Expanding the 'Mobility' Concept

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INTRODUCTION

During the last two decades of the twentieth century we have seen various transformations in our society as a whole. In particular, information and communication technologies (ICTs) have played a critical role in this transformation process. Because of their pervasiveness and our intensive use of them, ICTs have changed our ways of living in virtually all realms of our social lives. ICT is of course not the sole factor of this transformation; various "old" technologies have also played a significant part. Modern transportation technologies, for example, have become dramatically sophisticated in terms of effectiveness and usefulness since the early twentieth century. The train and airline infrastructures are highly integrated with ICTs such as electronic reservation systems and traffic control systems. It is therefore important to recognize that the fundamental nature of technological revolution in the late twentieth century is the dynamic and complex interplay between old and new technologies and between the reconfiguration of the technological fabric and its domestication [6, 27, 32, 40].

This paper concerns the concept of *mobility*, which manifests such a transformation of our social lives combining new and old technologies. It is now widely argued that our life styles have become increasingly *mobile* in the sense that the speed of transportation and hence geographical reach within a given time span is dramatically augmented by modern technological developments and sophistication such as train and airplane systems. However, in spite of the upsurge of concern with mobility in our social lives, current research perspectives define the notion of mobility quite narrowly, exclusively in terms of *humans' independency from geographical constraints*. For example, Makimoto and Manners [28] argue that within the next decade or so, a large part of the facilities and tools at home and in the office will be reduced enough in size to be carried, making people "geographically independent" (p. 2) and that people who use such mobile technologies, it is claimed, will be "free to live where they want and travel as much as they want" (p. 6). Their arguments for the significance of mobility, or nomadicity, are clearly confined to the corporeal characteristic of human movement freed from geographical constraints thanks to mobile computing technologies and services such as mobile phones and personal digital assistants (PDAs). Likewise, most of research on mobility in the Computer Supported

Cooperative Work (CSCW) field has been showing the same tendency [e.g. 5, 11].

Considering such a confined situation of the debates on mobility looking only at human geographical movement, we reconsider in this paper the notion of mobility and try to expand our perspective towards it. To do so, we argue that "being mobile" is not just a matter of people traveling but, far more importantly, related to the *interaction* they perform — the way in which they interact with each other in their social lives. New configurations of social-technical relationships resulting from the diffusion of ICTs afford various dimensions of mobility to humans' interactivity with others in their social lives. We here suggest expanding the concept of mobility by looking at three distinct dimensions of human interaction; namely, *spatial, temporal* and *contextual* mobility. These three dimensions of human interaction have been dramatically mobilized by intensive use of ICTs, especially mobile technologies, in our social lives in general and work environments in particular. In the following, we will discuss each of these three dimensions in detail and implications for future debates on mobility will be drawn.

SPATIAL MOBILITY

Spatial mobility denotes the most immediate aspect of mobility in our social lives and is manifested by, for example, dramatic increases in both international tourism and business travel in the twentieth century. It is estimated that tourism accounts for 10% of global employment and global GDP [39]. It has been argued that people in the post-industrial era are geographically independent "nomads" supported by various technologies [e.g. 8, 28]. The rapid diffusion of ICTs in general and mobile communication technologies such as mobile phones and PDAs in particular has further energized human nomadicity in urban life, business environments and many other societal milieus [2, 21]. Support technologies are not exclusively comprised of the newly emerging ICT infrastructures but on the situated use of both old and new technologies [7].

However, the emerging nomadic nature of human life only signifies a fraction of the whole debate area concerning the mobility in human interaction. The nomadic society is just a manifestation of the increasing corporeal travel of people by foot, car, train, airplane or other means of transportation. As Urry [36] explains, there are several other aspects of spatial mobility in the modern society.

First, the mobility of *objects* should be considered. Traveling objects are often associated with the movement of people, although objects may follow much more complex and diverse routes than people. The travel of objects is intertwined with human dwelling and traveling norms. Lury [26] argues: "objects move in relations of traveling-in-dwelling and relations of dwelling-in-traveling in the practices of global cosmopolitanism" (p. 83). More conspicuously, this can be observed in the case of the Sony Walkman, which indicates the interplay between corporeal and object travel. du Gay et al. [10] explain: "it is virtually an extension of the skin. It is fitted, molded, like so much else in modern consumer culture, to the body itself... It is designed for movement – for mobility, for people who are always out and about, for traveling light. It is part of the required equipment of the modern 'nomad'... it is testimony to the high value which the culture of late-modernity places on mobility (pp. 23-4).

Second, along with the mobility of objects, we also need to take the mobility of *symbols* into account. Global satellite television networks, for example, broadcast visual images and sound enabling billions of people to receive news almost simultaneously. Likewise, the internet has become a place where an immense amount of information, sound and images travel beyond national borders. The convergence of various media including telephone, television and the internet has supported and further facilitated our social and economic activities today requiring rapid exchange of symbols.

Third, symbolic travel on the internet generates another distinct spatial reality: the mobility of *space* itself. As computers dematerialized the means of communication and interconnected millions of people, such a loosely connected network of computers brings forth a virtual spatiality — a "virtual community" or "cyber community" [4, 18, 20, 30]. In such computer-mediated communication among people, geographical distance no longer remains a fundamental aspect of the interaction — the boundary between "here" and "there" dissolves. Jones [18] points out that "cyberspace hasn't a 'where'... Rather, the space of cyberspace is predicated on knowledge and information, on the common beliefs and practices of a society abstracted from physical space" (p. 15). In this sense it could be argued that in this cyberspace the notion of 'space' itself is reconfigured and mobilized in relation with human interest-centric communality rather than geographical proximity.

In summary, spatial mobility refers not only to extensive movement of people; it also signifies the global flux of objects, symbols, and space itself, and as such evokes complex patterns of human interaction. It is obvious that the current debates on mobility only concerns geographical movement of humans and that such a perspective is quite incapable of capturing the complex, emerging reality of mobility in our social lives. The

mobilization of spatiality in human interaction results from the complex and rapid flux of all entities in our living world including not just humans but also objects, symbols and images.

TEMPORAL MOBILITY

Technology inherently influences temporality of our social activities. Efforts to invent new technologies and introduce them into existing work settings are motivated to a large extent by the desire to accelerate the pace of work and to save time. Typography, for example, is a modern printing technique employed to speed up the production of documents such as newspapers and books compared with traditional printing methods. Likewise, factory assembly lines clearly aim at improving the temporal efficiency of production of goods.

It is obvious, however, that speeding-up and saving time are not the only temporal transformations of social activities induced by new technologies. Barley [1] studies the temporal order and changes in work places brought about by new technologies, and argues that "The temporal order of the workplace therefore serves simultaneously as a template for organizing behavior as well as an interpretive framework for rendering action in the setting meaningful" (p. 125). In order to investigate temporal order in work places, he distinguishes between *structural* and *interpretive* aspects. Structural attributes are measured by largely objectified parameters, among which sequence, duration, temporal location and rates of recurrence are particularly important. In addition to those attributes, he also points out the importance of interpretive aspects of temporality: how people in the work place interpret the change of those structural parameters. He argues that "such interpretations not only enable us to lend meaning to events in our work worlds; they lead us to form opinions and make pronouncements about the behavior of persons operating in alternate temporal systems." (p. 129) From the investigation of the impacts of computer-based radiology equipment on temporality and social relations in hospital radiology departments, he argues: "new technologies may enhance or inhibit conflict by triggering changes in the structural allocation of events that, in turn, shift interpretive temporal frameworks" (p. 160). Thus we can conclude that temporality encompasses a variety of aspects, which influence and are influenced by the introduction and use of technologies.

Furthermore, inspired by Hall's [15, 16] work, Barley characterizes temporality using the dichotomy: *monochronicity* and *polychronicity*. The former refers to situations where people seek to structure their activities and plan for events by allocating specific slots of time to each event's occurrence. The latter signifies situations where people place less value on and accept divergence of structural and interpretive attributes of the temporal order. Barley found in his investigation of temporal order and its change in hospital radiology departments that the newly introduced technology increased the monochronicity of

actors' activities by restructuring structural and interpretive framework of temporality.

However, considering the recent diffusion of ICTs into a wide range of our social lives, polychronicity rather than monochronicity of human interaction seems to rapidly increase. Applying Barley's analytical framework in their analysis of a Korean trading companies, Lee and Liebenau [22, 23] found that a new EDI system restructured the temporal order of the companies' business operations, increasing polychronicity in the work setting. It is obvious that by using email or other asynchronous ICT applications, people become able to deal with multiple tasks simultaneously. It is no longer strictly necessary to share the same time period exclusively with a particular person or group. Moreover, whereas telephones and fax machines reduced the response time from weeks and days to a few seconds, the computers and the Internet make it further contracted into nanoseconds [29]. ICTs allow information and ideas to be instantaneously transmitted and simultaneously accessed across the globe [36]. Thus it could be argued that such "instantaneity" of time in the contemporary society in general and in cyberspace in particular further increases polychronicity of human activities.

As discussed above, the temporal dimension of human interaction is increasingly mobilized by the impacts of various technologies. The temporality of human interaction can no longer be explained from a linear 'clock-time' perspective; it is now highly mobilized into multiple temporal modes such as monochronicity and polychronicity. This leads to a complex social environment where monochronicity and polychronicity of interaction among humans are intertwined and renegotiating with each other. Whitehead [38] insists that the temporal nature, or process, of human action is inseparably bound to human's fundamental existence and social reality as a whole. In this sense, the increasing temporal mobilization of human interaction is simultaneously creating new opportunities and constraints for the ecology of social life.

CONTEXTUAL MOBILITY

In fact, spatial and temporal aspects of mobility in human interaction have been discussed in various research fields in various ways. The CSCW field has, for example, intensively dealt with spatial and temporal aspects in relation to technological innovations such as the internet applications, groupware and various information systems. Through the use of stationary and mobile ICT applications people can organize and manage their work activities with fewer constraints, making the work environment flexible and independent from geographical and temporal constraints [3, 9, 24]. However, considering the broad aspects of mobilization of our social interaction induced and facilitated by various ICTs including mobile technologies, another important dimension of mobility needs be addressed: *contextuality*.

Human action is inherently situated in a particular context that frames and is framed by his or her performance of the action recursively. Such contextuality, or situatedness, of human action is critical for capturing the nature of interaction. Suchman [34] argues: "the coherence of situated action is tied in essential ways not to individual predispositions or conventional rules but to local interactions contingent on the actor's particular circumstances" (p. 28). In addition to spatiality and temporality, contextuality in which the action occurs is of equal importance in organizing human interaction; aspects such as "in what way," "in what particular circumstance," and "towards which actor(s)" the action is performed constitute the critical disposition of interaction just as the aspects "where" and "when" do.

Modern technologies, especially ICTs, influence the contextuality of interaction in various ways since such technologies afford diversified modalities of interaction. Ljungberg and Sørensen [25] characterize *interaction modality* by two dimensions drawn from Schmidt and Simone [31]: *unobtrusive* vs. *obtrusive* and *ephemeral* vs. *persistent*. Interaction can be "more or less obtrusive dependent on how strictly it imposes obligations to notice or react" (p. 125). At the same time, interaction can range from ephemeral interaction, which "only exists in the flux of unfolding activities," to persistent interaction, which "leaves behind a trace for further inspection and discussion" (p. 125). Based on this framework, it is easy to observe that various communication technologies can affect modality of interaction. A Post-It Note discretely place on a desk or a telephone message recorded on an answering machine can be characterized as unobtrusive-persistent interaction. An incoming email urgently requiring a receiver's reply and/or displaying an alert box notifying the user of the email can be seen as obtrusive-persistent interaction.

As ICTs offer us opportunities for interacting with others in various interaction modalities, we are now relatively freed from contextual constraints on interaction. Cyberspace is a good example. Computer mediated communication (CMC) not only enables people to asynchronously connect with others in distant areas, it also transforms the contextual constraints amongst those interacting. For example, Multi User Dungeons (MUDs), electric bulletin boards and mailing list services can alleviate many difficulties for people to interact [35]. Whereas unfamiliarity or weak social relationships among people can hamper natural face-to-face interaction, unobtrusive and persistent CMC media can lubricate the interaction beyond those obstacles [18, 30]. From this point of view, CMC can serve as a catalyst for mobilizing *weakly tied social networks*. Granovetter's [13, 14] pioneering work on "the strength of weak ties" illuminates the fact that the weakly tied social relationship provides people with access to information and resources, such as job information, beyond those available in their own strongly tied social circles. Applying his findings to CMC

environments, many argue that CMC provides access to a wider range of weakly tied actors and a wider set of contacts, extending communication possibilities beyond time and space [12, 17, 33, 37].

We then could argue that contextuality plays a critical role in constituting human interaction just as spatiality and temporality do. Contexts in which people reside continuously frame their interaction with others, including people's cultural background, particular situation or mood, degree of mutual recognition, and so on. In face-to-face interaction among people, conformity of such contextual aspects is very important; same cultural background, shared mood and high degree of mutual recognition are preferable. Yet thanks to various ICT applications and mediated communication technologies, people nowadays can easily interact with others relatively freed from such contextual constraints, interacting with people in largely different contexts. In this sense, the relationship between interaction among people and contexts in which they are is becoming mobilized in terms of flexible patterns of interaction across different contexts. It is also clear that such contextual, or relational, aspects of human interaction are increasingly 'uneven' among interacting people beyond neat time-space conditions of interaction. Hence, when considering the mobility, or more specifically societal mobilization, of human interaction, we need to deal with contextuality as well as spatiality and temporality, and, more specifically, *mobilized situatedness of interaction* in particular contexts and relations.

CONCLUDING REMARKS

In this paper we have explored various dimensions of mobility in human interaction. To summarize, we argue: (1) what has been and will be further mobilized is not just human corporeal movement but more importantly interaction among people; and (2) the notion of mobility should be addressed in three distinct dimensions: spatial, temporal and contextual aspects of mobility in human interaction.

As we discussed through the paper, the current understanding of mobility, especially in the CSCW field, is rigidly confined in human geographical movement. We of course recognize that geographical movement of people enhanced by various modern technologies is an important aspect of the contemporary society in general and workplace settings in particular, manifesting the nomadicity of human life. However, in order to appreciate a larger background of the emerging debates on mobility, we need to go beyond such a confined and functionalistic understanding of mobility and to capture multiple dimensions of mobilisation of our social interaction.

The discussions in this paper are still preliminary and further elaboration is clearly needed. We have tried to further discuss the concept of mobility and fluid work practices in the context of work coordination of a

Japanese distribution company [19]. Subsequent empirical validation in actual workplace settings is essential for us to further understand the theoretical issues on the notion of mobility discussed in this paper and to draw practical implications for mobile work practice.

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