

THE DUALITY OF MOBILITY: DESIGNING FLUID ORGANIZATIONS THROUGH STABLE INTERACTION

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ABSTRACT

Debates concerning mobility are proliferating. Once looking at the issues of mobility, however, one can immediately find a vacuum within this emerging debate. The current mobility literature lacks a well-defined common ground and an effort for theorization, both of which are essential for sustainable development of any scholarly discourse in social sciences. To cope with it, we propose to set an analysis that can integrate mobility studies in a coherent manner and facilitate the practice of theorization on mobility within the study of mobile devices and organizations. We do so by connecting two diverging ways of looking at mobility that emerge from the current literature; one sees mobility as creating perpetual, stable and controllable contact, while the other views mobility as creating fluidity through the formation of ad-hoc, de-contextualized contacts. By connecting these two views, we present the duality of mobility: the more stable the interaction with routines becomes, the more fluid organizations will become; thus, mobility as stability.

1. INTRODUCTION

Debates concerning mobility are proliferating. Nowadays, we frequently find articles talking about mobile technology such as newly developed mobile phone, personal digital assistants (PDA), and other kinds of handheld computing technologies, not only in the magazines for technology enthusiasts but also in more widely diffused media such as ordinary newspapers and pop-culture magazines. Billboard ads and posters by mobile phone service network operators and handsets manufacturers are everywhere in cities. Our society is now often said as mobile or nomadic society where people, automobiles, planes, mails and parcels, and any kinds of objects bewilderingly move around the world (Sassen 1991; Castells 1996; Urry 2000). All these clearly indicate the rapidly growing public interest in mobility and various issues relating to 'being mobile.' These issues extend to the domain of organizational design, where organizations project their architectures by aligning the perceived capabilities of new ICTs to human resources.

Once looking at the issues of mobility, however, one can immediately find a vacuum within this emerging debate. That is to say, we are talking about the issues concerning mobility *without* a clear image of 'mobility' itself. In fact, the concept of mobility and the significance of 'being mobile' are used in strikingly diverse ways. Because of such diversity in terms of definitions, the current mobility studies lack a well-defined common ground and efforts for theorisation, both of which are essential to sustainable development of any scholarly discourse in social sciences. To cope with it, we propose to set an analysis that can integrate mobility studies in a coherent manner and facilitate the practice of theorisation on mobility, and thus mobile devices and their connection to work and social organizations.

We shall attempt to do so by connecting two diverging ways of looking at mobility that emerge from the current literature. These views of mobility can be grouped into two diverging lens for looking at the phenomenon; one sees mobility as creating perpetual, stable and controllable contact (networks), while the other views mobility as creating fluidity through the formation of ad-hoc, de-contextualized contacts (networks)¹. Both of these views contain a corollary for how to understand the relation between work/social organizations and mobile devices. Connecting these two views gives birth to what we will define as the duality of mobility. Our final aim is to build an initial theoretical understanding of mobility to guide both academics and practitioners into a more comprehensive analysis of mobile devices.

The structure of this paper is as follows. Section 2 will revisit the concept of mobility in current academic discourse. Section 3 discusses mobile devices from a micro viewpoint using a metaphor of stability of interaction. It further advances how mobile devices can be viewed as mechanisms to sustain routines. Section 4 partly opposes the previously discussed view and introduces a theory of fluidity and ad-hoc re-configuration of resources within work and social organization through the usage of mobile devices. Following, Section 5 brings together the previous two metaphors to form the concept of the duality of mobility. This merging attempts to create a better understanding of how we can employ mobile devices in work and social organizations. Finally, Section 6 puts forth concluding remarks.

2. MOBILITY AND MOBILE DEVICES: AN OVERVIEW

The interest in mobile devices shifted from being a purely technical one, concerned with the self-contained artefact, to a more sociological/philosophical project that considers the dialectic between technology and society. This is due not only to the increasing concern with socio-technical systems in the academic world (Bijker, Hughes et al. 1987), but also to a rising awareness of commercial companies of

¹ We are grouping these opposing views not in the strict terms of social or technical analysis, but rather on the notion of the causes/effects of mobility and mobile artefacts. That is on the value attributed to mobile devices in changing organizational design and the nature of work and social fabric.

the value of better understanding the dynamics of human-computer interaction (HCI), which, in turn, suggests that the study of humans and the machines as mutually exclusive entities is increasingly inadequate (Dahlbom 1996).

Although being grounded in descriptive studies of usage and adaptation of mobile devices, in recent times, the literature has moved to more theoretical questions concerning the nature of mobility in modern work/social organizations. These studies have provided good insights into mobility by linking time, space and context (Harrison and Dourish 1996) and adding in modalities of interaction (Kristoffersen and Ljungberg 2000). However, it is our contention that there is no well-established, uniform tradition, partly because of the lack of a solid theory to guide the design of mobile devices within organizations. This is also due to the fact that most studies tackle context-specific problems (e.g. ethnomethodology) without attempting to produce any kind of abstraction/generalization.

In general use of its term, 'mobile' refers to a state where a given entity can move or be moved, and 'mobility' refers to ability of and/or quality for ensuring it. Thus it is obvious that 'mobile' can be relevant to *any* entity, be it physical or non-physical, tangible or intangible, as long as it can 'move' or 'be moved' in some sense. Due to this abstract nature of the meaning, the terms 'mobile' and 'mobility' can signify a wide variety of states and qualities, and hence lead to a difficulty of grasping the nature.

In narrowing down the meaning of mobility within the study of mobile devices, we shall like to make a distinction between mobile artefacts (which, indeed, contain applications) and mobile applications (such as Hotmail Instant Messenger). A mobile device, together with its various applications, is not bound to a specific place but is present regardless of place while a mobile application is bound to a specific setting; in other words mobile devices move with the user in all modes of interaction². As highlighted by (Ljungstrand 2000) stationary devices are associated with places while mobile devices are associated with persons. Thus, while the context of a place is relatively static, the context associated with people is not.

Additionally, intrinsically connected to the understanding of mobility, location is becoming the key issue within the worlds of industry and academia. On one side there is the industry's contention that location sensitivity has mostly to do with the type of services/functions available in a certain situation/location. This takes for granted what a location is and in other terms conceptually separates the technology from its place of use. Essentially fails to acknowledge the self-referentiality of technology and of society (Giddens 1984; Kallinikos 2001). On the other side, academia is expanding our understanding of location sensitivity and aiming to maximize interactivity in every location (Suchman 1987; Dix 2000; Brown and O'Hara 2001; Green 2001). However, the concept of interactivity suggests that we are acting in an environment and that location is also defined by a set of inter-related activities (Kakihara and Sorensen 2002; Kakihara and Sørensen 2002). Therefore, the aim of maximization, with its exclusive focus on technology, is at odds with the harmonic dialectic between location, humans, and technology. We contend that this dialectic can be explained by an expanded theoretical understanding of mobility.

While allowing us to alienate ourselves from the physical environment or, conversely, to enrich our contact with it, mobile devices also include the element of interaction (Ljungberg and Sorensen 2000). The interactive function of mobile devices necessitates a different level of analysis. Our world is increasingly being defined as mobile. Giddens (1999) brought new meaning to the term 'Runaway World', using it to represent the 'mobility' of our contemporary social world in terms of both ritualistic and geographical movement. These movements are related to our ability to mobilize and interact with virtual environments in different contexts. The next two sections will look at the constitutive elements of mobility.

² The modes of interaction are explored by Kristoffersen, S. and F. Ljungberg (2000). These modalities are divided into three categories: Travelling (the process of going from one place to another using a vehicle), Visiting (spending an extended amount of time in one well defined space) and Wandering (extensive local mobility in a workplace). For the purpose of this paper, interaction can be understood as a particular setting where HCI takes place (e.g. on the train or while walking)

These are, in order of appearance, the mobility as stability when taking an interactional view, and the mobility as fluidity, when taking an organizational view.

In general, the organizational view looks at the macro changes brought about by mobile devices, while the interactional looks at the micro ones. Why is it important to bring together a macro and micro understanding of mobility? This paper, heavily relying on modern sociological theories, presupposes that micro and macro changes cannot be looked at separately but have to be reconnected to provide a better understanding and thus a better proactive stance toward the design of new mobile devices within organizations. Stability, for instance, has historically been looked at as a contraposition to mobility. Such logic is highly questionable, as it will be made clear later in the paper. Mobility in fact does not exist if separated from stability. In a sense, one makes the other possible. It is further claimed that stable interaction creates mobile organizations. This means that perpetual communication through technological mediums, while allowing a stable interaction, enables the organization to be shaped ad-hoc. Thus a higher level of de-contextualization in interaction allows for, paradoxically, the generation of a better organizational response within contexts.

3. MOBILITY AS STABILITY: AN INTERACTIONAL VIEW

When looking at mobility it is essential to understand the nature of what is being mobilized. Drawing on (Kakihara and Sørensen 2001; 2002), we acknowledge that the device is not the only thing mobilized but also symbols, images, voice etc. - being mobile is a matter of interaction. This means that in order to be considered mobile, a device must allow facilitate/enable interaction. Whilst acknowledging this argument, we must understand what these objects represent for users of mobile devices on a micro, individual level.

Empirical studies on mobile phones suggest that the fact of mobile device has various implicit functions, one of which is socialization. A series of studies highlight that both workers and teenagers use mobile phones primarily as a communication device to 'keep in touch' with colleagues and/or friends (Leung and Wei 2000; Brown and O'Hara 2001; Kim, et al. 2002). We will define this dynamic as human-to-human socialization. Other studies suggest that the ability to use mobile devices as proxy is also central to understanding the implications of socialization (Dix 2000). 'Proxy' is used in the sense that we access other technologies through our mobile devices. This, then, can be defined as human-to-machine socialization. Based upon these assumptions, we can proceed to elaborate on the 'raison d'être' for different types of socialization.

By taking the sum of what is mobilized (human-to-human and human-to-machine) we can see that a whole system of routines is mobilized; these routines have to do with the way humans and technology³ interact. Routines are activities that we repeat every day that we are thus familiar with (Giddens 1984). For instance, being able to call the secretary in the office to gain assistance in a task we are performing elsewhere creates in us a sense of safety (i.e. we are able to replicate a routine from 'home'). By the same token, being able to access our address book online in order to find the number of a client adds leverage to the preparation required in the work field and thus decreases anxiety levels.

Following this argument we can answer another crucial question: why do we mobilize our routines? Sensitized by some concepts from the theory of structuration, we can argue that the mobilization of routines has to do with ontological security (Giddens 1984). This is the security derived from familiarizing ourselves with an environment and acting in and/or interacting with it. Our 'being in the world'⁴ is, in fact, supported by a 'phatic function' (Jakobson 1960), an attitude of maintaining interaction with our routines (and the people, or objects, within them) regardless of what is being transmitted. This is represented by the

³ Technology is seen as an institutionalised process which contains rules and regulation as put forward by Orlikowski, W. (1992).

⁴ 'Being in the world' is related to Heidegger, M. (1962)' notion of us being thrown in a situation and acting in it as argued by Ciborra, C. U. (1999).

amount of casual messages (e.g. 'Thinking of you') sent via the Short Messaging Services (SMS) over wireless networks (Economist 2000; Nardi 2000; Wickham 2001). This environment, as explained above, is made of both people and objects. On a simple level, we are not frightened of using a cash machine because we expect certain things to happen. In fact, routinization is crucial to the psychological mechanisms 'whereby a sense of trust or ontological security is sustained in the daily activities of social life' (Giddens 1984). Thus interaction with our routines, represented by both humans and non-humans (as in the case of the cash machine), are central to maintaining ontological security.

However, we must now draw a distinction between the act of interaction and the perceived ability to interact. Which of the two gives us ontological security? At first glance it may seem that we require both. Nevertheless, it is the ability, or perception, of being able to engage or interact with a routine that gives an individual ontological security. (Giddens 1984) states that 'agency refers not to the intentions people have in doing things in the first place,' but to the action itself. A simple example can illustrate this concept. The current IS literature is moving toward an understanding of improvisation (Orlikowski and Hofman 1997; Lewin 1998; Moorman and Miner 1998; Weick 1998; Ciborra 1999; Ciborra 2001). To improvise means to react by instinct to a given circumstance "grounded on an opaque stock of past experiences (Ciborra 1999)". Music improvisation is a prime example, yet it is important to understand that improvisation always relies on an understanding of the rules and structures of music (Ciborra 1999).

This reaction cannot be discussed 'in separation from the body, its mediations with the surrounding world and the coherence of an acting self' (Giddens 1984). Hence, instincts draw both on biological features (e.g. the reflex action that make us close our eyes if something comes toward our face) and on culturally inherited features (the instinct of nodding to say yes, a cultural routine) (Maturana and Varela 1992). These culturally inherited routines can be described "as recursive...like some self-reproducing items in nature" (Giddens 1984). It is not the outcome of the improvisation that matters; rather, it is the improvisation itself that reflects the ontological security. Thus, the ability to interact with routines gives us ontological security that in turn can enable improvisation as opposed to not taking action. Seen from this particular viewpoint the mobile device, by dint of its capacity to interact with routines in different contexts, makes us capable of a higher degree of interaction in a physical environment. In a sense, on a psychological level, it enables a greater propensity toward crossing contexts, known or unknown to the individual.

Thus, the mobile phone is a device that allows us to transport a spatially distant, or absent, reality containing people and objects and to interact with it. Of interest to us is the absent present, an oxymoron which draws attention to the way a sense of 'belonging to a place' can be altered and redefined by new technologies (Fortunati 2000). We can 'belong' to a communicative network rather than (or at the same time as) a physical space. In effect, the importance of physical environment/situation diminishes when we are able to enter an abstract environment that, on some level, substitutes for what might be the empty room from which one is communicating. The emotional elements that have vanished in relation to physical location are moved to a social level; 'that is the sense of identification, familiarity, stability and security (Fortunati 2000).'

To sum up, this discussion has so far brought us to understand that mobile devices give us the potential to interact in disparate places with routines that are represented by both objects and people. This, in turn, leads to ontological security, brought to us by a virtual reality made of routines; a reality that is not tangible and that can only be perceived by the beholder. According to (Kundera 1984) the being is light in that it is ephemeral. This explains the advent of monuments to show a sense of stability. The mobile device, under this view, can also be considered as a crystalliser of interaction routines.

This diminishment in natural communication has permitted the emptying of physical presence in space (Fortunati 2000) and thus a weakening of the link between content and context in favour of a precise

symbol system (Kallinikos 2001). Thus, mobile devices should be conceived of as multiple contexts made up on the one hand of the virtual and on the other of the real (i.e. physical spaces of interaction). So far, however, we have seen the phenomenon of mobility strictly from a micro viewpoint. The paradox, when looking at the macro organization, emerges in that we see increasingly unpredictable social mobility, and within it ad-hoc organization relying on weak ties. Unfolding the paradox shows that humans require a sense of stability in order to enable mobility. The next section will explore how the ad-hoc reconfiguration of resources through stable interaction enables the creation of a fluid organization.

4. MOBILITY AS FLUIDITY: AN ORGANIZATIONAL VIEW

The advent of mobile devices has led to a claim of a post-modern period, which is characterized by independent professionals and a sense of fluidity (Kakihara and Sørensen 2001; 2002). This advocates the idea of an interlinked mobile and global community (McLuhan and Powers 1989) with both strong and weak ties (Granovetter 1982), which can, depending on the outside circumstances, dynamically change its arrangement of resources.

Nowadays, our interaction patterns have been significantly mobilized by various ICTs compared with those in the pre-ICT age whereby people usually interacted with a quite limited number of neighbours in a local area. Today's social environment can no longer be appreciated in terms of static spatiality, linear clock time, or rigid contextuality. In this sense, from a macro viewpoint, the mobilization of human interaction facilitated by ICTs is requiring a new way of understanding and explaining the social morphology of our interaction pattern. Based on the discussion of three dimensions of human interaction, we here seek to delineate an image of social environment in which we reside now. In so doing, we apply Mol and Law's (1994) ideas of social topology and the fluid metaphor.

Mol and Law propose three distinct metaphors to describe social topologies, drawn from their investigation on the spatial properties of the blood condition anaemia in which there are too few red blood cells in the blood. First, the region is a distinct topology whereby objects are clustered together and boundaries are drawn around each particular regional cluster. In short, this topology can be characterized by "boundary." Second, the network is a topology whereby relative distance is a function of the relationship between components constituting the network. Complex connection of nodes creates the whole network structure. This topology can be characterized by "relationship." Third and most important to our discussion here, the fluid is a topology whereby "neither boundaries nor relations mark the difference between one place and another. Instead, sometimes boundaries come and go, allow leakage or disappear altogether, while relations transform themselves without fracture. Sometimes, then, social space behaves like a fluid" (p. 643). This is a particular image of the topology of anaemia Mol and Law discuss. Anaemia, like blood, can be seen as flowing in and out of different regions, across different borders, using diverse networks.

In a stark contrast to our previous discussion of mobility as stability in interaction, applying the fluid metaphor to mobile technology use can provide us with another distinct reality of mobility: mobility as fluidity. This view is particularly important for management when designing organizational work practices/activities. Given the rapid diffusion and domestication of various ICT applications including mobile phones, SMS (Short Message Service), PDA, laptop PC, and awareness technologies such as ICQ into our everyday lives, people's interactional accessibility to each other, as we discussed above, has been dramatically increased. The weak social ties between the people have been significantly mobilized by those technologies so that they can interact with others stably, virtually 'anytime, anywhere' (Kleinrock, 1996). When considering such interactional stability in an organizational context, we can discern that the stability provides the workers significant fluidity in their work activities. Traditionally, modern work activities have been tightly bound to specific physical workplaces such as office and factory. This is partly

because of the strong preference of bureaucratic control and coordination of work activities in centralized manners and partly because of the traditional 'immobilized' communication technologies installed in fixed spaces, such as landline telephone and fax machines (Malone et al., 1987; Yates, 1989). The emerging mobile and net-based technologies, however, is actually transforming this old curse of the modern work, liberating work activities from fixed spaces with opportunities to be performed in alternative work arrangements such as at home, at a client's office, in a vehicle, in a hotel room, at an airport, and so on. In those emerging, distributed work arrangements, the workers' activities are organized and coordinated beyond and across the traditional organizational boundaries (Belanger, 1998; Venkatesh, 1992). This is exactly the topology of fluid. Mol and Law suggest: "a fluid world is a world of mixtures" (p. 660) and "variation without boundaries and transformation without discontinuity" (p. 658). Thus interactional stability afforded by mobile technology along with other ICTs clearly brings forth another distinct aspect of mobility; namely, mobility as fluidity characterized by "the remarkably uneven and fragmented flows of people, information, objects, money, images and risks across regions in strikingly faster and unpredictable shapes" (Urry 2000: p. 38).

The fluid organization of work might appear an overly radical or exceptional case of working. On the contrary, such a fluid organization of work activities is already upon us. From an individual point of view, we are witnessing a new kind of independent workers, which is sometimes symbolically depicted as 'e-lancer' (Malone & Laubacher), 'self-programmable workers' (Castells, 2001) or 'post-modern professionals' (Kakihara & Sorensen, 2002). They are the workers who can decide independently and autonomously what to do and when and where it should be done. Such quality is ensured and supported by their own distinct skills and/or knowledge and their active and intensive utilization of mobile and net-based technologies. They include independent consultants, temporary-based executives and managers, designers, planners, freelance journalists, and the like. As they are not constrained by organizational boundaries or traditional employment relationship, they can seek 'boundaryless career' (Arthur, 1996). This kind of workers is clearly the main actors in the fluid organization.

Likewise, from an organizational point of view, the emerging practice of 'virtual teams/organizations,' is also gaining momentum (Davidow and Malone, 1992; Lipnack and Stamps, 1997). The new distributed work arrangements inevitably lead to restructuring of the ways in which the firms organize work activities, since more and more activities are to be done across space, time, and organizational boundaries through 'virtual' or technologically mediated communication and coordination. Snow et al. (1999) argue that virtual organizations "can be defined as those that are multisite, multiorganizational, and dynamic" (p. 17). And nowadays, more and more practices of virtual teams/organizations are 'multinational' and 'global,' being dynamically organized across national boundaries (Jarvenpaa and Leidner, 1999; Maznevski and Chudoba, 2000; Orlikowski, 2002). All these are ensured by the mobility as fluidity, the rapidly increasing flows of people, information, and work activities across various boundaries.

As seen above, the notion of mobility encompasses the distinct nature characterized by not only interactional stability but also fluidity in organizing activities. The mobility as fluidity is clearly ensured by individuals' interactional stability, which in return is conditioned by the fluidity of activities. Following we shall bring together these two views in the concept of the duality of mobility.

5. TOWARD A POSTULATE: THE DUALITY OF MOBILITY

To sum up, the mobility brought about by mobile devices has been misinterpreted as a dualism. This is partly due to the ontological standpoint that, in mobile devices' studies, has been closely associated with functionalism without taking enough account of human cognition. After this discussion we suggest that the word mobile might be better understood if associated with a duality.

From our discussion we understand that mobility does not mean independence from place but rather an optimal dialectic between real and virtual environments, between stability and fluidity. The mobile device becomes the extension of a virtual work/leisure space. This provides us with a better understanding of mobile devices - they exist in that they bring about a virtual reality that affects the way in which we act in disparate physical environments. This in turn complicates our notion of what mobility is. The ability to bring along and to engage with rituals and traditions makes us fluid. We exist synchronously in a physical environment and a virtual one. Our reality and organization becomes fluid and stable at the same time; it moves with us in different contexts through the mobile artefact and influences our perception of real space. In turn, the real space allows our virtual reality to be co-existent. The link between these intrinsically related dimensions gives birth to what we will define as the duality of mobility.

In short, by moving with the person, the stable becomes fluid and, finally, this creates a new concept of mobility. We have seen that understanding mobile devices requires a focus on two main phenomena: interaction with and organization of resources. The duality of mobility is expressed in its mutually reinforcing constitutive elements: stability and fluidity. Where does this discussion bring us? What are the implications of such duality for further research in work/social organizations? Given the phenomenon of perpetual cross-contextual movement of professionals and common people, and the preceding argument, we shall like to formulate a simple but powerful postulate concerning mobility: *The more stable the interaction with routines becomes, the more fluid organizations will become*; thus mobility as stability.

This postulate clearly entails clarification on what kind of interaction, in terms of sustaining routines, needs to be sustained. Furthermore, this postulate shifts particular attention to the most basic purpose and function of these devices, which would tie them to a broader academic discourse. That is, communication and socialization at both a horizontal and vertical level of organizational work. This for organizational analysis is related to issues of centralization vs de-centralization of work activities as well as management of local vs global contexts.

6. CONCLUSION

The discussions on mobility in contemporary contexts have been polarised into two contrasting research schools. Specifically due to such diversity in terms of fields and definitions, the current mobility studies lack a well-defined common ground and efforts for theorisation, both of which are essential for sustainable development of any scholarly discourse in social sciences. Empirically substantiated research on mobility and mobile devices is increasingly inadequate if not connected to a broader theoretical background. To cope with it, we proposed setting an integrative approach that sees mobility as a duality and thus facilitate the practice of theorisation on mobility; namely, studying *both fluidity and stability* in contemporary society and work organizations and understanding their mutual influences. The next step will be to test our arguments in various real-world contexts. We believe that field studies with rich and contextualized data on the *actualities of mobile devices' usage* and *on the kind of mobility we engage in* are essential to fertilize this embryonic research field.

7. REFERENCES

- Arthur, M.B. and D.M. Rousseau eds. (1996). *Boundaryless Career: A New Employment Principle for a New Organizational Era*. Oxford University Press, New York.
- Belanger, F. and R.W. Collins (1998). "Distributed Work Arrangements: A Research Framework." *The Information Society*. Vol.14, No.2, pp. 137-152.
- Bijker, W. E., T. P. Hughes, et al., Eds. (1987). *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. Cambridge, MA, MIT Press.

- Brown, B. and K. O'Hara (2001). "Place as a practical concern of mobile workers." *Environment and Planning*.
- Castells, M. (1996). *The rise of the network society*. Oxford, Blackwell.
- Castells, M. (2001). *The Internet Galaxy: Reflections on the Internet, Business, and Society*. Oxford University Press, Oxford.
- Ciborra, C. U. (1999). "Notes on improvisation and time in organizations." *Accounting, Management and Information Technologies* 9(2).
- Ciborra, C. U. (2001). In the Mood for Knowledge: a New Study of Improvisation. *Working Paper, Department of Information Systems*. London, London School of Economics: 15.
- Dahlbom, B. (1996). "The New Informatics." *Scandinavian Journal of Information Systems* Vol. 8(2): 29-47.
- Davidow, W.H. and M.S. Malone (1992). *The Virtual Corporation: Structuring and Revitalizing the Corporation for the 21st Century*. Harper Business, New York.
- Dix, A. (2000). "Exploiting Space and Location as a Design Framework for Interactive Mobile Systems." *ACM Transactions on Computer-Human Interaction* 7(3): 285-321.
- Economist (2000). "Moreover: 2moro & 2moro & 2moro." *The Economist*: 91.
- Fortunati, L. (2000). "The Mobile Phone: New Social Categories and Relations," *University of Trieste*.
- Giddens, A. (1984). *The Constitution of Society*. Cambridge, Polity Press.
- Giddens, A. (1999). *Runaway World: how globalisation is reshaping our lives*. London, Profile Books.
- Granovetter, M. S. (1982). "The Strength of Weak Ties: A Network Theory Revisited." *Social Structure and Network Analysis*. P. V. Marsden and N. Lin. Beverly Hills, CA, Sage Publication: 105-130.
- Green, N. (2001). "On the move: technology, mobility, and the mediation of social time and space." *Department of Sociology, Surrey, University of Surrey Guildford*: 22.
- Harrison, S. and P. Dourish (1996). "Re-Placing Space: The Roles of Place and Space in Collaborative Systems." *Proceedings of ACM Conference of CSCW 1996*, Cambridge.
- Heidegger, M. (1962). *Being and Time*. Oxford, Basil Blackwell.
- Jakobson, R. (1960). "Closing Statement: Linguistics and Poetics." *Style in Language*. T. A. Sebeok. New York, Wiley.
- Jarvenpaa, S.L. and D.E. Leidner (1999). "Communication and Trust in Global Virtual Teams." *Organization Science*. Vol.10, No.6, pp. 791-815.
- Kakihara, M. and C. Sørensen (2001). "Mobility Reconsidered: Topological Aspects of Interaction." *IRIS* 24, Ulvik, Norway, University of Bergen.
- Kakihara, M. and C. Sørensen (2002). "Mobility: An Extended Perspective." *35th Hawaii International Conference on System Sciences*, Hawaii, USA.
- Kakihara, M. and C. Sorensen (2002). "'Post-Modern' Professionals' Work and Mobile Technology." *London School of Economics*.
- Kallinikos, J. (2001). *The Age of Flexibility*. Sweden, Academia Adapta.

- Kallinikos, J. (2001). "Recalcitrant Technology. Cross-contextual Systems and Context-embedded Action." *Department of Information Systems, London School of Economics*. London.
- Kim, H., J. Kim, et al. (2002). "An Empirical Study of the Use Contexts and Usability Problems in Mobile Internet." *35th Hawaii International Conference on System Sciences*, Hawaii, USA.
- Kleinrock, L. (1996). "Nomadicity: Anytime, Anywhere in a Disconnected World." *Mobile Networks and Applications*. Vol.1, pp. 351-357.
- Kristoffersen, S. and F. Ljungberg (2000). "Mobility: From stationary to mobile work." *Planet Internet*. K. Braa, C. Sørensen and B. Dahlbom. Lund, Sweden, Studentlitteratur: 41-64.
- Kundera, M. (1984). *The Unbearable Lightness of Being*. New York, Faber and Faber.
- Leung, L. and R. Wei (2000). "More than just talk on the move: user gratifications of the cellular phone." *Journalism and Mass Communication* **77**(2): 308-320.
- Lewin, A. Y. (1998). "Introduction: Jazz Improvisation as a Metaphor for Organization Theory." *Organization Science* **9**(5): 539.
- Lipnack, J. and J. Stamps (1997). *Virtual Teams: Reaching Across Space, Time and Organizations with Technology*. John Wiley & Sons, New York, Chichester, Brisbane, Toronto, Singapore.
- Ljungberg, F. and C. Sorensen (2000). "Overload: From Transaction to Interaction." *Planet Internet*. K. Braa, C. Sorensen and B. Dahlbom. Lund, Sweden, Studentlitteratur: 113-36.
- Ljungstrand, P. (2000). "Context Awareness in Mobile Telephony." *Proceedings of Wireless World Workshop, Digital World Research Centre, Guildford, United Kingdom*.
- Malone, T.W. and R.J. Laubacher (1998). "The Dawn of the E-Lance Economy." *Harvard Business Review*. Vol.76, No.5 (September-October), pp. 145-153.
- Malone, T.W., J. Yates and R.I. Benjamin (1987). "Electronic Markets and Electronic Hierarchies." *Communications of the ACM*. Vol.30, No.6, pp. 484-497.
- Maturana, H. R. and F. J. Varela (1992). *The Tree of Knowledge: The Biological Roots of Human Understanding*. Boston, MA, Shambhala.
- Maznevski, M.L. and K.M. Chudoba (2000). "Bridging Space Over Time: Global Virtual Team Dynamics and Effectiveness." *Organization Science*. Vol.11, No.5, pp. 473-492.
- McLuhan, M. and B. R. Powers (1989). *The global village : transformations in world life and media in the 21st century*. New York, Oxford University Press.
- Mol, A. and J. Law (1994). "Regions, Networks and Fluids: Anaemia and Social Topology." *Social Studies of Science*. Vol.24, pp. 641-671.
- Moorman, C. and A. S. Miner (1998). "Organizational Improvisation and Organization Memory." *Academy of Management Review* **23**(4): 698-723.
- Nardi, B. (2000). "Interaction and Outeraction: Instant Messaging in Action." *CSCW'00 of the ACM*: December 2.
- Orlikowski, W. (1992). "The Duality of Technology: Rethinking the Concept of Technology in Organizations." *Organization Science* **3**(3): 398-427.
- Orlikowski, W. J. and J. D. Hofman (1997). "An Improvisational Model for Change Management: The Case of Groupware Technologies." *Sloan Management Review* **38**(2): 11-21.

- Orlikowski, W.J. (2002). "Knowing in Practice: Enacting a Collective Capacity in Distributed Organizing." *Organization Science*. Vol.13, No.3, pp. 249-273.
- Sassen, S. (1991). *The global city : New York, London, Tokyo*. Princeton, N.J, Princeton University Press.
- Snow, C.C., J. Lipnack and J. Stamps (1999). "The Virtual Organization: Promises and Payoffs, Large and Small." In *Trends in Organizational Behavior: Vol. 6. The Virtual Organization*. (C.L. Cooper and D.M. Rousseau eds.) John Wiley & Sons, Chichester, pp. 15-30.
- Suchman, L. (1987). *Plans and situated actions: The problem of human-machine communication*. Cambridge, Cambridge University Press.
- Urry, J. (2000). *Sociology beyond Societies: Mobilities for the Twenty-First Century*. London, Routledge.
- Venkatesh, A. and N.P. Vitalari (1992). "An Emerging Distributed Work Arrangement: An Investigation of Computer-based Supplemental Work at Home." *Management Science*. Vol.38, No.12, pp. 1687-1706.
- Weick, K. E. (1998). "Improvisation as a mindset for organizational analysis." *Organization Science* 9(5): 543-555.
- Wickham, R. (2001). "SMS: Europe's smash hit." *Wireless Review* **EXTRA**: 24-26.
- Yates, J. (1989). *Control through Communication: The Rise of System in American Management*. The Johns Hopkins University Press, Baltimore.