

The Mobile and Mobility: Information, Organisations and Systems

John Traxler

Abstract Information is the basis of our society, of our businesses and of our organisations. Once, information was marginal to organisations and then gradually information became central. Consequently, information systems development methodology, "... [the] recommended collection of philosophies, phases, procedures, rules, techniques, tools, documentation, management, and training for developers of Information Systems", also became central (Avison and Fitzgerald 1988). Over the last decade, the mobility and connectedness afforded by universal personal devices, systems and technologies have meant that the production, transformation, transmission, consumption, ownership, control, nature and significance of information have changed rapidly and dramatically. The consequences for information systems, for the development of information systems, and for the organisations that use them are still unfolding. This paper outlines in very general terms the impact of mobility and connectedness and asks about the effects on information systems and their development.

1 Introduction

Personal mobile devices are curiously both pervasive and ubiquitous, both conspicuous and unobtrusive, both noteworthy and taken-for-granted in the lives of most people. Almost everyone owns one and uses one, often more than one. Not only do they own them and use them but they also invest considerable time, effort and money choosing them, buying them, customising them, enhancing them and exploiting them. These devices express part or much of their owners' values, affiliations, identity and individuality through their choice and their use. They include smart-phones, satnav, games consoles, digital cameras, media players, netbooks and handheld computers. They are a challenge to the world of information and organisation and how systems are developed.

J. Traxler (✉)

Learning Lab, University of Wolverhampton, TF2 9NT Telford, UK

e-mail: john.traxler@wlv.ac.uk

The personal, cultural, organisational and social aspects of their impact hinge in many respects on the essential difference between desktop technologies and mobile technologies, a difference that means we can ignore the former but not the latter. Interacting with a desktop computer takes place in a bubble, in dedicated times and places where the user has their back to the rest of world for a substantial for a probably premeditated episode.

Interacting with mobile technologies is different and woven into all the times and places of users' lives. Mobile phones have created "simultaneity of place": a physical space and a virtual space of conversational interaction, and an extension of physical space, through the creation and juxtaposition of a mobile "social space", a place where conversations are no longer substantial discrete entities but instead are multiple living threads. This affects people's sense of time, space, place and location, their affiliations and loyalties to organisations and communities, the ways in which they relate to other individuals and to other organisations, their sense of their identity, and their ethics, that is their sense of what is right, what is wrong, what is approved of and what is appropriate.

Therefore, when we say we can ignore desktop technologies but not mobile technologies we mean that desktop technologies operate in their own little world, mobile technologies operate in *the* world. There are, furthermore, issues of agency, ownership and control. Desktop technologies are organizational technologies in buildings whilst mobile technologies are personal technologies with people.

We are of course evading a precise definition of both "desktop" and "mobile"; the laptop, the iPad and the netbook, for example, fall between the two extremes and the point here is not to make a hard distinction based on objective technical characteristics but a softer and more fluid distinction based on the values, perceptions and preferences of individual and organisations. The point here is also move attention to the notions of mobility and connectedness and away from those of mobiles and connectivity.

Mobile devices demolish the need to tie particular activities to particular places or particular times. They are reconfiguring the relationships between public and private spaces, and the ways in which these relationships are penetrated by mobile virtual spaces. Virtual communities and discussions had previously been mediated by static networked PCs in dedicated times, places and spaces. Now, mobile technologies propel these communities and discussions into physical public and private spaces, forcing changes and adjustments to all three as we learn to manage a more fluid environment. This is clearly a profound challenge for organisations.

The obvious starting points are the quantitative aspects of this impact. The statistics are commonplace: new phones routinely make national headlines, mp3 downloads outnumber CD sales, camera-phones outnumber cameras, smart-phones outnumber laptops, mobile phone ownership is reaching saturation and the British send over two billion texts a week.

In fact, mobility is now increasingly seen as a defining characteristic of our societies and our organisations but it is under-researched in its own right. At its broadest,

we see the pervasive effects of mobility in “. . . five highly interdependent ‘mobilities’ that form and re-form diverse networks:

- Corporeal travel of people for work, leisure, family life, pleasure, migration and escape.
- Physical movement of objects delivered to producers, consumers and retailers.
- Imaginative travel elsewhere through images of places and peoples upon TV.
- Virtual travel often in real time on the internet so transcending geographical and social distance.
- Communicative travel through person-to-person messages via letters, telephone, fax and mobile” (Urry 2007, p. 47 and elsewhere).

These are all part of organisations’ environment, some impact directly on their information. One implication is that location and movement can no longer be discounted or demoted as merely non-functional requirements in specifying and modelling an information system, nor can the business environment be assumed to remain as stable and coherent as it currently seems.

2 Mobiles at Work

Mobiles and mobility are changing many aspects of work, employment and the economy. The economic aspects of these trends are twofold. Firstly, the shifts in the nature of economic activity, that is in the jobs that people do, the products and services they supply, the assets and resources they invest and the businesses they work for, as mobile systems become more and more central to economies across the world. Mobile phone networks and hardware manufacturers are major multinational organisations, investing in R&D, developing products, supplying services, running call centres and employing many thousands of people, at the expense of more traditional parts of the economy, perhaps in the more developed parts of the world. Media distributors and banking operations amongst others, have adapted to the new mobile economy and trade ring-tones, downloads, airtime and credits. Secondly, the changes in the nature of work itself, in the times and places of work and the relationships within work are changing. The improved connectivity between a mobile workforce and its headquarters means greater efficiency since peripatetic workers can be deployed and supported at a distance. It also means greater supervision and increased deskilling. Furthermore since mobile technologies operate on the move as well as at a distance, we see increasing workloads as people stay connected on holidays and weekends, and we see the “day-extender syndrome” (International Telecommunications Union 2004, p. 28), weakening the home/work boundaries, as people work whilst they travel or relax.

These changes clearly affect the business processes within organisations that information systems must support, and clearly affect the possible processes by which information systems are developed.

3 Organisations in Space and Time

Mobile technologies are eroding established notions of time as a common structure. In their place we see the “approx-meeting” and the “multi-meeting” (Plant 2000, p. 31), “Our sense of time need not necessarily be strictly governed by linear time, but can instead be socially negotiated” (Sørensen et al. 2002, p. 3) and the “micro-coordination of everyday life” (Ling 2004, p. 69) alongside the “softening of schedules” (Ling 2004, p. 73) afforded by mobile devices. Nyíri (2007, p. 301) says, “with the mobile phone, time has become personalized”. Agar (2003, p. 4) makes a direct comparison between the mobile phone and wrist watch, in terms of intimacy and ownership, but a direct contrast in terms of personal freedom, saying, “while it might have felt like liberation from tradition, the owner was caught anew in a more modern rationality, for, despite the fact that the pocket watch gave the owner personal access to exact time, accuracy depended on being part of a *system*”, in fact it *made* the owner part of a system, handcuffed to it. Time zones and daylight saving, also artefacts of the Industrial Revolution, in aftermath of the new national railway networks, had a similar effect of creating a unified and monolithic time system but now of course personal mobile connectedness erodes that too; international travellers are no longer locked into their local time zone. Mobile phones mean they are also still tethered to family times back home and to the rhythms of their office and colleagues back at base rather than their physical location. These remarks about perceptions of time are significant given how much the notion of time figures as a major constituent of information system development methods, from structured methods through rapid methods to the current agile methods. Business process reengineering and rapid application development (RAD) are two examples of information system development with a strong and objective temporal dimension. The changes we describe not only accelerate movement along this dimension but fragment and socialise it.

Mobile devices are accelerating teleworking and also eroding physical place as a predominant attribute of space. Place is being devalued or diluted by “absent presence” (Gergen 2002), the phenomenon of physically co-located groups, in the family home or in the organisation office, all connected online elsewhere and by “simultaneity of place” (International Telecommunications Union 2004, p. 20; paraphrasing Plant 2000) created by mobile phones, a physical space and a virtual space of conversational interaction, or an extension of physical space, through the creation and juxtaposition of a mobile “social space”, thereby eroding the “work-place”.

Many organisations are organised around specified times and spaces, their premises and their opening hours. They are clearly less and less well aligned to the needs and behaviour of many people, their customers, clients and workers. Furthermore the increase of 24-h rolling news, off-air recording and domestic video-on-demand means that TV schedules no longer provide a synchronous and collective experience that binds informal groups of colleagues together in the way they used to a generation ago.

Mobile devices are reconfiguring the relationships between spaces, between public spaces and private ones, and the ways in which these are penetrated by mobile

virtual spaces. This reconfiguration is accompanied by what goes on in those spaces. Cooper (2002, p. 22) says that the private “is no longer conceivable as what goes on, discreetly, in the life of the individual away from the public domain, or as subsequently represented in individual consciousness”, “. . . massive changes are occurring in the nature of both public and private life and especially of the relations between them” (Sheller and Urry 2003, p. 1). “The use of these mobile sound technologies informs us about how users attempt to ‘inhabit’ the spaces within which they move. The use of these technologies appears to bind the disparate threads of much urban movement together, both ‘filling’ the spaces ‘in-between’ communication or meetings and structuring the spaces thus occupied” (Bull 2005, p. 344). Earlier work on the Sony Walkman came to similar conclusions, “the Walkman disturbed the boundaries between the public and private worlds” (Du Gay et al. 1997, p. 115). Organisations predicated around workers on task at their desks are no longer on solid ground, modernity has become “liquid” (Bauman 2000).

This is accompanied by a growing dislocation of time and place, in which “everything arrives without any need to depart” (Virilio 2000, p. 20). “Closer to what is far away than to what is just beside us, we are becoming progressively detached from ourselves” (Virilio 2000, p. 83). Owing to “the tendency to previsit locations, through one medium or another; to actually arrive somewhere is no longer surprising in the way that it was . . . it is becoming replaced by prevision. Thus according to this logic, the mobile would be one more technique by which the world became unsurprising” (Cooper 2002, p. 26). Another personal device, the in-car sat-nav, has a similar effect, that of *previsiting* places and locations. Other personal digital devices, the camcorder, the camera, allow us to recreate the past, to *revisit* places and locations. Google Maps with Street View also dilutes the here-and-now, creating perhaps *absent presents*, but the ever-growing sense of surveillance is implicit too.

4 Mobiles and Individual Identity in Organisations

In 2007, Charlie Schlick, Product Manager of Nokia, described company practice in talking of mobile phones as “our new private parts”. These devices are personal, universal and closely linked to identity and in talking about mobile devices; we must recognize how closely they are bound up with a changing sense of self. Some authors describe personal mobile devices as becoming prosthetic; Pertierra (2005, p. 27) says, “Unlike desktops and other immobile technologies, mobile phones more closely resemble tools or prosthetic devices as extensions of the body. They become extensions of the hand, allowing us to connect anytime, anywhere, with anybody. Bodies themselves become writing devices as phoneurs negotiate new urban spaces”. Other authors describe them as becoming “embodied” (for example, Rettie 2005).

From pacifier, to nipple, to digital umbilical cord, the mobile phone rapidly progressed to assume a vital place in the virtual biology of urban information societies of the late twentieth century. At the final extreme, the mobile phone’s connectivity might be completely subsumed into the body, and all other forms of communication become redundant email, web, phone calls, all can be delivered over the universal handheld (Townsend 2001, p. 70).

“One can be interrupted or interrupt friends and colleagues at any time. Individuals live in the phonespace—they can never let it go, because it is their primary link to the temporally, spatially fragmented network of friends and colleagues they have constructed for themselves. It has become their new umbilical cord, pulling the information society’s digital infrastructure into their very bodies. In fact, as technical evangelists at Nokia pondered, mobile communications could eventually evolve into an activity indistinguishable from telepathy” (Townsend 2001, p. 70). However there is also a widespread perception that technology, including mobiles, is enabling supervision, oversight and surveillance and this must erode or weaken aspects of identity, or perhaps merge and confuse professional identity and social identity, digital identity and physical identity.

Mobile devices have been associated with new forms of discourse and thus with different communities. The obvious example is “text-speak” and its original subversive association with teenagers but another is the evolution of the “missed call” around the world (Donner 2008). There are also more subtle transformations. Goffman (1971), for example, noted the phenomenon of “civil inattention”, where in certain social situations it is customary and necessary not only to not speak to others but to avoid looking directly at them. This management of gaze is one way in which the boundary between public and private is negotiated and is now often a characteristic of creating a private space for mobile phone conversations in a public setting; a similar concept is the “tie-sign”, the various gestures that keep a face-to-face encounter live and “in play” whilst servicing an interruption caused by a mobile phone call. The recipient of the call is obliged to “play out collusive gestures of impatience, derogation, and exasperation” according to Goffman.

Murtagh (2002) describes a wide set of non-verbal actions and interactions with the mobile phone in public, and these are part of a wider transformation of discourse and social interaction as society engages with mobile technologies. Organisations are growing less likely to know what is going on.

Mobile devices also affect many aspects of the processes by which knowledge, ideas, images and information are produced, stored, distributed, delivered and consumed. They are now part of a system that allows everyone to generate and transmit content not just passively store and consume it, making mobile systems an integral part of the Web2.0 ideology that takes users from being merely the Web’s readers to its writers. This happens in several ways, for example is citizen-journalism, the phenomenon of people using their camera-phones to capture news events and then using perhaps YouTube or Flickr to broadcast the images and comments, with no intervention or control from head office, the centralized government, media or news corporations. Organisations will have less control about what individuals show or say about them (though will quickly explore ways to appropriate and colonise these new media).

A more general example includes Flickr, YouTube, Wikipedia and other file-sharing or wiki-based technologies that have migrated onto mobile devices as connectivity and usability improve. Once built into mobile devices, these technologies are starting to exploit the capacity to capture or retrieve information that is

context-aware and location-specific. Google on mobiles, for example, offers an improved “local search experience” based on the expectation that there is a market for area information such as cinema listings. Content, information and knowledge will become location-specific and this could lead to much richer, more diverse and more economically viable forms of context-aware knowledge and information.

The significance of social network technologies, such as LinkedIn or Plaxo, in facilitating virtual communities has been widely documented (Bryant 2006) and is already being exploited or appropriated by organisations. These technologies have now migrated from desktop computers to mobile devices and supplement technologies that are “native” to mobile devices, systems such as Twitter, micro-blogging systems that connect communities on the move. Multi-user virtual worlds such as Second Life will take on a mobile dimension soon. These changes will further interweave physical and virtual communities and spaces, and identities. They facilitate the creation and support of discursive communities, within and across organisations, able to collaborate whilst moving (again linking to the “smart mobs” concept (Rheingold 2002). The use of Second Life in information systems development has already begun.

One challenge for information systems development is the growing chasm between the solidity and boundedness of organisations such as companies, institutions and governments and the fluidity and movement of people’s information lives, echoed in the open source development community and cloud computing.

Mobile devices will consequently soon break down the notion of stable and commonly accepted and understood corpus of knowledge and information distributed through privileged channels within or between organisations by sanctioned individuals—now everyone can produce information content, and everyone one can discuss it *anywhere/anytime* and *just-in-time, just-for-them*.

5 Information as Content

Mobile devices deliver knowledge “chunked”, structured and connected in very different ways from the presentation, the web and the manual. Knowledge is not purely abstract, unaffected by how it is stored, transmitted or consumed. In its earliest forms, knowledge and information came from the talk, idealised as a substantial linear format from an authority with no facility to pause or rewind, and from the book, also authoritative, substantial and linear but segmented and randomly-accessed. The delivery of knowledge and information by networked computers using the Web meant a break from linearity with the introduction of hyperlinks and the need for new heuristics of usability (for example, Nielsen 1992) that described how knowledge and information should be best “chunked” and presented. We have to recognise of course the tension between a rational objective articulation of these heuristics and the capacity of new technologies to overturn them, in for example the case of the badly designed but wildly popular iPad (Budiou and Nielsen 2010).

With mobile technologies, using a small screen and a limited input medium, the “chunks” become much smaller but the navigational overhead has become much,

much larger. In essence, small pieces of information can be easily presented but their relationship to each other and to anything else may be difficult to understand, thereby fragmenting and perhaps trivialising what people know. As Marshall McLuhan (McLuhan and Zingrone 1997) says, “It is the framework which changes with each new technology and not just the picture within the frame”.

Mobile technologies are starting to merge with an equally powerful technology, that of “cloud” computing (as described in Wiess 2007). This is the phenomenon of data, applications and processing moving away from specific hardware hosts and into the Internet. Google docs and Flickr are examples. The combined consequence for organisations and institutions will be to challenge the primacy of organisationally controlled desktop computers. A different medium-term trend will be for these activities to move into the environment, into buildings, furniture, vehicles or clothing, and to become ambient and pervasive (Satyanarayanan 2001). The consequence for organisations will be to accelerate the convergence of physical architecture and virtual architecture, and to blur the boundaries between institutional space, social space and personal space. This has implications for information systems development methods that focus on the immediate environment for developer teams (Martin 1991).

In another respect, information and knowledge are no longer anchored in physical artefacts. The advent of eBook readers and mp3 media players, for example, means that books and records are longer necessary to store and transmit literature and music. Video-on-demand is another part of the transformation of live social performance into consumable artefact and now into disembodied asset.

Whilst mobile technologies, especially as portals into cloud computing, seem to increase the participation and ownership of information, they may be transferring these from the jurisdictions of national governments and located institutions to powerful supra-national organisations rather than creating more democratic forms. They may also be creating more local, partial and transient forms of information as well as, obviously, catalysing exponential growth in its sheer volume.

These are all components of what has been called an “epistemological revolution” (for example, in the sense broadly outlined in Des Bordes and Ferdi 2008), a phrase used to express the fact that computers and now mobile technologies are revolutionising what we know and how we know it. In talking in these terms, we should however be careful not to obscure the nuances and differences between individual devices and technologies and the various ways in which different cultures and organisations with society adopt and adapt them.

6 Conclusion

This account is only partial and attempts to describe a fragmented and rapidly changing picture. The organisational world, its information systems and their development are very complex. These make sweeping statements or recommendations fairly problematic. The literature described here does however systematise and legitimise what

we can easily see around us in our colleagues and organisations, and creates a broader context for the future of information systems development.

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