

Mobiles: Past, Present and Future **Edited by Lynne Hamill and Amparo Lasen**

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Introduction: Digital Revolution – Mobile Revolution?

By

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This book is a sequel to *Wireless World: Social and Interactional Aspects of the Mobile Age*, by Brown, Green and Harper published in this CSCW series in 2002. This new volume is a collection of invited chapters, drawing heavily on an international conference held by the Digital World Research Centre (DWRC) at the University of Surrey in July 2003. The title of the conference was “The Mobile Revolution – A Retrospective”: its theme, lessons on social shaping. The idea was to focus on what can be learnt from the adoption of mobile devices that could be applicable to other, new, digital technologies.

The Digital Revolution?

What is it that makes digital technologies different from what has gone before? There are three key features that can be used to characterise digital technology. The first is that it reduces information — text, sound, picture or films — to a common currency of noughts and ones. It is this characteristic which leads to the convergence of devices: why cameras are now in phones, for example. The second, leading on from the first, means that it is easy to store information; and increasing miniaturisation means that it is very cheap to store very large quantities of data. Think about a film for example: what used to be stored on half a dozen large reels of celluloid is now stored on a disk you can put in your pocket. Thirdly, it is easy to transmit and reproduce. Nothing is lost in transmission or reproduction. For example, home audio taping of music was very inferior to vinyl records, whereas CDs can be copied with no loss of quality. This simple fact is having enormous implications for the music industry. What this adds up to is a step change, a discontinuity. The problem is to try to understand what are the implications, for businesses, public services and for society in general.

Because it is a step change rather than more of the same, it presents a very big problem. In the words of Schumpeter (1934), it is “economic development” in the sense of a qualitative change that creates radically new conditions and for which technology is the prime driver. He gave this example: however many stagecoaches are produced, representing economic growth, you do not get a railroad, which represents economic development.

And there are possibly bigger implications too. The Russian economist, Kondratieff (1935 (1926)) identified long economic cycles or waves that lasted 50 to 60 years and were characterised by 20 years or so of growth and general prosperity, a plateau of some

10 years followed by twenty years of low growth. One of the main causes of these waves is attributed to what he called “changes in technique”. He explained, “Changes in the technique of production presume (1) that the relevant scientific-technical discoveries and inventions have been made, and (2) that it is economically possible to use them. It would be an obvious mistake to deny the creative element in scientific-technical discoveries and inventions. But from an objective viewpoint, a still greater error would occur if one believed that the direction and intensity of those discoveries and inventions were entirely accidental; it is much more probable that such direction and intensity are a function of the necessities of real life and of the preceding development of science and technique.” He went on to argue that the inventions will not bring about a change in production methods if the “economic conditions favourable to their application are absent”.

This sounds very much like “social shaping” even though the phrase was probably not used until 1985 (Mackenzie and Wacjman, 1998). It implies that technology is endogenous in society: that it is developed within society rather than somehow being imposed from outside. It is a multidisciplinary concept. While economics is a key driver in the process, sociology and psychology provide insights into how people’s needs are generated and how companies come to develop and design certain products and services.

Now Schumpeter (1939) identified three long waves, each of which, he argued, was driven by major technological change:

- 1780s to 1842: the “industrial revolution”
- 1842 to 1897: the introduction of the railways
- 1897 to 1939: cars, electric power and changes in the chemical industry.

On the basis of this chronology, it is possible to make a case for two more waves: the “electronic revolution” running from the 1940s to the 1990s, followed by the “digital revolution”, starting around 1990.

The immediate post-war period was characterised by boom conditions coinciding with the arrival of solid-state electronics. The transistor was invented in 1947. Texas Instruments claim to have produced the first commercial transistor radio in 1954 (Texas Instruments, 2004) and “by 1959 almost half of the 10 million radios made and sold in the US were the portable transistor type” (University of San Diego, 2004). And in 1959 integrated circuits appeared; many transistors on a single silicon chip performing a dedicated function. The first microprocessor — general purpose programmable digital chip — appeared in 1971. By 1974 a microprocessor was powering the Altair, the first widely available personal computer, selling for under \$400; equivalent to about £1,700 in 2004 (Intel, 2004; Ceruzzi, 1998).

The last decade of the 20th century saw a flood of new digital technology enter the marketplace, the office and the home. The compact disc player was introduced in the late 1980s by 1992 “had revolutionised the way we listen to music” (CSO, 1994). Arriving on the commercial market in the early 1990s, digital cameras have transformed consumer photography. The DVD player is said to be the fastest growing consumer good ever: virtually unknown in homes in 2000, by 2003 they were to be found in nearly half of UK households (OFCOM, 2004). The arrival of the internet has transformed some businesses

and contributed to the enormous growth of computers in the home. Mobile phones started as business tools in the 1980s but by 2002-03, were to be found in 70% of UK households (ONS, 2004).

And on the horizon, there is more to come. In Chapter 4, Alex Taylor and Jane Vincent refer to “technology-in-progress” and in Chapter 8, Richard Tee refers to mobile internet services as “a work in progress”. Throughout this book, people talk about 3G. But in the engineering labs, they are working on what comes after that, which some call 4G. It appears that the digital revolution has just begun.

But what are the implications? What will life be like when the whole of the country, or indeed large parts of the world, is one big wireless hotspot? While mobile phones mean that you no longer have to be in your office or your home to make a phone call, this will mean that you no longer have to be at your PC to access the internet. There are implications for almost all aspects of life: transport, health, education, entertainment.

Yet, forecasting is a hazardous game, albeit essential for business and public sector service providers. In macroeconomic forecasting — which attempts to answer quantitative questions such as how much the economy will grow next year — it is easy enough if next year is expected to continue on current trends, with all the main variables expected to be within a couple of percentage points of their current values. The key problem is foreseeing turning points or discontinuities: an unexpected oil price hike, for example, that will destabilise the economy.

If the introduction of new technology is regarded as a turning point or discontinuity, then it is easy to understand why it is so difficult to forecast its impact. As Carey and Elton (1996) point out, “The past century is littered with erroneous forecasts and predictions. Some have seriously underestimated demand; most have overestimated demand”.

Overestimating demand can have enormous economic costs: not just the financial costs, the money lost, but also the “opportunity costs”, the technology that might have been developed if time and effort had not been devoted to the failed product. For example, it is reported that AT&T predicted that one million picture phones would be in use by 1980, and two million by 1985. But picture phones failed to take off at all (Carey and Elton, 1996).

But, occasionally, forecasts seriously underestimate. For example, it is reported that the founder of Digital Equipment Corp said in 1977: “There is no reason anyone would want a computer in their home.” Yet by 2002-03 half of UK homes had one (ONS, 2004). The mobile phone industry was subject to serious underestimation too. Demand for the phones themselves, it is said, was underestimated by an order of magnitude: hundreds of thousands in the UK rather than the millions who now have them. Also, as discussed by Alex Taylor and Jane Vincent in Chapter 4, for certain services — in that case SMS — was also seriously underestimated.

Of course, history never repeats itself exactly. As the adverts for stock market investments say past performance is no guarantee of future performance. But past performance is all there is to base forecasts on, whether that experience is expressed in terms of mathematical equations based on large quantitative data sets or on qualitative ethnographic observation. The hope is that this book will provide some ideas that might contribute to reducing these expensive forecasting errors in the future.

The Mobile Revolution?

The idea of person-to-person wireless communication is not new. In 1892, Sir Willaim Crookes foresaw person-to-person wireless communications and in 1901 Professor William Ayrton predicted: “a time when if a person wanted to call to a friend he knew not where, he would call in a loud, electromagnetic voice, heard by him who had the electromagnetic ear, silent to him who had it not. ‘Where are you?’ he would say. A small reply would come, ‘I am at the bottom of a coal mine, or crossing the Andes, or in the middle of the Pacific.’ Or, perhaps, in spite of all the calling, no reply would come, and the person would then know that his friend was dead. Let them think of what that meant, of the calling which went on every day from room to room of a house, and then think of that calling extending from pole to pole; not a noisy babble, but a call audible to him who wanted to hear and absolutely silent to him who did not.”

By the 1920s, police forces in the United States were using radios to communicate. The first basic “Mobile Telephone Service” was launched in the US in 1946. In 1955, the first was launched in Europe in Sweden, where by 1981, there were 20,000 mobile users (Agar, 2003). By 2004, the number of mobile phone users worldwide had reached 1.2 billion (GSM, 2004), representing an astounding one in six of the global population. Mobile phones, especially in Europe and the Far East, have become ubiquitous and their use is rapidly becoming an unnoticed and taken for granted aspect of everyday life. As mobiles have become more widespread, all sorts of issues have been are are being raised about the effect of this technology on people and society.

This book brings together the work of researchers in arts, economics, information science, psychology, and science and technology studies and sociology. Geographically, it ranges across Europe and beyond to Japan. Most importantly, it deals with people and how they use new technology in their everyday lives, both at home and at work. It aims to examine the past for clues as to what may happen when new technology is introduced in the future. A key underlying theme is that people and their needs do not change, but that new technology changes the way that these needs are met. A better understanding of people’s needs would provide a better idea of what technology people really want to use. It also explores how social scientists can collaborate with designers and engineers in the development of new devices and uses. It is divided into three major sections: lessons from the past, present users and how to study the future.

Part 1, which looks at lessons from the past, starts with Imar de Vries’ Mobile Telephony: Realising the Dream of Ideal Communication? This chapter applies the concept of ideal communication to media in general, and to mobile telephony in

particular. It argues that mobile telephony, as the most recent addition to our media spectrum, may seem to achieve communication Utopia. However, experience and expectations of this medium are surprisingly similar to those of older media, and it is argued, therefore mobile telephony is bound to fail to meet this high expectation as did its predecessors.

In the second chapter, *History Repeating? A Comparison of the Launch and Uses of Fixed and Mobile Phones*, Amparo Lasen compares the history of society's adoption of the fixed-line telephone, and the corresponding adoption of the mobile telephone. This comparison covers a time span of a century and yet, considering the differences of social contexts and technical devices, the knowledge of early practices, conflicts, fears and hopes about telephones can nevertheless help to understand the uses and social roles of mobile telephones. The interest of the comparison is, therefore, to give an insight into what happens when new services and new devices enter a marketplace.

In Chapter 3, *Kids will be Kids: the Role of Mobiles in Teenage Life*, Richard Harper and Lynne Hamill look at two aspects of life; mobile phone bills and social etiquette. Focussing on teenagers, and drawing on evidence from the 1960s and recent work on teenagers and mobiles, they advance the hypothesis that what teenagers do has not changed significantly with the arrival of mobiles, but the new technology has provided a new way for them and their parents to do what they have always done. In the next chapter, Alex Taylor and Jane Vincent look at *A SMS History*, telling a tale of social shaping. They explain how technical, economic and social factors intertwined to produce a totally unforeseen demand for a service. Drawing on this experience, they look forward to what lessons might be drawn from this tale to apply to camera phones.

Part 2 focuses on the present, starting with Jane Vincent's *Emotional Attachment to Mobile Phones: An Extraordinary Relationship*. This explores people's relationship with their mobile phones and argues that it embodies an emotional attachment and mobile phone use involves emotional behaviours. The chapter describes those behaviours, both in the way that people are observed using their mobiles and, in the terms they use to describe their relationship with them. It offers evidence from recent empirical research of how attached people have become to their mobiles and it offers some explanations. Finally the chapter suggests some of the implications that these behaviours might have on the development of mobile communications and how these are different from that of any other information communication technology devices.

In Chapter 6, *Textmates and Text Circles: Insights into the Social Ecology of SMS Text Messaging*, Donna Reid and Fraser Reid look at the psychological impact of texting on social interaction amongst regular users and ask whether texting has the same effect as is reported for internet use. They present here preliminary findings of a survey, with particular reference to measures of phone usage, patterns of communication, and social anxiety and loneliness. Exploring the differences between those who prefer texting and those who prefer talking on their mobiles, it is found that "Texters" had a close knit text circle, interconnecting with a close group of friends in perpetual SMS messaging contact. Rather than provide a stepping stone to real-world relationships, texting provides a

distinctive and alternative mode of social contact which continues to appeal to Texters even when textmates are already close friends meeting up on a regular face-to-face basis. Furthermore, the evidence suggests that texting does help to create relationships that may not have developed otherwise.

Next, in *Appropriating Tools and Shaping Activities: The Use of PDAs in the Workplace*, Jenny Waycott moves away from mobile phones and looks at the use of Personal Digital Assistants (PDAs) as general workplace tools. She reports what happened when staff from two very different organisations used PDAs for various purposes, including to support time management, to access and manage emails, and to record and store notes. She uses activity theory as a framework for understanding how new tools mediate activity. This provides a useful vocabulary for describing how mobile technologies can disrupt and change workplace activities, for example, by changing the relationship between elements of the activity, by modifying the processes by which the activity is carried out, and by introducing and resolving contradictions.

Part 3 turns to ways of studying the future. Starting with *Different Directions in the Mobile Internet — Analysing Mobile Internet Services in Japan and Europe*, Richard Tee makes use of a Social Construction Of Technology (SCOT) approach to identify the underlying causes that have shaped the developments of mobile internet services in Europe and Japan respectively. The configuration of relationships between relevant social groups is identified as a key factor. In particular, the power of the mobile operator in Japan has had far reaching consequences with regard to the way mobile internet services can be introduced and controlled. While no actor in Europe has either the power or the will to coordinate mobile internet services as these have been introduced in Japan, the mobile internet has taken along a different shape, characterised by protocols based on open standards as well as proprietary platforms.

In Chapter 9, *Context Perspectives for Scenarios and Research Development in Mobile Systems*, James Stewart examines the need for tools to link the work of engineers developing future wireless technologies to the vast amount of existing social science research, particularly qualitative, is imperative. To do this a common language and set of frameworks is needed so the apparently rather different concerns of each group can be met. Stewart sets out a framework for developing scenarios by looking at the interaction between people, devices, location and application packages.

Finally in Chapter 10, *Instant Messaging and Presence Services: Mobile Future, CSCW and Ethnography*, Philippe Rouchy, explores Unified Messaging Services (UMS) using ethnography. He explains the context in which UMS technology is developed and then demonstrates how evaluative ethnography can work as a tool of fruitful comparison between present and future, as a first proxy to the use of a yet-to-come technology. This he does by looking at the role of ethnography in CSCW and then drawing on four vignettes, designed to draw out specific features of the new technology. In doing this, he draws interesting comparisons between the concepts of users and consumers; and between useability and usefulness. He concludes that going from CSCW studies of

distributed work in large organisations to CSCW studies of the use of mobile technology in private and individualised settings allows forthcoming technology to be assessed. In particular, evaluative ethnography can help to formulate socio-economic dimensions of users rather than technical design suggestions.

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