-face-encounters, and increasingly turn off their communication devices in order to have time to think, when what they sell (ICT) seems to advocate the opposite.

Conclusion

It is only logical that the whole communications industry celebrates itself with the illusions of productivity gains across the board. After all, their own industry seems to be flourishing, with estimates of 12 million mobile wireless data users by the year 2002 (according to the Yankee Group). But one thing is that they are convincing people, another is to prove that it is a good thing. Where work is confused by its equation with connectivity, the character of innovative work is obscured.

So, what is entrepreneurial knowledge work? The most important lesson is that it has to do with timing and placing, with time-making and place-making. In a world where you can be anywhere, anytime, it becomes even more important to know where you will invest you face-to-face encounter time, you main 'presence'. People will continue to expect attention, you still need attention, and access to relevant knowledge will still reside in particular spaces, or in relevant networks. Knowing where to be, what to say, and having a 'message', will only become more important as we pursue the path towards a de facto network society. And, in order to be convincing, you must be convinced. Pitching skills are no substitution for integrity, as Sennet points out in *Corrosion of Character* from 1998.

The other insight derived from knowledge working professionals is that they need their own space. They need independence, in order to produce what is required. Thoughts, ideas, concepts - all of these are fragile. While knowledge workers might be on the move, they still have to be rooted in their own reality, whatever it might be, in whatever physical locations. But if we forget that they are human beings with social needs, even extreme social needs, we loose their creative impact and we can forget their treasured ways to analyze, portray, synthesize and pitch symbols. Their pitching skills depend on their ability to seize a thought process, freeze ideas, and execute in required speed. Most of which still occurs in particular places, if also in spaces like Internet, hyperspaces like incubators, or composite spaces like restaurants, pubs, and coffee houses.

Networks are not enough. They must be interpreted, acted upon, and 'stirred-up', as it were, before they are active. For sure, if we continue to pursue knowledge management as an issue only within organizations, not at the borders of these organizations, we will fail to see the real benefits of the network society. The view that knowledge resides within the organization, and has to be systematized and organized, is less true today, that ever. The entrepreneurial trend, the increasing innovation-rate, and the number of start-ups all point towards a quasi-nomadic network society. Even large organizations like HP or Microsoft can not expect to

retain their innovative edge if they take such a possessive view of knowledge creating processes. Knowledge only exists as a relationship between individuals and networks, or as a pattern of flows. The idea of nomadic knowledge production, while it may even be global in nature still has visionary, rather than real character. As we have pointed out, although we live in a wireless society, there still seems to be strings attached.

Bibliography

Berreby, D. (1999) «The Hunter-Gatherers of the Knowledge Economy», *Strategy & Business*, Third Quarter 1999, Issue 16:52-64.

Bontis, N. & Girardi, J. (1998) «Teaching Knowledge Management and Intellectual Capital Lessons: An Empirical Examination of the Tango Simulation» http://www.celemi.com/articles/leveragingknowledgeman.asp?sidnr=400100000000

Burawoy, M. Et al (2000) *Global Ethnography*, University of California Press

Castells, M. (1998) «Information Technology, Globalization and Social Development», *UNRISD Conference on Information Technologies and Social Development*, Palais des Nations, Geneva, 22-24 June 1998

Cairncross, F. (1997) *Death of Distance: how the communication revolution will change our lives*, Boston, Massachussets: Harvard Business School Press.

Castells, M. (1996) *The rise of the network society*. London: Blackwell.

Castells, M. (1994) *Technopoles of the world*. New York: Routledge

Czikszentmihalyi, M. (1990) *Flow: The psychology of optimal experience*. New York: Harper Collins.

Czikszentmihalyi, M. (1996) *Creativity*. New York: Harper Perennial.

Davenport, T.H. & Prusak, L. (1997) *Information Ecology: Mastering the Information and Knowledge Environment*, Oxford: Oxford University Press.

De Kerckhove, D. (1997) *Connected Intelligence*, Somerville

Ellin, N. (1997), Ed. *Architecture of fear*. Princeton: Princeton Architectural Press

Fisher, C. (1992). *America Calling: A Social History of the Telephone To 1940*. Berkeley: University of California Press.

Fleich, J. (1999) *Faster – on the acceleration of just about everything*. New York: Random House.

Frenkel, S.J. et al. (1999) *On the Front Line: Organization of Work in the Information Economy*, Ithaca: Cornell University Press.

Giddens, A. *Runaway World lecture*. Reith lectures, British Broadcasting Corporation, 1999. http://news.bbc.co.uk/hi/english/static/events/reith_99/

Greinacher (1997) in Ellin, N. (1997), Ed. *Architecture of fear*. Princeton: Princeton Architectural Press

Hansen, M.T., Nohria, N. & Tierney, T. (1999) «What's your strategy for managing knowledge?», *Harvard Business Review*, March-April 1999.

Hope, K.L. (1999) *...og bakom ligg metoden – konstruksjon av kultur i IKT-konsulentselskaper*, STS rapport, nr. 45.

Hozic, A.A. (1999) «Uncle Sam goes to Siliwood: of landscapes, Spielberg and hegemony», *Review of International Political Economy* 6:3 Autumn 1999:289-312.

Kaplan, D.A. (1999) *The Silicon Boys and Their Valley of Dreams* William Morrow & Company.

Lee, G. (1999) «The determinants of knowledge transfer within a multi-divisional corporation», a proposal to study knowledge transfer at Hewlett-Packard, unpublished research proposal, Haas School of Business, UC Berkeley.

Leich, N. (1999) *The Anaesthetics of Architecture*, MIT Press, Cambridge

Makimoto, T. & Manners, D. (1997) *Digital Nomad* NewYork: John Wiley & Son Ltd.

McDermott, R. «Why information technology inspired but cannot deliver knowledge management», *California Management Revew*, Summer 1999, Vol.41, No.4, pp.103-117.

Nonaka, I. & Konno, N. (1998) «The concept of *ba*: building a foundation for knowledge creation», *California Management Revew*, Spring 1998, Vol.40, No.3, pp.40-54.

Pecaut, D. (1999), Senior Vice President, Boston Consulting Group, at the http://e-conomy.berkeley.edu:80/events/deip/summary.html#David Pecaut, (web-link available September 21st 1999). The Digital Economy in International Perspective: Common Construction or Regional Rivalry: A Conference of the University of California E-conomy™ Project 2, The Willard Inter-Continental Washington, Washington, D.C., May 27, 1999.

Reich, R. (1991) *The work of nations*, New York : Alfred A. Knopf

Riain, S. (2000) «Net-working for a living: Irish software developers in the global workplace», in Burawoy, M. Et al (2000) *Global Ethnography*, University of California Press

Salisbury, J.G.T & Barnett, G.A. (1999) «The world system of international monetary flows: a network analysis», *The Information Society*, 15:31-49.

Sassen, S. (1996) Interview with Nettime 97 archive (07-09): June 1997 Andreas Broeckmann (abroeck@v2.nl) Mon, 7 Jul 1997, at http://re-lab.net/nettime/97/07-09/0061.html

Sassen, S. (1996) The Topoi of e-space, DEAF Festival 1996, found on the web at: http://www.v2.nl/DEAF/96/nodes/SassenS/

Saxenian A. (1999) «Silicon Valley's New Immigrant Entrepreneurs», report for the *Public Policy Institute of California*, San Francisco, CA.

Saxenian, A. (1999) «Regional development of knowledge economies», panel presentation, *Building Competitive Advantage in the Knowledge Economy: The*

Third Annual UC Berkeley Forum on Knowledge and the Firm, Haas Business School, October 15 1999.

Saxenian, A. (1994) *Regional Advantage*, Cambridge, Massachussets: Harvard University Press.

Seely Brown, J.S. & Duguid, J. (1998) «Organizing Knowledge», *California Management Revew*, Spring 1998, Vol.40, No.3, pp.90-111.

Sennet, R. (1998) *The Corrosion of Character*, New York: Norton.

Shapiro, A. (1999) *The Control revolution: how the Internet is putting individuals in charge and changing the world we know*, PublicAffairs

Silver, D. (forthcoming 1999) "Communication, Community, Consumption: An Ethnographic Exploration of an Online City," in *Virtual Publics: Policy and Community in an Electronic Age,* edited by Beth E. Kolko (Columbia University Press.

Silver, D. (1999) "Localizing the Global Village: Lessons from the Blacksburg Electronic Village," in *The Global Village: Dead or Alive?*, edited by Ray B. Browne and Marshall W. Fishwick. Bowling Green, OH: Popular Press: 79-92.

Spinosa, C., Flores, F. & Dreyfus, H.L. (1997) *Disclosing new worlds: entrepreneurship, democratic action, and the cultivation of solidarity*, Canbridge: MIT Press.

Sorensen, K.H. (1997) «Den nye tverrfagligheten : fra polyteknisk generalist til polyvalent spesialist», *Perspektiver på tvers : disiplin og tverrfaglighet på det moderne forskningsuniversitetet*, Trondheim: NTNU.

Teece, D.J. & Nonaka, I. (forthcoming), eds. *New perspectives on Knowledge-based Firm and Organization* (tentative title), Oxford University Press.

Teece, D.J. (1999) «Strategies for managing knowledge assets: the role of firm structure and industrial context», The role of knowledge in the Information Age, panel presentation, *Building Competitive Advantage in the Knowledge Economy: The Third Annual UC Berkeley Forum on Knowledge and the Firm*, Haas Business School, October 15 1999.

Thorvik, K. & Undheim, T. A. (1998) *Trøndelag 2030 : status og muligheter i et internasjonalt perspektiv*, Trondheim: Trondheim InnoVision AS. http://www.hf.ntnu.no/itk/sts/trondau/kompetanseregion_trondelag.htm

Undheim, T.A. (1999) «Getting access to research interviews with the élite – some reflections on interviewing skills in the Network society», STS Working Paper (forthcoming), NTNU, Norway, Department of Interdisciplinary studies of Culture.

Ware, J. & Degoey, P. (1998) «Knowledge work and Information Technology», *Working Paper #98-WP-1028, February 1998*, Fisher Center for Management and Information Technology, Haas School of Business, UC Berkeley, USA.