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The Urban Space of the Motions and Emotions of Human Bodies in Mobile Networks

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Abstract : Machines, cities and bodies have been evolved together for a long time, and the recent development of information and communication technologies has transformed cities and bodies into new forms. Concerned with the relations between machines, cities and bodies, this paper explores how mobile networks are related with the physical space of the city and the psychological space of the body. The paper is organised into four main sections. First, it provides a theoretical review of the ways in which mobile networks transform urban spaces and human bodies. Secondly, it explains the generation of mobile networks through technological and institutional changes in Korea. Thirdly, it looks at the socio-spatial scales and time-space landscapes of mobile networks in relation to mobile users' motions and practices in their everyday lives. Finally, it attends to the ways in which mobile networks involve the production of paradoxical emotional spaces in relation to mobile users' emotions and desires to be dis/connected with mobile networks.

Key Words : mobile phone, human body, cyborg, social networks, control networks, intelligent/emotional spaces

요약 : 기계, 도시 그리고 육체는 오랜 시간 동안 함께 진화되어 왔으며, 최근 정보 통신 기술의 발달은 도시와 육체를 새로운 형태로 변형시켜 왔다. 본 논문은, 기계, 도시 그리고 육체의 관계에 관심을 가지면서, 휴대폰 네트워크가 어떻게 도시의 물리적 공간과 육체의 심리적 공간과 관계되는지를 탐구한다. 이를 위해 본 논문은 네 개의 주요 절로 구성된다. 먼저 휴대폰 네트워크가 도시 공간과 인간 육체를 변형시키는 방식에 대한 이론적 검토를 제공한다. 둘째로, 한국에서 기술적 및 제도적 변화를 통한 휴대폰 네트워크의 형성을 설명한다. 셋째로, 일상 생활에서 휴대폰 이용자들의 활동 및 실천과 관련하여 휴대폰 네트워크의 사회-공간적 규모와 시-공간 경관을 살펴본다. 마지막으로, 휴대폰 네트워크와 연결 혹은 분리되고자 하는 휴대폰 이용자들의 감정 및 욕망과 관련하여 휴대폰 네트워크가 패러독스적인 감정 공간을 수반하는 방식에 주목한다.

주요어 : 휴대폰, 인간 육체, 사이보그, 사회 네트워크, 통제 네트워크, 지능/감정 공간

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1. Introduction

Recently, one of the most important characteristics of electronic landscapes has been that they are formed by personal, mobile or wearable technologies such as mobile phones, digital cameras, MP3 players, wireless game players and so on. Among the technological devices, it may be the mobile phone that has the most significant effects on our everyday lives. As a result of its development as 1G, 2G (2.5G) and 3G multimedia, the mobile phone produces new kinds of mediascapes and bodyscapes in the so-called information city and network society.

When it comes to the network society, as a new kind of society emerging through the development of information and communication technologies, it has been explained mainly with regard to the global space of flows mediated by global cities at a macro-level (Castells, 1996; Sassen, 1991). However, our everyday lives in ordinary cities are somewhat far from the 'macro-network society' or 'global network society' (Webster, 2000). I here want to look at the 'micro-network society' fabricated and facilitated by mundane technologies such as mobile phones and people's practices in their everyday lives. As Wittel (2002, 52) states, "it is worthwhile translating this macro-sociology of a network society into a micro-sociology of the information age". One of the most outstanding landscapes of the micro-network society, I want to characterise, is that ordinary human bodies which are connected to electronic machines act as nodes in techno-social networks such as mobile networks.

Machines, cities and bodies have been evolved together for a long time, and the recent development of information and communication technologies has transformed both cities and bodies into new forms through the implosion of humans and machines and the explosion of the body in the world. As Grosz (1992, 250-1) puts it, "the city is an active force in constituting bodies, and always leaves its traces on the subject's corporeality. It flows that, corresponding to the dramatic transformation of the city as a result of the information revolution will have direct effects of the inscription of bodies". Alongside the development of state-of-the-art technologies such as info-technologies, bio-technologies or nano-technologies, contemporary cities are undergoing 'cyborg urbanisation' (Gandy, 2005; Chatzis, 2001; Graham and Marvin, 2001) in which the boundaries between human and machine spaces are increasingly blurred and human bodies are evolving into 'human-machine hybrids' called 'post-humans' or 'cyborgs' (Haraway, 1991; Stelarc, 1998; Hayles, 1999).

In this context, concerned with the relations between machines, cities and bodies, this paper explores how mobile networks are related with the physical space of the city and the psychological space of the body. For this, I surveyed mobile landscapes produced by Korean university students in their 20s, who are more active in mobile phone use than any other social class in Korea, in Daegu, the third largest city in Korea, mainly through semi-structured interviews in 2003. The paper is organised into four main sections. First, it provides a theoretical review of the ways in which mobile networks transform urban spaces and human bodies. Secondly, it explains the generation of mobile networks through technological and institutional changes in Korea. Thirdly, it looks at the socio-spatial scales and time-space landscapes of mobile networks in relation to mobile users' motions and practices in their everyday lives. Finally, it

attends to the ways in which mobile networks involve paradoxical emotional spaces in relation to mobile users' emotions and desires to be dis/connected with mobile networks.

2. Mobiles, Spaces and Bodies

1) Mobile networks and spaces

Although the mobile phone is having very significant effects on our everyday lives or urban spaces, there have been very few studies of the mobile phone in urban, social or cultural studies. It is perhaps not surprising at a time when the telephone's implications for cities and societies have not been fully explored.[1] Recently, however, some researchers have begun to draw their attention to the landscapes created by mobile phones (Kopomaa, 2000; Townsend, 2000; Sussex Technology Group, 2001; Laurier, 2001; Brown *et al.*, 2001; Henderson *et al.*, 2002; Green, 2002; Fortunati, 2002; Katz and Askhus, 2002; Weilenmann, 2003; Ito, 2003; Yoon, 2003; Rafael, 2003; Goodman, 2003; Ling, 2004; Carey, 2004; Williams and Williams 2005). The following pages present a brief overview of their research, particularly focusing on the ways in that mobile phones produce the blurred boundaries between absent and present spaces and bodies-with-mobiles as nodes in mobile networks.

One of the outstanding effects of mobile phones is that they tend to blur the boundaries between binary realms. For example, the boundary-blurring process between public and private spaces by mobile networks has been underlined by many researchers (see Sussex Technology Group, 2001; Henderson *et al.*, 2002; Green, 2002; Sheller, 2004). As Green (2002, 287) puts it, "a kind of spatial and temporal 'boundary rearrangement' becomes possible. ... This involves both the case of 'public' activities and responsibilities (as in the case of work) that become embedded in the temporal rhythms of the home, as well as 'private' relationships becoming integrated into the public sphere in mobile relations". That is, whether people exist in public spaces or private spaces is not determined by whether the people are physically in public spaces or private spaces but is dependent on whether their mobile phones are on or off.

More importantly, mobile networks shatter the boundaries between absent and present spaces. With outstanding insights, Gergen (2002) stressed that we need to distinguish between the potential of mobile phones and that of other technologies in regard to the separation and integration of the present and the absent. The development and proliferation of our major communication technologies of the past century have expanded the dimension of 'absent presence' which results in "the erosion of face-to-face community, a coherent and centered sense of self, moral bearings, depth of relationship, and the uprooting of meaning form material context" (Gergen, 2000, 236). However, the mobile phone makes 'absent presence' tenuous in local communities, resulting in the integrations of 'the absent' which other technologies have facilitated so far, and 'the present' which the technologies have eroded. As a result, "with the cell phone, one's community of intimates more effectively sustains one's identity as a singular and coherent being" (Gergen, 2000, 238).

In a similar vein, Fortunati (2002) argued that the mobile phone enables 'present absence' through which the binary opposition presence/absence is undermined. What is

important is that this process restructures the sense of belonging to places. "This shift makes it possible to suffer less from nostalgia, a tormenting feeling which frequently accompanies immigration, mobility, tourism and so on, and which is connected to the sense of loss of one's own relationship with a place" (Fortunati, 2002, 520). However, Fortunati (2002) concluded that as the sense of belonging to one single place is translated into the sense of belonging to many places or an unlimited space, people come to suffer from a sense of uncertainty, insecurity and confusion.

In the recent special issue on 'absence' and 'presence' in Society and Space (2004, Vol.22), Urry (2004), Sheller (2004) and Licoppe (2004) explained complex network spaces produced by mobile machines such as mobile phones in terms of 'intermittent connections and mobility', 'fluid and contingent social structures' and 'connected presence and social relationships' respectively. Here, the mobile phone can be perceived as a key technology transforming the existing Euclidean frame of time-space into fluid, multiple and complex time-spaces where spatial and temporal boundaries are reordered and rearranged. Especially, Callon and Law (2004) explained this complex space in terms of 'actor-network theory'.

> "But how are new relations made? If we want to answer the question we have to start thinking about technologies. We have to think about telephone directories, telephone lines, mobile phones, not to mention the billing and call-logging systems for telephone canvassing. These are the kinds of technologies that link distant actors, that make them present to one another, and that move them through time and space. These are the kinds of technologies that distribute actors, even those who say at home, through time and space" (Callon and Law, 2004, 6).

As such, that people are connected to mobile phones and one another through mobile networks within/between cities, signifies that the time-space of the city comes to be changed by the techno-social networks of mobile phones. The techno-social networks of mobile phones can be characterised as individualised and decentralised spatial networks and accelerated and speeded up temporal networks. Townsend (2000) suggested that the arrival of mass mobile communications in the city results in the acceleration of urban metabolism through decentralized and complex information networks, producing the 'extension of the body' and the 'real-time city'. In the real-time city, mobile phones tend to make people move according to indeterminate and uncertain time-space coordinates at which people get together and meet each other through incessant mobile communications Ling and Yttri (2002; see also Ling, 2004) called 'hyper-coordination' or 'micro-coordination'.

In this sense, Carey (2004, 136) said that "we're no longer required to make prior arrangements - activities can keep their chosen sites for demonstration (physical and virtual) secret until the last minute, thus stealing a march on the authorities". Furthermore, Kopomaa (2004, 271) argued that "increased use of the phone and spontaneous phone conversations in public enliven the street scene. ... Non-places - with the ideal type being the traveller's space - are transformed to loci of here-and-now by mobile phone users". Carey (2004) and Kopomaa (2004) called the city based on such mobile

communications an 'indeterminate city' and a 'condensed city' respectively. This effect of mobile phones on time-space coordinates is reflected in conversations on mobile phones. As Laurier (2001) observed, (especially, for those who live their lives as nomadic worker) 'geographical locating' appears often in conversations on mobile phones and thus at the heart of the conversations are temporal and spatial orderings on a spatio-temporal context which is mutually accomplished between users. While Laurier said that the most frequent question is 'where are you?', Weilenmann (2003) said that it is 'what are you doing?'. According to Weilenmann, the frequent question sometimes causes a location to be given as part of the answer which shows how location, activity, and availability are strongly related.

2) Mobile networks and bodies

In the present generation of mobile networks a new pattern of electronic network seems to have appeared: individualised and decentralised networks. We can think of this spatial structure of mobile networks as an important aspect of the micro-network society in which ordinary bodies themselves become nodes in mobile networks and the (individual or collective) temporal and spatial coordinates of everyday life come to be fluid and floating. After all, people come to be 'bodies-with-mobiles' as nodes in mobile networks in the micro-network society. As Sheller (2004, 49) puts it, "persons themselves are not simply stationary nodes in a network, but are flexible constellations of identities-on-the-move". Human bodies become not only biological entities but also electronic nodes combined with mobile phones as not only technological objects but also prosthetic parts of their bodies. In such bodies-with-mobiles, the mobile phone can be thought of not just as objects but also as 'organs'. As Callon and Law (2004, 9) put it, "technologies such as cell phones are not best thought of as extensions to the body. Instead they are organs, integrated into the body".

As the mobile comes to be more and more directly and closely connected to the human body, the technological machine does not exist as a pure object any longer but rather as a 'quasi-object', and likewise the human body cannot exist as a pure subject any longer but rather as a 'quasi-subject' in terms of Latour's (1993) 'actor-networks'. In this sense, the emergence of bodies-with-mobiles implies that the mobile phone, as an organ existing not 'inside' but 'outside' the human body, can transform the human body into a 'cyborg' in Haraway's (1991) terms. Furthermore, the 'bodies-with-mobiles' can be seen as deterritorialised bodies or 'bodies-without-organs' in Deleuze and Guattari's (1987) terms. That is, as Lash (2001) puts it,

> "In technological forms of life, what were more or less closed systems, my body, the social body, become more or less open systems. My body cannot interface with technological systems unless it is more or less open. The social body (nation-state) cannot interface with another unless each is to a certain degree open. When individual or social bodies open up, their organs are often externalized at a distance. This is true of the institutions of nation-state as well. Technological forms of life, whether natural or social are like Deleuze and Guattari's 'body without organs'. As the open, they externalize their organs, and open up to flows of information and communication" (Lash, 2001, 108).

In addition, the development of bodies-with-mobiles provides the possibility of the production of a kind of 'wearable' or 'ubiquitous' computing space in which human-machine hybrid networks blur the boundaries between human and machine spaces, leading to 'cyborg urbanisation'. Through the connections of body and media and of body and space, "space becomes wearable when affect becomes the operator of spacing or the production of space through bodily experience" (Hansen 2002, 321). The mobile phone can be explained as one of the technological devices that are capable of constructing a new kind of technological environment. It brings about major changes in 'the geography of calculation' where "from being centred and stable entities located at definite sites, through the medium of wireless computing, computing is moving out to inhabit all parts of the environment and users are able to be mobile" (Thrift, 2004, 182).

The mobile phone can also be described as bringing into being the world of 'local intelligence' where "everyday spaces become saturated with computational capacities, thereby transforming more and more spaces into computationally active environments able to communicate within and with each other" (Thrift and French, 2002, 315). Particularly, in these mobile spaces of calculation and intelligence, the mobile phone can play a role as a kind of GPS [Geographical Positioning System] in that mobile networks make it possible to identify the locations of bodies-with-mobiles on the move. This point can be found in the fact that communications on mobile phones are characterised by 'geographical locating' in the sense that the most common and frequent question found in conversations on mobile phones is "where are you?" (Laurier, 2001). In a sense, this relates to the networks of control.

In such a new technological environment, we can think about how mobile networks produce 'relative' and 'relational' networks between 'bodies' and 'spaces'. First, mobile phones enable human bodies to be 'extensible' and 'divisible'. Reviewing studies of the relations of practice and structure in the context of Hägerstrand's time-geography (mainly, studies by Pred, Thrift and Carlstein in the 1980s) and studies of the relations of space and technology in the context of McLuhan' media theory (mainly, studies by Abler, Gould and Jannelle in the 1960s to 1980s), Adams (1995) argues the possibility of 'personal extensibility' like 'amoeba' in space-time through electronic media. For example, "when a person in city A telephones a person in city B, he or she is partly present in city A and partly present in the virtual space of the phone call" (Adams, 1995, 270). In a similar vein, Townsend (2000) says that "the mobile phone is more and more becoming perceived as an extension of the body". As Fortunati (2002, 518) puts it, "with the spread of the mobile, that is, the phenomenology of the presence of individuals in social spaces also changes, in that individuals apparently present in a given place are actually only half-present".

Time-geographers have seized on the idea that "one individual cannot exist in two places at one time and therefore has to allocate his path in time-space" or "all individuals are indivisible - never being able to be at more than one place at a time" (Adams, 1995, 271 and 269). However, the mobile phone makes the argument invalid. Furthermore, "the ability to be in one room or building, linked to a computer accessing data elsewhere, while phoning someone who is at

another point, begins to unravel any simple time-geography based on physical presence" (Crang, 2000, 306). Thus, "the points of a personal network need not be unitary Cartesian individuals" (Bridge, 1997, 622). The mobile phone makes it possible for the body to be extensible and divisible into off-line and on-line spaces or into co-present and tele-present spaces. As a result, the body can be located at different points, and different spaces can be located at the same point at the same time.

Second, the mobile phone make spaces around the body 'multiple' and 'eversible'. Let us suppose a person communicating with his/her friend at point C on his/her mobile phone in the bus or underground moving from point A to point B. How many spaces is he/she related to? First, he/she exists in the moving space of the bus or underground. Second, he/she lies in the transit space between point A and point B. Third, he/she exists partly in point C through mobile networks. In addition, one's mobile phone contains others' mobile phone numbers at different locations which could be instantly and directly connected through mobile networks. These multiple networks can be seen as invisible, potential and virtual social networks contained in the small chip of the mobile phone, like the phrase '*the city in your pocket*' (Kopomaa, 2000), forming the 'liminal' spaces between absent and present spaces in everyday life (Shields, 1992).

Such multiple spaces are eversible spaces where 'inside' and 'outside' spaces can be easily changed. In Euclidean or Newtonian absolute space, physically close spaces can be regarded as inside spaces, and remote spaces as outside spaces. However, mobile networks can easily reverse or dislocate the two spaces' positions. As Gergen (2002, 238) puts it, "cell phone conversation typically establishes an 'inside space' ('we who are conversing') vs. an 'outside space' constituted by those within earshot but prevented from participating". In the sense, mobile spaces are like Mobius spaces where there are no boundary between inside and outside spaces.

3. The Generation of Mobile Networks in South Korea

Here, I explain how mobile networks have proliferated in Korea through technological and institutional changes. In Korea, mobile communication services began in the 1980s (car-phones in 1984 and 1G mobile phones: analogue cellular phones in 1988). Until the mid-1990s mobile phone ownership was only affordable for a small group of people. Furthermore, most of mobile phones were imported from foreign countries, mainly the USA. To create the stable supply and demand for mobile phones, it was necessary to develop new mobile technologies that were not dependent on foreign technologies, and which furthermore could be exported into foreign markets.

In this situation, in 1989, the government set up a project for the development of digital mobile communication systems, and in 1995, IT institutes and companies in Korea succeeded in developing digital mobile phones using CDMA [Code Division Multiple Access] technologies,[2] which was possible only in theory but uncertain in practice at that time. As a result, 2G mobile phones such as digital cellular mobiles (in 1996) and PCS [Personal Communications Services] (in 1997) began to be used in Korea, and furthermore 3G mobile phones (CDMA-2000)

began to be introduced in the early 2000s. These technological changes were important in making Korea one of the most wired countries in the world.

The changes in mobile technologies were combined with changes in the structure of mobile service markets from monopoly to competition systems through the government's institutional regulations. In fact, such regulatory changes have taken place in almost all communication service markets in Korea since the mid-1990s. In the case of mobile services, until 1994, the public company Korea Mobile Telecom had acted as the main and only mobile carrier. However, in 1994, according to the government's policies for facilitating competition systems in mobile service markets, the public mobile carrier KMT was privatised into SK Telecom, a private mobile carrier, which is now the largest mobile carrier and another private mobile carrier (Shinsegi Telecom) was allowed to launch mobile services.

With the development of CDMA-based mobile technologies, the two companies began digital cellular phone services in 1996, and three new telecom companies (Korea Telecom, Hansol Telecom and LG Telecom) selected as new mobile carriers (PCS) started their mobile services in 1997 (Table 1). Of course, this institutional transformation of mobile service markets does not mean that there is actually no monopolistic landscape. For example, SK Telecom has more than 50 per cent of the cellular phone service market. This is because the company could easily secure established network facilities and subscribers that once belonged to KMT, and thus was able to retain privileges through a kind of 'lock-in effect'.

As a result of these technological and institutional changes there has been a tremendous increase in mobile devices, services and users since the late 1990s. From 1996 to 1998, the subscribers increased by 100 per cent per year, and by 1999, about 50 per cent of the population (more than 20 million people) were using mobile phones (Figure 1). Mobile users began to surpass pager users and fixed telephone subscribers in 1999.

Table 1. Change in the market share of mobile carriers

	Cellular		PCS		
	SK Telecom	Shinsegi Telecom	KT	Hansol Telecom	LG Telecom
1995	100	-	-	-	-
1996	90.0	9.1	-	-	-
1997	66.9	16.5	5.1	6.1	5.4
1998	42.7	15.3	16.8	10.1	15.1
1999	43.1	13.8	18.2	11.7	13.2
2000	40.8	13.1	19.7	11.7	14.7
2001	52.3	(merged into SKT)	33.0	(merged into KT)	14.7
2002	53.3		31.9		14.8

Source: Ministry of information and Communication, Korea(2003, 85)

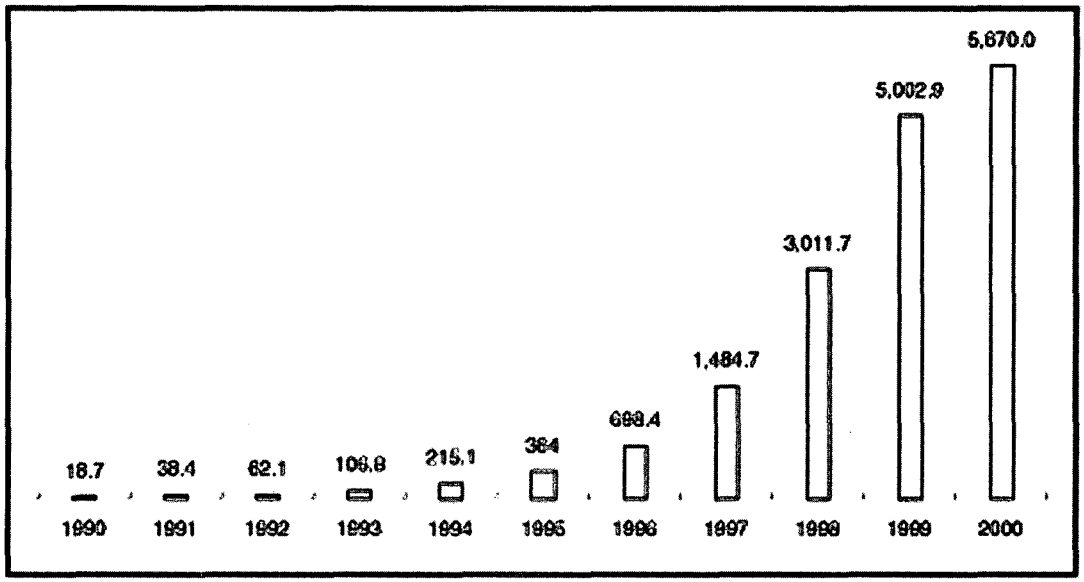

Figure 1. Change in the number of Mobile subscribers per 10,000 persons

Source: Ministry of information and Communication, Korea(2001, 79)

4. Mobile Networks and Urban Places

1) Mobile-mediated and place-based networks

Many argue that increases in human mobility have detached people from their original territories, resulting in the demise of their local communities. For example, Bauman (2001, 38) argues that "the cellular telephone, offering independence even from wired networks and sockets, delivered the final blow to the claim physical proximity might have had on spiritual togetherness". However, I suggest here that mobile phones, which can be seen to facilitate and accelerate people's mobility, are highly bound to their local places. In order to address this question, I investigated the socio-spatial scales of mobile networks, comparing them with e-mail networks.

Both mobile and e-mail networks can be seen not only as technological tools for personal communications, but also as social networks. Table 2 shows, in the case of university students, how many phone numbers are booked in their mobile phones and how many e-mail addresses are booked in their e-mail accounts. First, it is found that mobile phones are being used more than e-mails. More importantly and surprisingly, they frequently said the same things about the differences between mobile phone and e-mail communications. They tend to use their mobile phones for communications with those whom they meet frequently in their everyday lives, while they tend to use their e-mails for communications with those whom they do not meet often in their everyday lives due to social, temporal and spatial distances, in addition they use e-mails with those whom they have to communicate with due to public reasons or affairs. It is helpful to explain this in more detail

Table 2. The number of people booked in mobile phones and e-mail accounts

Interviewee' name (sex)	In mobile phone	In e-mail account	Overlapped
Ji-Wook Jang (M)	229	31	24
Kyoung-Wan Seong (M)	136	89	75
Hae-Min Kang (F)	84	0	0
Eun-Kyoung Jeon (F)	94	20	10
Myoung-Sook Lim (F)	83	9	2
Min-Jeong Baek (F)	93	1	1
Jeong-Min Kim (F)	130	25	20
Kyoung-Mi Kim (F)	113	25	20
Soo-Jeong Lee (F)	164	53	53
Jung-Lim Heo (F)	230	41	16
Hyo-Jin Park (F)	200	25	25
Ki-Heon Park (M)	172	30	13
Seong-Ik Jang (M)	30	0	0
Jong-Ki Moon (M)	100	10	10
Chang-Soo Cha (M)	77	17	9
Chang-Jun Lee (M)	11	0	0
Hyeon-Seok Jeong (M)	51	6	6
In-kyoung Kim (F)	188	98	43
Young-Dong Cho (M)	168	17	16
Jin-Geol Shin (M)	13	27	21
Dae-Yeol Bae (M)	22	4	2
Min-Gwak (M)	178	10	2
So-Jeong Heo (F)	164	29	29
Da-Jin Jeong (F)	134	32	13

in order to understand the socio-spatial scales of mobile networks in relation to e-mail networks.

In general the mobile phone users interviewed for this research had the numbers of intimate friends and family stored in the phone books of their mobile phones. These were people that they met in their homes, universities or other locales, and were people that they kept in close touch with in their everyday lives. Of course, this does not mean that all people whose numbers were stored in their mobile phones were close associates. In fact, the interviewees' mobile phones also contained the numbers of people that they did not call on a frequent basis. This is because on first meeting a new person they had the habit of storing that person's number in their phone book, even though they knew that the number might not be used. This is because they tend to get a kind of pleasure by filling their mobile phones with others' phone numbers, whether the invisible, potential and virtual social networks are important or not. In addition, this is

because they tend to take the stranger's number to signify friendship and think it as a part of the social ritual of politeness.

The interviewees said that the email addresses stored in their email accounts tended to be those of people that they rarely met in everyday life. They can be divided into some types. (a) Those whom they once met intimately or were acquainted with in the same city or other cities: for example, ex-girl/boy friends or their primary or secondary schoolmates. (b) Those whom they cannot meet easily because they live different cities or countries: for example, friends living in foreign countries. (c) Those whom they need to communicate with for public reasons: for example, classmates with whom they have to communicate about shared tasks, or university professors or lecturers to whom they were required to submit their papers or assignments by e-mail. (d) Those whom they came to know in the on-line world: for example, friends in made in on-line communities or on-line chat rooms. Most of these people are not those whom they now have strong or private links with, and their communications with the people are already broken off or are being practised temporarily or momentary.

Finally, people in the overlapping part between mobile phones and e-mail accounts are somewhat ambiguous. In fact they are often closer to the user than those described in the first and second cases. Many said that people in this group are those with whom they had originally or previously kept in touch through e-mail communications, whether they first met them in the off-line world or the on-line world, but with whom they now are keeping in touch with through mobile communications after purchasing their mobile phones or as they developed a closer relationship. In this case, e-mail communications tend to be replaced by mobile communications. However, some said that people in this group are those whom they already have been acquainted with in the off-line world and have always kept in touch with through face-to-face or mobile communications. They occasionally get in touch with these people via e-mails due to private or public reasons. For example, they use e-mails when they say something special which is hard to say through face-to-face or mobile communications for private reasons, or because they send and receive files by e-mail for private or public reasons. In this case, e-mail communications do not replace mobile communications, but supplement face-to-face or mobile communications.

In short, they tend to use mobile phones for communications with those whom they meet socially intimately, spatially closely and temporally frequently. In terms of Granovetter's (1973) social networks, whereas e-mail networks relate to 'weak links' formed at larger spatial scales, mobile networks relate to 'strong links' at smaller spatial scales. The localised socio-spatial scale of mobile networks represents 'network enclosure' (Bridge, 1997, 616) with relatively dense networks, and indicates that they are associated with a strong sense of place. We can know that social, temporal and spatial networks in the off-line world have effects on the ways of on-line communications though mobile phone or e-mail networks and that the ways of on-line communications reflect social interactions, relations or networks in the off-line world. The two on-line worlds of mobile phones and e-mails correspond to two off-line worlds of

'now-and-here' and 'then-or-there' respectively. In other words, while 'co-presence' in the off-line world is related to 'tele-presence' through mobile communications, 'absence' in the off-line world is related to 'tele-presence' through e-mail communications.

The point that mobile communications tend to be based on local places is evident in the case of a female interviewee. When comparing the contacts she had stored in her mobile phone and e-mail account, she said of the effects of the mobile phone on her social networks:

> "Those who are in my hand-phone (mobile phone) are socially and geographically close people I usually meet often. ... Those who are in my e-mail account are otherwise, though they are also in my hand-phone. They are people I hardly meet or people I send and receive files by e-mail. Though I booked them in my e-mail account, I don't get in touch with them often (Soo-Jeong Lee, female, 21).

In the time-diary where she recorded her behaviours related to the use of various electronic media such as the mobile phone, the Internet and cable TV for two days (Table 3), we can see how the mobile phone produces personal or urban time-space fabric. (a) The mobile phone is overwhelmingly used more often than any other media, increasing real-time interactions in the city. (b) The mobile tends to be used locally. (c) The mobile tends to be used regardless of day and night; private and public spaces; and fixed and moving spaces. (d) Finally, the mobile phone tends to be used at weekends rather than weekdays, this implies that the mobile phone is used for private activities rather than public activities. As such, in the landscape of 'absent presence', the mobile phone can provide alternative socio-spatial networks (Gergen, 2002).

2) Floating time-space coordinates

The mobile phone enables us to access others instantly and directly, and thus entails the socio-temporal networks of 'flexibility' in two ways. First, the mobile phone also enables 'always-accessible' networks, extending time in which we can access others. Just as "much of what many people now think of as 'social life' could not be undertaken without the flexibilities of the car and its availability 24 hours a day" (Urry, 1998), so "one aspect of temporal location significant for user (and for service providers) is the 'anytime, anywhere' availability provided by mobile devices" (Green, 2002, 287). Second, the mobile phone enables 'immediately-accessible' networks, reducing time we spend in accessing others. While the always-accessible networks relates to the extension of time, the immediately-accessible networks to the reduction of time. The mobile phone is a typical device to reduce the time taken in the intermediary zone. This aspect of mobile phones can be compared to that of private cars (Bauman and May, 2001, 40). Just as private cars are used for people to increase temporally accessibility to destinations, so are mobile phones. Here, I explain how the socio-temporal networks of flexibility can lead to the socio-temporal networks of 'uncertainty' in terms of 'floating time-space coordinates'.

The mobile phone enables their users to call and be called instantly and directly, making a 'real-time lifestyle' (Townsend, 2000) or 'just-in-time lifestyle' (Sussex Technology Group, 2001) where "the old schedule of minutes, hours, days,

Table 3. The time-diary of electronic media use

	Media		Counterpart	
Time	Media	Location	Who	Where
Friday 31 October 2003				
07:45-07:47	Mobile	Home	Friend	Local
09:30-09:30	Mobile	University	Friend	Local
12:50-12:52	Mobile	University	Friend	Local
18:00-20:40	CATV	Bar	-	-
20:45-20:52	Mobile	Street	Friend	Non-local
23:30-00:50	Internet	Home	-	-
Saturday 1 November 2003				
00:56-00:58	Mobile	Home	Friend	Local
01:13-01:17	Mobile	Home	Friend	Local
08:21-08:22	Mobile	Street	Friend	Local
09:34-09:35	Mobile	Home	Friend	Local
09:46-09:48	Mobile	Taxi	Friend	Local
10:01-10:02	Mobile	Bus	-	-
13:07-13:10	Mobile	Coffee shop	Friend	Local
13:28-13:29	Mobile	Street	Friend	Local
14:08-14:10	Mobile	Coffee shop	Friend	Local
15:53-15:55	Mobile	Coffee shop	Friend	Local
16:56-16:57	Mobile	Photo studio	Friend	Local
17:30-17:32	Mobile	Street	Friend	Local
17:41-17:42	Mobile	Street	Friend	Local
19:18-19:26	Mobile	Bus	Friend	Local
19:31-19:35	Mobile	Bus	Friend	Local
20:43-21:01	Mobile	Home	Friend	Local
21:13-21:14	Mobile	Street	Friend	Local
21:23-21:28	Mobile	Street	Friend	Local
21:28-21:29	Mobile	Home	Friend	Local
22:00-23:00	Internet	Home	-	-
23:06-23:10	Mobile	Home	Friend	Local

and weeks becomes shattered into a constant stream of negotiations, reconfiguration, and rescheduling" (Townsend, 2000). The emergence of this 'on-the-spot lifestyle' in turn produces two paradoxical temporalities. On the one hand, it results in speeded up temporalities, making users move according to accelerated rhythms. As Kopomaa (2004, 269) notes, "the mobile phone challenges its user to engage in real-time participation, which brooks no delays. The

mobile phone side-steps anticipatory social arrangement and allows for spontaneous forms of real-time interaction. It offers a tool for a social and practical control of the urban environment". On the other hand, it results in loose temporalities, making users free from strict schedules. As Kopomaa (2004, 269) states, "mobile phones change our notion of time as something linear and mechanical, distinct from rhythm of nature and always divisible into smaller parts. ... Continuous availability means more flexible working hours; the mobile phone rearranges the division of time into work and leisure, previously dictated by the clock".

In these urban temporalities, the mobile phone produces floating time-space coordinates in that it can unexpectedly change locations, directions and connections in time-space prisms in terms of time-geography. For instance, the mobile phone makes it possible to easily arrange prompt or impromptu events and to easily change or cancel already arranged or anticipated events, making uncertain the time-spaces of events even until the last moment. In interviews with mobile users, I found that mobile phones make them have frequent meetings, they tend not to decide previously or precisely the time-spaces of appointments, and they tend to constantly change the time-spaces of appointments even until some minutes before they actually meet each other.

> "(Thanks to the hand phone) appointment times and venues tend to remain undecided often, and even already decided times and venues tend to be changed easily" (Jung-Lim Heo, 20, female).

> "Certainly, I have become more and more insensitive to appointment times, since the hand phone made it possible to immediately get in touch with others" (Jin-Geol Shin, 23, male).

Ling and Yttri (2002) call these kinds of mobile communications 'micro-coordination', and Ito (2003) also describes these aspects as one of the important landscapes of mobile communications. In this context, Carey (2004, 136) claims that the mobile phone engenders the 'indeterminate city': "by virtue of the cellular phone, meeting places have become indeterminate; fluid territories rather than precise spots". As such, time-space coordinates according to which mobile users move, meet each other and get together in urban space always remain uncertain, changeable, fluid and floating.

5. Mobile Networks and Emotional Spaces

1) Social networks and desires to be connected

Mobile phones tend to make their users always ready to call and to be called, and thus desire to be connected to mobile networks. Human communication through the phone relates to the "true psychological need for 'social belonging'" (Lull, 2000, 106). To be sure, the mobile phone is a tool which can satisfy such a psychological and social need in contemporary life. That is, mobile phones are social networks, increasing 'connected presence' (Licoppe, 2004) or 'present absence' (Fortunati, 2002) and decreasing 'absent presence' (Gergen, 2002). "The mobile can play the part of a technological injunction (you will never ignore my demands

upon you, you will never be free of my intrusion) as much as a technological conjunction (you will never be outside the network of always-immediately-available presence, you will always be able to reach me)" (Sussex Technology Group, 2001, 220). In a sense, the mobile phone tends to make the user Pavlov's dog, making him/her desire to be always connected to mobile networks as we can see in the following case.

An underground scene in Korea:

I was going to somewhere by underground in Daegu, Korea. Most of people in the underground were just sitting without doing anything, and some people were reading books or newspapers or were fingering with their mobile phones, or were having conversations. I was listening to the Walkman radio, wearing earphones. Now, some of them suddenly began to take their mobile phones out of their pockets. They seemed to check something phone and after checking something, and put their mobile phones in their pockets back again. They did the same behaviour in turns. I did know exactly what and why they did so, and just the behaviour looked somewhat strange to me. It was not until I got off the underground that I knew the reason. A friend of mine called me when I was at the underground, and I however could not hear the bell sound because I wore the earphone. Why the people did so was because they thought of the sound to come from their mobile phones.

When they heard the mobile phone bell sound as a stimulus, they automatically looked at their mobile phones as a response. It seems that people are more addicted to the mobile phone than any other technological device, maybe even more than their attachment to the Internet. This is because mobile networks involve and implies social networks. For many people, living without the mobile phone means exclusion from social networks, and mobile phones "are also significant for social capital because they are accessible to unprecedented numbers of people" (Goodman, 2003, 5). For example, in the case of Korean adult users, "users of mobile phones were more active in getting together with their colleagues, participated more in after-work drinking occasions, considered life at work more important than private/family life, and tended to be more innovative" (Kim, 2002, 71), and also in the case of Korean teenage users, "young people's cultural practices via the mobile phone did not contradict that which was valued by adults" (Yoon, 2003, 342).

However, when invisible, potential and virtual social networks in the mobile phone could not be unfolded and realised for different reasons (for example, when other people do not call, the user leaves his/her mobile phone somewhere else, the power of the mobile phone runs out, the mobile phone is missing and so on), that is, the desire to be connected to mobile networks could not be satisfied, the user comes to have painful emotions (such as anxiety, irritation, frustration, disappointment, depression and so on). These cases are shown well in the example below shows.

"When I leave my hand phone at home sometimes, I become nearly irritated and almost crazy. However, when I come back home and find that no text message is left for me in my hand phone during the day, it makes me more disappointed and depressed. ... And, I become really nervous when the power of the hand

phone is gone and I could not remember the phone numbers of my friends booked in my hand phone, thus I could not call them" (Kyoung-Mi Kim, 20, female).

Because the number of calls or messages can be though of as the popularity or social currency of the user (see Ling and Yttri, 2002, 161; Yoon, 2003, 338), receiving very few calls or messages can make the user very disappointed. In addition, the mobile phone tends to make the user oblivious of others' phone numbers for the user usually tends to store them in his/her mobile phone without keeping in mind the phone numbers or noting them elsewhere. This mobile-referring habit or mobile-induced amnesia makes the user more frustrated when his/her mobile phone is missing. For the social networks stored in the mobile phone come to disappear and be lost and the user comes to be isolated from his/her social networks.

2) Control networks and desires to be disconnected

Mobile phones make their users desire not only to be connected, but also to be disconnected from mobile networks. This is because the mobile phone can be a tool for remote controls with unpredictable and interruptive networks, for example, in the social networks between employers and employees and between boyfriends and girlfriends (Sussex Technology Group, 2001) and between parents and their children (Green, 2002, 288-9). In this sense, concerning such a contradictory and paradoxical function of the mobile phone, Green (2002, 291) stresses the duality of time-space in relation to social relationships by mobile phones: "on the one hand, social space and time are 'extended', and on the other, they remain locally continuous. Communities are being formed in highly contradictory ways, which reflect new disjuncture, as well as new continuities, in the relationship between space, time, and location".

The mobile phone can be used to forbid the user from even being apart from his/her social networks and relations, forming somewhat homogenous and standardised social spaces by restricting the user to existing social networks (Gergen, 2002). Furthermore, just as "visual representation of the moving body by GPS introduces the possibility of subjective mapping - or plotting the personal" (Parks, 2001, 212), so too the mobile phone enables vocal representations of the moving body. Actually, GPS services through the mobile phone are provided in Korea, and the police use the mobile phone as a means for the networks of surveillance like CCTV in order to trace criminals.

As such, while the mobile phone can be seen as a means of mobility and freedom, the device can be viewed as a means of control and surveillance. This is the reason why people want to turn off or throw away their mobile phones.[3] A male interviewee told me that he deletes voice and text messages other people send him and does not store females' mobile numbers in his mobile phone because his girlfriend gets jealous about them. A female interviewee said that she found that her boyfriend was cheating on her by checking text messages in his mobile phone. Another female interviewee said that she sometimes turns off her mobile phone to avoid calls from her home, and another male interviewee said about the interruptive and

embarrassing effects of the mobile phone on his everyday life as follows.

> "When I miss or turn off my hand-phone, other people such as my friends or parents seem to be more irritated than me, because they cannot call me. Especially, my mom is very concerned about me. ..... When I am outside my home until late at night, sometime I intentionally turn off my hand phone not to receive calls from my home " (Soo-Jeong Lee, female, 21).

> "The hand phone gives me many chances to meeting people. ... It gives me on the one hand convenience, and on the other hand restrictions. ... When I would like to be alone at home, if someone calls me, then I have to go out. Sometimes I think it would be better to get way from the hand phone. Of course, if I have no hand phone, then I would feel anxious. However, this also is because I have the hand phone now. It is not something I can escape from. Even though I want to be severed from it, I cannot do so" (Hyeon-Seok Jeong, 24, male).

After all, human bodies linked to mobile phones have ambivalent desires: desires to be connected to mobile networks as social networks on the one hand, and disconnected from mobile networks as control networks on the other hand. The point signifies that mobile phones produce emotional spaces in the everyday lives and lived spaces of their users.

6. Conclusion

Recently, mobile networks have produced new kinds of urban spaces and landscapes, blurring the boundaries between absent and present spaces, enabling human bodies to act as nodes in mobile networks and producing relative or relational networks between bodies and spaces. Until now, I have tried to depict how mobile networks are embedded in urban places and are related with emotional spaces. Mobile networks involve the socio-spatial scale of mobile networks which are highly localised for people tend to use their mobile phones for communications with those who are socially, temporally and spatially close to them in their everyday lives, and produce the socio-temporal landscapes of floating time-space coordinates according to which mobile users shift in the city. Furthermore, they entail social networks to which their users desire to be connected and at the same time, control networks from which the users desire to be disconnected, and thus make the users have ambivalent desires.

What I want to more underline in the results suggested above is that mobile networks tend to produce paradoxical emotional spaces. On the one hand, mobile networks can be seen as 'rhizome-like networks', producing the 'rhizome-city' in terms of Deleuze and Guattari's (1987) in the sense that mobile phones involve decentralised spaces, deterritorialised bodies or 'bodies-without-organs', making mobile users desire to be connected to mobile networks. On the other hand, mobile networks can be regarded as 'control networks' like Foucault's (1977) space of power (closed, disconnected and centralised spaces) or more exactly Deleuze's (1997) space of control (open, connected and decentralised spaces) in the sense that mobile phones can be used and operated as surveillance or control networks, making mobile users desire to be disconnected from mobile networks.

In general, alongside the development of discourses on the emergence of the so-called 'knowledge-based' society or economy, and more recently on the construction of 'ubiquitous' computing spaces or cities, information and communication technologies have been explained in relation to the production of intelligent spaces where people can access information or knowledge wherever and whenever they want to do so. However, we need to draw attention to the fact that such techno-social networks as mobile phones produce not only 'intelligent' spaces, but also 'emotional' spaces where mobile users have various negative feelings or discontents when their desires to be dis/connected with the techno-social networks of mobile phones cannot be satisfied.

Note

1) For the landscapes of the telephone, see de Sola Pool (1977), Marvin (1988), Wellman and Tindall (1993), Katz and Katz (1999) and Stein (1999).

2) CDMA [Code Division Multiple Access] was a much more advanced mobile communication technology than the existing GSM [General System for Mobile Communications] in Europe and TDM [Time Division Multiplexing] in the USA. The technology was originally developed as a military satellite technology by Qualcomm, but was not adapted in mobile phones (see Agar, 2004, 67-9).

3) According to the eighth annual Lemelson-MIT Invention Index study released in 2004, in the case of the USA, "nearly one in three (30%) adults say the cell phone is the invention they most hate but cannot live without".

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