

Introduction

The diffusion of mobile communications technology has brought about the phenomenon and concept of telework as well as that of mobile work – which, however, means much more than work done via a mobile telephone. Entire industries have been organized around the mobile workforce, which poses a series of new problems to be analyzed. In this study I shall examine the emergence, main features, and problems of this mobile workforce, as well as predictable changes, tendencies, or shifts that can be expected in the future. Mobile work, in addition to being an industrial trend susceptible to economic analysis, may considerably change human forms of behaviour, as well as the development and competitiveness of societies.

Literature on this subject mainly includes studies published within the framework of the COMMUNICATIONS IN THE 21ST CENTURY project (e.g., papers by O’Hara, Brown, Perry, Paragas, Dimitrova, Ling and Julsrud). It should be noted that the social science of work now also involves communication science: when new forms of communication are introduced, people’s work opportunities and their relation to work also change.

The term “mobile work” is a product of the latest period, and the emergence of the mobile worker and mobile workforce can also be attributed to the last ten years. However, it is not clear whom we can call a mobile worker: the one who works at home for a company, the one who does his work via the internet, or the one who really works in a mobile way at a different physical location each day? Indeed, the mobile worker now belongs to the category of the managerial stratum rather than that of workers in classic terms. Obviously, this shift in meaning is more considerable in certain industries, and in some we can find workers who are *mobile* in the strictest sense of the word, those who use some mobile device (a laptop, a PDA, a mobile phone, or an iPod) as a tool.

“Mobile work” is also used in several senses. When we ask people

about mobile work, they are likely to use the terms remote work, teleworking, telecommuting, or e-work.

In this paper I will use “mobile work” in reference to mobile workers who do their work via mobile devices (laptops, PDAs, mobile phones, or PCMCIA cards) in changing locations or even while they are on the move.

An Overview of Recent Literature

The analysis of the relationship between mobile work and place¹ is important, although it is generally accepted that mobile work may occur anywhere. In-depth studies show that place has retained its prominent role in the lives of mobile workers. If the place in question does not meet certain criteria, mobile workers might not be able to perform their work, or their work efficiency might decrease drastically. It is not necessarily true that mobile work can be done anywhere, even if we consider that devices have made great strides in development in recent years.

Place, in the domain of mobile work

- influences social relations and the way mobile workers relate to their environment (if we do not encounter people doing similar work or our bosses, then our loyalty, sense of security, and performance may weaken);
- has an effect on how much time we spend on mobile work (e.g., its duration may be longer on board a plane, while trains sometimes do not have a proper table or space for mobile work);
- affects our uncertainty in relation to work (whether we can reach people or access necessary documents which may not be downloadable or readable due to some problems with the display or transfer speed);
- organizes activities around specific places (we can print a document at the office only, therefore we arrange our activities in such a manner that we have to appear at the office every day).

As for the mobile workforce, the analysis of the development of their relations with their employer often produces a surprising result: if such a workforce has no daily contact with the organization, negative effects can accumulate in the so-called decorporalization process. In some cases,

¹ Kenton O’Hara, Barry Brown and Mark Perry, “Mobile Work, Technology and Place”, in Kristóf Nyíri (ed.), *Mobile Democracy: Essays on Society, Self and Politics*, Vienna: Passagen Verlag, 2003, pp. 65–72.

employers strive not to allow mobile workers to create personal zones (through making it difficult to place personal objects, photos, or books on tables used by an entire group), while in other cases with a different consideration, attachment to the company is reinforced in-house over regular intervals (informal sessions or even weekly meetings). Generally, the creation of mobile jobs often evokes resentment on the part of the people concerned. If the employee likes mobile work, their boss may not, or vice versa.

A definite connection can be discovered between the social contacts of individuals and the availability of ICT devices.² Basically, there are matrices of social contacts whose strength is greatly influenced by the individual's access to the internet, a mobile phone, or a computer (a laptop or PDA). In contrast, there are also social networks where practically no effect can be detected between the availability or lack of ICT devices. Contacts were analyzed on the basis of four characteristics, namely, from the perspective of

- leisure activities shared with friends and acquaintances,
- frequency of attending official organizations,
- contacts with friends, relatives, and family members, and
- social coexistence.

It can be clearly verified that social capital and access to (or possession of) ICT devices (the internet, mobile phones, and computers) are related. Interestingly, the first ICT-like device, television, had been found to have a negative impact on the given forms of contact in all research fields. People who watch TV exclude themselves from almost every social contact studied.

Research findings show that the internet may have an isolating effect on the one hand, as television does; on the other hand, it also improves the individual's chances and opportunities to integrate through the emergence of community sites and applications. People who could not find either an opportunity or a proper form to engage in standard relations of social interaction are now able to contact the external world. As for opportunities to develop social contacts, the mobile phone serves as a means of maintaining, rather than initiating, connections. We are rarely contacted by strangers through our mobiles, while the internet is much more likely to act as a tool for building contacts. When studied from the perspec-

² Rich Ling, Birgitte Yttri, Ben Anderson and Deborah DiDuca, "Mobile Communication and Social Capital in Europe", in *Mobile Democracy*, pp. 359–373.

tive of social contacts, the mobile phone has a prominent role as a means of coordination.

Although mobile work has numerous advantages, having ICT-based contacts and the resulting detachment from the office environment pose several negative problems or challenges that we have to face.³ Studies show that people who have jobs with routine tasks have a much greater demand for personal encounters than others. It was found that employees working in routine sales jobs which require lower-level qualifications definitely strove to meet colleagues in similar positions personally and more or less regularly, although they had ICT devices (in this case, laptops or mobile phones). They tended to organize their daily work in a way which allowed them to bump into others. Such encounters provide an opportunity to relax as well as informally exchange important information, discuss common problems, and possibly reduce the daily workload.

In contrast, for people in sales executive positions, the possibility of mobile work provided greater efficiency and a working environment which is free from interruptions (negotiations at the office or unexpected visitors). Sales executives could devote more time to undisturbed thinking than they did at the office, and hence mobile work was clearly advantageous for them.

Some of the studies on mobile work also cover applications, and the focus will probably shift toward this issue in the future. It is not sufficient to examine how and in what ways the presence of mobile devices affects the life of the mobile worker, since this yields a rather unsophisticated picture only. Mobile devices offer a repository of applications which serve specific areas of life. We can already read studies on distinct usage categories, for example, on SMS, MMS, and instant messaging applications and their effects; video recording and replay; live video telephony; financial, commercial, and sales (sales force automation) applications available for open-source operating systems; push to talk technologies, and so on. But few research studies on mobile work have focused on, for example, messaging-related areas, which will obviously change in the future.

One of the early applications is MMS, where research focused on attitudes to and the daily life-related and work-related use of MMS in three distinct workgroups.⁴ The three different groups (of workers) utilized MMS messaging opportunities available to them in strikingly different ways

³ Dimitrina Dimitrova, "Work Relationships and Communication in Distant Work", in Kristóf Nyíri (ed.), *A Sense of Place: The Global and the Local in Mobile Communication*, Vienna: Passagen Verlag, 2005, pp. 283–291.

⁴ Rich Ling and Tom Julsrud, "Grounded Genres in Multimedia Messaging", in *A Sense of Place*, pp. 329–338.

depending on the work and life situations to which their daily activities were related. Some workers proved to be unable to integrate MMS use in their work processes, but some groups of manual workers (carpenters) shared daily events with a distant architect or contractor. This study was an important step toward the development of applications which will be able to satisfy demands arising from real-life situations in the future.

Naturally, the mobile telephone has differing practical value for the mobile worker according to different life situations across countries and societies.⁵ Many studies have discussed how ICTs (especially PCs and the internet) affect communities in developing societies, but studies of mobile work and the mobile phone have been relatively rare. Interesting results were produced by a study carried out in Rwanda: mobile work is absolutely dominant in the lives of micro and small enterprises (MSEs, employing 0 to 5 workers). These businesses do not own offices or landline telephones, while the number of mobiles is skyrocketing. For these entrepreneurs, the mobile fundamentally defines friendship and social (“intrinsic”) contacts, client (“instrumental”) relations, and security. Surveys show that their opinions about mobile work cluster around four major values: it increases productivity, facilitates social life (“intrinsic”), it is convenient, and “indispensable”.

The analysis of daily activities in selected groups of white-collar mobile workers gives insight into the usage habits of these groups.⁶ In the daily life of a mobile worker, the telephone, the computer, e-mail, and the fax have the most prominent roles. Surprisingly, having paper-based documents in a printed form was helpful in all life situations: the mobile worker is likely to keep a part of his work physically at hand to support communication via the telephone. The mobile telephone primarily facilitated maintaining contact and secondarily enhanced management skills. It should be noted that the role of e-mail has gone through a considerable change since these research findings were published: while at the time e-mail seemed to be an office-bound application, new “push” e-mail applications have taken the lead from SMS and telephone calls. Today, e-mails can be exchanged as easily as SMS messages – there are no polling and response times, everything is instant and immediate.

⁵ Jonathan Donner, “The Mobile Behaviours of Kigali’s Microentrepreneurs: Whom They Call... and Why”, in *A Sense of Place*, pp. 293–301; Jonathan Donner, “What Mobile Phones Mean to Rwandan Entrepreneurs”, in *Mobile Democracy*, pp. 393–410.

⁶ Kenton O’Hara, Mark Perry, Abigail Sellen and Barry Brown, “Exploring the Relationship between Mobile Phone and Document Activity during Business Travel”, in Barry Brown, Nicola Green and Richard Harper (eds.), *Wireless World: Social and Interactional Aspects of the Mobile Age*, London: Springer, 2002, pp. 180–194.

As expected, the fax is becoming an extinct form of communication, despite the fact that signatures are still a frequent requirement in communication. Indeed, researchers concluded that few faxes were sent or received by the selected mobile workers.

However, document-related activities played a major role in work done by all mobile workers who participated in the survey. It was important for the documents to be seen and analyzed at the same time. Consequently, we can predict the emergence of mobile applications where partners located at the two ends of a connection can view, edit, and access the same document via mobile devices.

The Definition of the Mobile Worker

Both developed and developing societies are increasingly engaging in mobile work. The desire for mobility probably arises for different reasons in different cases: for one, it may be the sole device available, for another, it can be a way of overcoming constraints...

Recently, two types of mobile workers have been distinguished. One of these types is the stratum of workers who enjoy plenty of leeway due to their positions, are willing to use electronic devices, are highly qualified, and are ready to devote their money and intellectual energy to mobility. The other type of mobile worker includes those who are trained to become mobile workers: their positions require the use of ICTs, otherwise they could not perform their tasks. For this stratum, the IT challenge posed to the existence of a mobile worker has a crucial role. If hardware devices and software applications are too complicated and hard to use, they consume much energy and thus the expected increase in efficiency will not be realized. Occasionally, these workers may even refuse to use mobile devices, complaining about repeated malfunctions. It is essential that they should be provided with adequate preparation, training, and ongoing support.

Globalization is clearly increasing the number of mobile workers. For the workers of a truly global company, all offices are virtual offices, their workplace are laptops and a host of mobile devices connected to those laptops. And of course, flight tickets are also indispensable, since they travel frequently. In such positions, virtual private networks, video conferences, instant messaging, and VoIP calls are everyday tools. This stratum of employees is the one which can really utilize the possibilities offered by cybercafés; they buy mobile internet access with their cups of coffee so that they can do their jobs. And they are the ones who can be addressed, as early adopters, by mobile service providers offering their latest data trans-

fer upgrades. The monthly mobile expenditure often exceeds 2,000 euros in this circle.

Factors Influencing the Emergence of Mobile Work

Mobile work as well as social and individual adaptability are influenced by several factors. One of the most important factors is economic development (GDP and growth rate). As can also be observed in the studies mentioned above, the workers of countries where economic development has not reached a certain level, use the simplest function of mobile technology at work, i.e., they make phone calls only. Countries with a high GDP make considerable efforts to increase efficiency though equipping mobile workers as well as possible.

Available telecommunications infrastructure and bandwidth – as well as fees to be paid for telecommunications services – basically determine the use of this technology. Many companies try to reduce costs through cutting the number of mobile devices, even when those devices obviously increase efficiency each day (Blackberry devices struggle on such a life course). The availability of PCs at homes and internet penetration also have definitive roles in increasing the number of mobile workers. Although none of these things are indispensable for mobile workers (theoretically, you do not need a PC to become a mobile worker), the intellectual capacity to learn new technologies can be significantly enhanced if people can discover and use applications at home, or worsened if they are bereft of the same.

The number of people working in the service sector and the knowledge industry is obviously proportional to the number of mobile workers. We can say that the number of and demand for mobile workers probably began to increase first in the service sector. Sales-type positions and client-side support services were the first to require portable computers and mobile devices.

The pool of available IT devices, the relative size of the IT industry, and the amount budgeted for IT are all important in creating the basic conditions. If this area is weak in a particular country, the number of devices needed for mobile work (on both the individual and corporate sides) will probably not reach a critical mass. This is also directly related to labour market characteristics (skills, average salaries, etc.). If the general skills of the workforce do not reach a certain standard, if the levels of motivation, culture, and mobility are low, then we cannot expect an immediate change in the attitude towards mobile work. Similarly, corporate culture and the views held by company executives have a defini-

tive impact. Several internal surveys, exploring the potential of mobile work, led to the conclusion that the attitude expressed by management prevented willing employees from participating in reorganization geared towards mobile work. The main reason for this is that bosses fear the loss of their control function, or that it will appear to be curbed. They ask: "How can I be sure that workers are really working if I can't see them?"

Geographical distance, underdeveloped road networks, and urban transportation may paradoxically encourage home-based work and in turn the emergence of a stratum of mobile workers. Although the members of a sales team might not be able to get to the office after spending time with clients, they can perform their duties as mobile workers.

The Effects of Mobile Work

The effects of mobile work can be analyzed from several perspectives. It has obvious economic effects: the deployment of a mobile workforce may bring about greater efficiency and higher productivity. A case study has revealed that a company making and distributing beer was able to recoup its several-million-forint investment in a newly introduced sales force automation system (orders were recorded and immediately sent to the storehouse via PDAs) through the sale of a few hectoliters of extra beer. The sales team was able to achieve this without extra working hours, since they had more time to sell products and visit customers after the transition to electronic documentation. However, we should be cautious when considering economic effects, which may often be restrained by social factors that could offset managerial initiatives in this direction. Sooner or later, we have to add the borderless nature of mobile work to the list of economic effects. Mobility allows complete industrial tasks to be performed in another country, or entire industries to move to another country (this goes beyond individual mobile work), which raises the issue of taxation. Where should they pay their taxes? Where do they provide their services?

As to environmental effects, less travel was usually mentioned as an advantage; however, research quickly refuted this assumption. Mobile workers spend some of the time they have freed up on trips they would not have to undertake if they were traditional workers. Generally, mobile work has a positive effect on office costs and thus it will (or may) alleviate the environmental impact. It should be noted, however, that in some cases mobile workers have the same devices (laptops, PDAs, and mobile phones) ready both on the road and in the office, which reduces cost-effectiveness.

The social effects are discussed most frequently. Social attitudes to mobile work are usually positive: in most cases people in the mobile workforce

feel that their competence and skills have improved and their value has increased in the (mobile) labour market. However, there are critics (sometimes in surprisingly large numbers) who show concern for the workplace because they believe that mobile work brings a greater degree of exploitation (some examples can be cited from sales automation for the brewery described above), and they would like to spend more time at the office. Mobile workers usually feel more comfortable because of their increased degree of freedom, which may also bring tangible benefits in their private lives (e.g., they have the time to bring children home from school, manage official matters, etc.). Generally, the quality of life for a mobile worker is (or could be) better than it is for colleagues who work in similar positions but are equipped with traditional devices only. Nevertheless, it is evident that mobile workers spend more time working. Surveys show that the working day is often as much as an hour longer for mobile workers, which they may not even notice. Reading mail on the road, briefly reviewing contracts on the laptop at home after the children have gone to bed, or the recent Blackberry always-on mailing system all allow them to spend “junk” time usefully (more efficiently).

The Role of ICTs in Mobile Work

Mobile workers can use a variety of tools at work. Obviously, the most familiar devices for mobile work include laptops, mobile phones, and PDAs; for some positions, the iPod (the multimedia player), personal media players, digital cameras, DVD players, and video cameras (which sometimes serve as webcams hooked up to a blog or the editorial office of a newspaper) have also joined the list. A mobile worker may be, for example, the London-based singer who performs each week at the Opera in Paris and listens to the parts of that performance on an MP3 or DVD player while travelling there.

Since we are discussing an area which experiences sweeping changes, it is worth considering the strengths and weaknesses of current devices in relation to mobile work.

Strengths

- Standards ensure an almost full compatibility between the products of various manufacturers. However, this can also appear to be a weakness: there are too many standards and thus too many kinds of sets are on the market, which are not compatible with devices working under another standard.

- Development has made wireless connection possible for all devices.
- Increasingly faster processors allow complete office application packages to be used on mobile devices.
- Open-source operating systems help the number of available applications developed by third parties increase dynamically.

Weaknesses

- Displays are usually small and do not allow documents to be read properly. Occasionally, we can download material to a device but are not able to read it.
- Built-in web browsers display pages slowly and with great difficulty, thus they are not suitable for internet-based work and searching.
- Download speed can be low because coverage is missing or the given set supports an older telecommunications protocol.
- Processor-intensive tasks can not be supported by the built-in battery for an extended time, therefore mobile workers have to restrain their activities in order to economize on power.
- Downloaded data cannot be stored in low-capacity memory.
- Standard office applications may not be available, and thus a set cannot handle, for example, PowerPoint or Excel documents. Or it may be difficult to play files of various formats that require plug-in modules (for instance Flash).
- As for data security, corporate system administrators are reluctant to grant full mobile access, despite the fact that today's security solutions effectively prevent fraudulent manipulation.
- When it is too complicated to customize settings, the would-be mobile worker may scrap the device after the first few attempts.

Dangers

- A mobile device may store a large amount of data, which can cause considerable data loss if the device is damaged.
- Access to corporate data on the mobile device may be obtained by unauthorized persons.
- Mobile viruses have appeared, and although they are harmless now, they may become dangerous over time. And it is harder to update virus definitions on mobile devices, while users are also slow to understand that it is necessary. The situation will probably remain this way until the first serious damage...

- Work done in a mobile environment requires another kind of availability. It was not important for the telephone to work around the clock. However, if a company employs a whole fleet of mobile workers, then ordinary issues, such as power supply, mobile coverage, or internet access become critical elements. And such elements are beyond even a major company's control.

Concluding Remarks

The concepts of mobile work and the mobile worker are products of our age. We may become mobile workers either by our own choice or because our employer forces us to do so. Surely, as indigo producers in El Salvador suffered from the invention of synthetic indigo, or as optical cables replace copper cables in more and more places making life difficult for copper miners, we can say that some people or even social groups will certainly suffer from the need to adapt to mobile work. It is possible that people who become mobile sooner will gain an advantage over their peers in similar situations. But there is no reason not to assume that in fifty years' time many more people will have access to mobile ICT devices, increasing their own or their company's efficiency and providing better life conditions for themselves and their families. Of course, it is a long road to that point: better devices, more open managers and employees, and more progressive governments are needed so that we can create the world of a more mobile workforce.