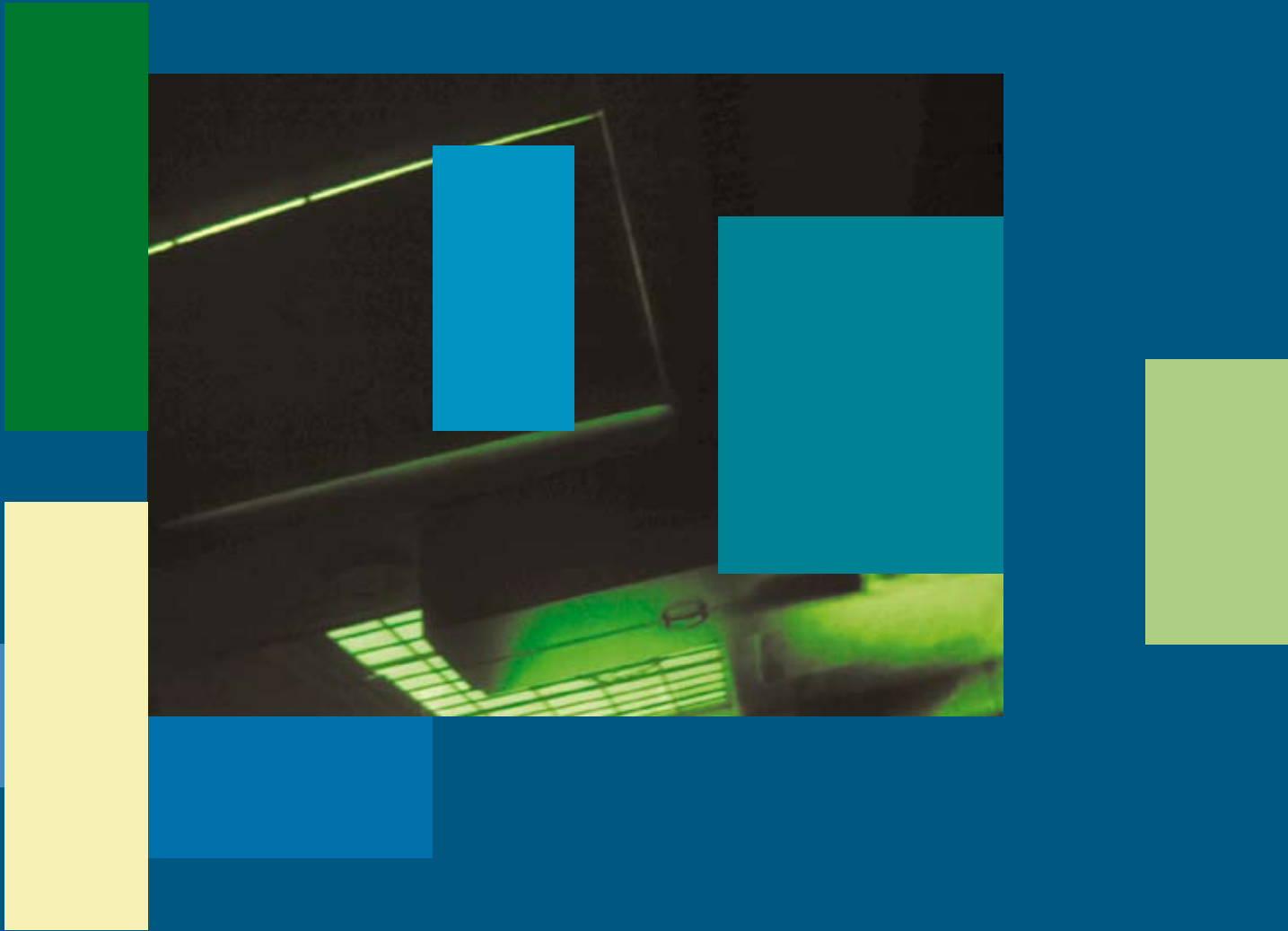


Guidelines

F o r I T M a n a g e m e n t



March 2006 – Number 299

Inventing the future with
mobile technology



Principia 

Since 1966, the National Computing Centre (NCC) has been helping organisations to manage IT processes and systems development and equip people with the skills to ensure business effectiveness. We do this through a unique membership service that brings together professionals and experts to identify, create and disseminate knowledge and experience across the spectrum of IT issues.



Principia, National Computing Centre
Oxford House, Oxford Road
Manchester M1 7ED

NCC Guidelines

The National Computing Centre
Oxford House
Oxford Road
Manchester
M1 7ED

Website: www.ncc.co.uk

Tel: 0161 242 2121
Fax: 0161 242 2499

© The National Computing Centre 2006
No part of this publication can be reproduced, stored in a retrieval system, transmitted or made available to the public in electronic form or by any other means (electronic, mechanical, photocopying, recording or otherwise) without the written permission of the publisher. Whilst every care has been taken to ensure the accuracy of the

editorial content the publisher makes no representation and gives no warranty as to its accuracy and cannot accept any liability for any direct, indirect or consequential damage or loss howsoever caused arising out of or in connection with the content of this publication.

First Published March 2006

Contents

page

I. Introduction	3
2. What is mobile data?	3
3. Seven reflections on our future with mobile data	4
Switching on, switching off	4
Lonely workers	5
Digital selves	5
Digital exclusion	6
Flexible working, flexible organisations	6
Selective integration	7
Living in a data cloud	8
4. Building the organisations of 2016	8
4.1 The Global Knowledge Company: Information Everywhere	9
4.2 'Adhocracy': Build Up, Break Down	10
4.3 Multi-layered organisation: Information Flow	11
5. Conclusions	12
6. Response by Alan Standley, The global future forum	13
Appendix: Methodology	15

Foreword

We are working in one of the most complex, challenging and dynamic environments that has ever faced the UK business market and this pace of change can be seen in almost every aspect of our lives. Both in and out of the work place, the sight of someone engrossed in their blackberry is a common one.

Every day we glimpse the way new technology is shaping the way we communicate – both on a corporate organisational level and as individuals. Yet there seems to be an imbalance. On one hand technology is the catalyst to change, while on the other, it is the inhibitor. Organisational structure – the way employers and employees work together, is perhaps the biggest single area that will be transformed by this mobile data ‘revolution’.

Revolutions have historically been based on the desire for greater freedom – driven in many ways by a thirst for greater knowledge. Today, knowledge has become a prized commodity – valued and traded by both employee and employer and often used as the currency for change. The result is that the shape of organisations themselves has undergone a dramatic process of evolution, if not revolution. Today a company’s value is based on the skills and knowledge of its employees – give them the tools and infrastructure to be more productive and you increase the potential value of the organisation itself.

The challenge to business, small and large, is how to strike the right balance between efficiency and flexibility. Organisations need to know how technology can help productivity while at the same time, increase loyalty with both employees and stakeholders. Employees need to be guided through the maze of ambiguity that new technology brings; when should you switch off? How should you use the company PDA?

In order to enable a process of change to better understand the needs of customers we need to look into the future and in some way predict and shape what life will be like. We want to provoke thought and debate about the way technology will impact upon us as employees, employers, citizens and government.

The challenge for all organisations is that we must be able to fully understand and grasp the simple fact that technology will be both the enabler and the barrier to the way we operate. In other words, we need to be ready to embrace the inevitable change when it comes our way.

This Guideline is the first step towards achieving that goal. Twelve months ago Orange got in touch with Henley Headlight Vision to bring together a group of individuals from a range of backgrounds, whose ideas and creative thinking would help us better understand what the future may look like. The Orange Future Enterprise Coalition is the result, and in this Guideline you will see the fruits of our labour.

Nobody can predict what lies ahead, but by creating a platform to discuss, debate and, in some cases disregard, the visions and ideas of the future – we can raise awareness in both businesses and individuals, to the fact that mobile technology will be an inevitable catalyst for change.

Alastair MacLeod, Vice President Business Solutions, Orange UK

1. Introduction

The networked person is always on the move, juggling with a laptop computer, a mobile phone and a BlackBerry for e-mails, keeping in electronic touch with people he (and increasingly she) no longer regularly bumps into in a corridor. Indeed, there may be no corridor. These days, many employees no longer have a physical home base in a building provided by their employer.

'The new organisation', 19 Jan 2006, The Economist

In autumn 2005, Orange Business Solutions founded the Orange Future Enterprises Coalition (OFEC), a group of industry and technology experts, academics, consultants and independent thinkers from across public and private sectors. In combination with the founding of OFEC, Orange Business Solutions commissioned original research on the meaning of mobile data and its relevance to today's organisations. This report presents just some of the output from these projects with a focus on seven reflections on the future of mobile data:

- 1. Switching on, switching off:** Working and 'homing' will be made easier by mobile technology, but the challenge will be successfully moving between the two worlds. Mobile data will liberate those who find ways of using it selectively, whilst burdening those who fail to adapt their routine.
- 2. Lonely workers:** Human contact will diminish in the face of mobility. The ability to discuss, connect and brainstorm will be eclipsed by an overall speeding up of communications. Decisions will be made quickly, with less mutual agreement and acceptance.
- 3. Digital selves:** Employers and employees will be speaking a language of 'digital rights'. The blurring boundary between work and home life will result in the claim to data ownership by organisations and individuals alike.
- 4. Digital exclusion:** Flexibility and mobility will not be available to all, leaving a 'digital underclass' excluded. We are moving toward a future in which a technology gulf will continue to grow, and in which large groups of society will not be speaking the language of flexibility, mobility and rights.
- 5. Flexible working, flexible organisations:** Organisational strategy and structure will be completely transformed by the use of mobile data. Improved efficiencies will open up possibilities in organisations for restructuring, downsizing, realigning and streamlining processes, but also shifting resources towards customers' needs and requirements.
- 6. Selective integration:** We will see some spectacular failures as well as some success stories in the integration of devices, services and systems. There has been much debate around the potential 'end of the network' as we know it. What does seem likely is an integration of systems and services that were once incompatible.
- 7. Living in a data cloud:** Mobile data will facilitate a state of ubiquitous, ambient technology. Mobile data plays an important role in our everyday lives – both socially and professionally – yet it often goes unnoticed for what it is.

2. What is mobile data?

In a technical sense, mobile data is information that is transmitted, received or stored on a device that can be used by someone on the move. But this definition does not go far enough to explain the context in which mobile data sits in this Guideline.

We are living and working in a society that is faster, busier and more demanding than ever before, for employees and employers alike. This is influencing the ways in which consumers lead their lives – in the home and at work, as well as in between. At the same time, organisations are changing the ways in which they operate in order to survive in a rapidly evolving marketplace. One of the main drivers (and facilitators) of this change is the advancement of technology, and more specifically, the development of mobilising technologies.

Examples include mobile phones that are capable of transferring data (e.g. SMS, MMS), BlackBerrys, smart phones and PDAs, laptops enabled with 3G connectivity, RFID tags and swipe-cards, GPS tracking tools and bespoke devices such as the handheld barcode scanner that communicates directly with a stock control system.

This Guideline focuses on the applications of such mobilising technologies and looks at their effects on the organisation of the future and the individuals who live and work in them.

'We are living and working in a society that is faster, busier and more demanding than ever before, for employees and employers alike. This is influencing the ways in which consumers lead their lives – in the home and at work, as well as in between.'

3. Seven reflections on our future with mobile data

Mobile data is about more than business solutions. Mobile technologies are starting to have profound effects on organisational culture and everyday lives. Our journey to work is being transformed – sometimes to a virtual one – as are our day-to-day activities, both inside and outside of work.

This section explores the implications of seven future-looking statements that focus on the impact of mobile data on organisations and the people within them. Some of the tensions identified are prefigured in existing literature; others have been less well documented. Many have also come out of discussions between members of the Orange Future Enterprise Coalition.

1. Switching on, switching off

Working and 'homing' will be made easier by mobile technology, but the challenge will be successfully moving between the two worlds.

The term 'empowered' is often used to describe the employee's status when equipped with a mobile device linking him or her to the office, the warehouse, headquarters or simply to email. But 'empowered' is not always the employee's perception.

'I hate having [a BlackBerry]. I leave it on my desk, charging, as a matter of principle.'

Business user, Henley Centre HeadlightVision research

There is a feeling among business users that being 'always on' is not so much beneficial as (in some cases) detrimental to their work. One member of OFEC suggested that his efficiency in the workplace may actually be reduced by having constant access to email, due to constantly checking and rarely 'switching off' or focussing on any one thing.

The leakage of work into home life or social life is also a risk and a concern to many:

'Some people are better than others at using the new technology. It's easy to get addicted, when you're not used to using mobile data. It has been known for me to confiscate people's devices when they go on holiday!'

Research respondent

A degree of discipline is required when using such technology, and a new way of working must be sought to make effective use of mobile data whilst not impinging on other elements of work or life. To this end, a new generation of employees is slowly emerging; a generation that understands how best to use mobile technology and how to derive maximum benefit without seeing personal lives suffer. As this generation rises through the workplace, we will see a gradual change in the way businesses operate, with a mental 'switching off' replacing the physical 'leaving work' at the end of the day.

This 'switching off' is the boundary between work and home life. When employees are 'off', they are inaccessible to their employer, and therefore personally responsible for their actions. For example, an email sent from the employee's mobile device when 'off' is not attributable to the organisation, but to the individual. When employees are 'on', however, they are expected to communicate about work-related matters only and any use of a mobile service would be associated with the organisation, not the individual.

It will take time for this future to evolve, and there will be those who are better at adapting than others. In a world of increasing expectations – of employers and of employees – and of heightened competition between businesses and workers, it will be difficult for some to allow themselves to 'switch off', particularly when they are within the working environment.

'These technologies have become so embedded they are invisible... They make us in principle always available... The challenge: How do we design to be sometimes off in a world that is itself always on?'

*Marko Ahtisaari*¹

1. *Blogging Over Las Vegas*

http://ahtisaari.typepad.com/moia/2005/09/blogging_over_l_10.html

There is contention among members of the Orange Future Enterprise Coalition as to whether 'switching off' from work as well as play is realistic, or even possible. It is undoubtedly the case that the stigma of being 'always on' is fading. But will mobile data only continue to bring our work into our home lives, and vice versa? Or will mobile services bring employees the 'empowerment' that has been much talked about in recent years? Perhaps the answer is somewhere in between: mobile data will liberate those who find ways of using it selectively, whilst burdening those who fail to adapt their routine.

2. Lonely workers

Human contact will diminish in the face of mobility.

Over the past ten years, we have seen a dramatic shift from manual to electronic. Letters and faxes have largely been displaced by emails, which are now legally binding documents. Whereas employees used to reside in a fixed physical space (their desk, their warehouse or other workplace) they now increasingly work from anywhere, and can do so at any time. Discussions that happened in meeting rooms now take place over the phone, or by video via the internet, or even by online chat-rooms or blogging. And the pace of change is not slowing down.

With the use of mobile data, many workplace activities can be achieved 'on the move', eliminating the need for fixed-line phones, meeting rooms and in some cases, even office space. A company may be able to exist on a purely 'virtual' basis, with communications limited to the electronic transfer of data. Intelligence and information that used to be held in the centre of an organisation is increasingly distributed to maintenance and customer facing staff at the edge.

Until now, workplace atmosphere, office morale and treatment of staff have been a selling point for many companies when looking to recruit. This will change as 'the workplace' becomes a thing of the past. A typical working day will involve less physical interaction than it does at present, with employees not needing to come into contact with colleagues, clients or suppliers as part of their job. In theory, it will be possible to exist in a vacuum of human interaction, with communications being electronic and not face-to-face.

This organisational shift will bring about a change in the way that staff is recruited:

'These days, it's all about getting the right person for the job, and getting someone within a 20 mile radius of the office is no longer such an issue.'

OFEC member, business representative

There will be a trade-off between increased flexibility and decreased human contact. On the one hand, efficiency will improve as employees are motivated by the ability to work on their own terms and in ways that better suit needs such as childcare, personal interests and obligations. On the other, staff morale and collegiality might fade through lack of social contact and relations with other employees. Employers will need to put innovative processes in place to incentivise staff to continue investing in the organisation as a whole; they will also need to identify where human contact is advantageous because it will not disappear completely. Nevertheless, the ability to discuss, connect and brainstorm will be eclipsed by an overall speeding up of communications. Decisions will be made quickly, with less mutual agreement and acceptance.

'An employee or a manager seems increasingly likely to be judged not by their wisdom, but by their response time.'

*Jon Steel, A Berry personal tale, The Wire, November 2005*²

3. Digital selves

Employers and employees will be speaking a language of 'digital rights'.

In ten years' time, identity theft is likely to be less common than it is today. High demands placed upon organisations to protect their employees and proprietary knowledge will lead systems designers as well as sales teams to prioritise privacy. Methods will be put in place to circulate data quickly but securely. Strict privacy protection is good for business on many levels, but, perversely, can be a barrier

2. A Berry personal tale, The Wire, November 2005

to innovation³. Compliance with privacy-protecting legislation will also become a requirement, just as Sarbanes-Oxley legislation has required transparency of accountability.

'There is currently no policy on the data that's sent in emails – mobile or otherwise. I guess that might change.'

Research respondent

'...the symbol of a social divide remains useful when looking toward a future in which a gulf will continue to grow, and in which large groups of society will not be speaking the language of flexibility, mobility and rights'

For government, the convergence of centrally-held data (car registration numbers, health records, education details and so on) will continue to deliver efficiencies and cost-savings. Government will know a good deal about its people's needs, and will have the ability and power to create near-complete profiles of citizens. This will give public bodies better opportunities to plan and deliver services. Tensions between business and government over the control of data will occasionally flare up, but the fierce protection of customer and employee information taking place in the private sector will mean that no organisation – neither public nor private – will be given privileged access to information. Steps will be taken to render the collation of especially sensitive databases impossible.

Whilst organisations will go a long way to safeguard their trade data, they will also lay greater claim to mobile data transmitted by employees via company-owned devices whilst in 'on' or 'working' mode. The blurring boundary between work and home life will result in the paradoxical claim to 'digital rights' by organisations. Workers may be mobile, but ownership of the data transferred is likely to be claimed by the procurer of the mobile service.

During 'off' hours, however, employees own their own freestanding digital profiles. The profile travels with them and is not tied to one particular device exclusively. Although their employers own mobile services, individuals are taking advantage of new tools to control their mobile identities – these are employee 'digital rights'. This seems certain to become an area of substantial conflict. Moreover, digital profiles increasingly have the power to filter communication and protect individuals from unwanted digital infiltration. These digital profiles will help employees navigate 'always on' lifestyles.

4. Digital exclusion

Flexibility and mobility will not be available to all, leaving a 'digital underclass' excluded.

As we have seen, mobile data allows for flexible working patterns and the ability to be everywhere simultaneously. The spread of mobile data use allows some to demand 'rights' to work when and where required, and to protect personal data and identities. The 'digital divide' has become a hackneyed catchphrase for understanding how technology skills vary according to socioeconomic status. Yet the symbol of a social divide remains useful when looking towards a future in which a gulf will continue to grow, and in which large groups of society will not be speaking the language of flexibility, mobility and rights. Schools will increasingly be drawing on mobile services, and those who remain in the education system will learn to take mobile technologies for granted. Educational attachment, at any stage of life, will provide access to wireless and mobile data. Those outside of education may be excluded from this resource. As a consequence, there will continue to be a skills ladder in which low-paid, service sector employees will not have the opportunity to demand flexible working and will not be offered training in mobile technologies.

Exclusion will take direct and indirect forms. Those directly excluded from mobile data developments will be those without the latest technology, who do not have the need, the desire or the ability to transmit data. In other cases, the use of mobile data and mobile technologies will be restricted to certain levels and fields. This indirect exclusion might be overcome, and there is the possibility that mobility options might eventually spread from the top to the bottom of organisations (as is already the case for field force). The spread of mobile data usage is not a white collar revolution exclusively, and the onus of adoption and training lies on organisations themselves.

There is an alternative version of this future: mobile technologies offer the potential for real democracy, such as through the frequent sampling of opinion and enabling those who are currently prevented from working because of physical limitations.

3. See, for example, the work of Annalee Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Harvard University Press, 1994

5. Flexible working, flexible organisations

Organisational strategy and structure will be completely transformed by the use of mobile data.

The adoption of new technologies will continue to transform the ways in which organisations operate, and mobilising applications will play a key role in this process.

Giving employees the ability to work 'on the move', from home and during non-standard hours is a major transformation in itself. The workforce is no longer a cohesive body, but in many cases this increased flexibility has a positive effect on the efficiency of those employees (although organisations must be aware of the risk of worker isolation discussed above). The improved efficiencies open up possibilities in the organisation for restructuring, downsizing, realigning and streamlining their business processes, but also shifting resources towards customers' needs and requirements.

Of the companies who claim to be 'always quick to adopt the latest technology', 31% are looking to 'completely transform the business process' – making this the most popular reason for adopting mobile data. Decision-makers within organisations are seeing the potential for change, but one question is whether they are brave enough to implement it.

The service industry in particular will benefit from this ability to transform. These benefits will manifest themselves in various ways:

- Improved productivity, as employees (largely freelancers) will be able to respond to enquiries remotely, thus working in real time and delivering solutions instantly.
- Reduced administrative costs as workers will manage their own workload, no longer relying on support staff or entire departments.
- Improved buoyancy in the market, due to the fluid nature of the flexible workforce (which is brought in at short notice when demand picks up and dropped when demand falls).
- Improved service delivery, because field workers have access to information which was previously held by managers in head office.

Accompanying this transformation of process will be a significant change in organisational structure. The need for large, fixed IT departments will be eliminated as employees become more self-sufficient with their mobile devices. Ease and speed of communication will improve, along with access to and ubiquity of information.

In the rapidly evolving world of business, mobilising technology will become one of the key ways that organisations can differentiate themselves. Use of developed mobile solutions will be the competitive edge for organisations, and those that fail to adopt will find themselves at risk of falling behind in a changing marketplace.

6. Selective integration

We will see some spectacular failures as well as some success stories in the integration of devices, services and systems.

'Convergence' has long been hyped as the future of telecoms and industry. But the word has a plethora of meanings and it is important to distinguish between them. This section looks at the integration of applications and of services, as well as standardisation of services across networks and markets.

In the future, it has been alleged, we will each own a single device that acts as our phone, our camera, our portable music player, our games console, our email and internet platform and our personal organiser. It makes sense, in many instances, to integrate such applications for convenience and portability.

'Use of developed mobile solutions will be the competitive edge for organisations, and those that fail to adopt will find themselves at risk of falling behind in a changing marketplace'

'If I were to carry around separate devices for all the functions I use on this thing, I'd be like Lara Croft – weighed down with a hundred gadgets on my belt!'

Research respondent

Over the past ten years, we have seen the integration of many hand-held applications – the most obvious example being the BlackBerry. The combined fixed-line/mobile phone is another. Reduced cost of service, improved coverage

and convenience for the user are just some of the advantages and hence drivers for uptake. However, blanket integration of devices is not always the solution sought by the user.

'When I go on site sometimes I'm made to leave my mobile phone at reception because they don't allow cameras on site. If I had everything in one device, I'd have to leave it all at reception.'

OFEC member, business representative

'Is there a toaster that can also brew coffee?' was the rhetorical remark made by Jon Rubinstein, senior VP of the iPod Division at Apple, during an interview with Germany's Berlin Online ⁴. The answer of course is that no such device exists because it would not provide any benefits over an individual toaster and a coffee machine.

When talking about integration of mobile data devices, the coffee/toaster argument is weaker because there is a clear benefit to rolling certain applications into one. But service providers should remain vigilant, ensuring that products are in line with what end users and businesses really need.

'They [mobile devices] all perform different functions, don't they? If I want to make a phone call, I'll use my mobile. If I want to edit a slide in my PowerPoint presentation, I'll use my laptop. But if I just want to check my email, I'll use my smart phone. There is no one-stop solution.'

Research respondent

7. Living in a data cloud

Mobile data will facilitate a state of ubiquitous, ambient technology.

Office swipe-cards, in-car satellite navigation and email on the move are already regarded as unremarkable. Mobile data plays an important role in our everyday lives – both socially and professionally – yet it often goes unnoticed for what it is.

'When Londoners use Oyster cards to get around, most of them don't realise they have an RFID chip in their hand.'

OFEC member

Mobile technology is becoming increasingly embedded in our society, not just in terms of stand-alone devices but as systems that operate remotely and unobtrusively. It is difficult to get through a day without employing – consciously or unconsciously – the use of mobile data. It is ubiquitous in home, the workplace and virtually all means of transport, and will become more so.

The ease with which information can be accessed means that organisations will operate in what has been termed a 'data cloud'. Employers and employees will have liberal access to information, restrained only by issues of privacy and data protection. Colleagues will be well-connected in a virtual sense (but not physical), and sharing of content will be easier.

As mobile technology becomes more ubiquitous and more 'intelligent' (making decisions on behalf of the user and so on), there is likely to be more reliance on the services themselves. Security and reliability will become key. As one member of OFEC put it, 'the more accessible the data is to employees, the more accessible it is to potential hackers.'

Yet it is possible to get too concerned about security. Organisations will need to weigh the security risks of mobilising technologies against the significant benefits and opportunities they offer.

'People may have security issues with new technology, but at the end of the day, you've just got to go ahead and implement, regardless of the risks.'

Research respondent

4. Building the organisations of 2016

At an intensive OFEC workshop in January 2006, participants were challenged to think about how mobile data might feature in various types of organisation in ten years time. The group discussions were shaped by the STP organisational

4. Interview with Jon Rubinstein, senior VP, iPod Division, Apple, with Germany's Berlin Online, 26 September 2005
www.berlinonline.de/berliner-zeitung/wirtschaft/486464.html

model devised by Friedman and Gyr, which explores how structure (formal organisation, management policies, information systems), tasks (products and services) and people (skills, talent, working relationships) contribute to business strategy and success.

Here we describe three of the organisational types and the role that mobile data will play therein. The descriptions are accompanied by depictions of 'organisations of the present' – snapshots of how mobile data currently makes the work of OFEC members happen. These possible worlds should be read in the context of the seven reflections explored in the last section. They will be an important part of organisational transformation.

4.1 The Global Knowledge Company: Information Everywhere

Key characteristics:

Strong central control of intellectual property, people and processes. Consistency is crucial to performance, but there is also a need to be responsive, agile and innovative as an organisation. Knowledge is everything and information is everywhere.

Take, by way of an example, a multinational pharmaceutical company with headquarters in London and offices all over the world. Data and knowledge are at the heart of this organisation – in the form of intellectual property, R&D findings, market insight, research techniques and personnel data. This information is tightly managed, tracked and protected. Knowledge management systems are central, and all data is stored centrally rather than on overlapping, independent networks. Access is password- (or biometrically-)protected and monitored, and different levels of access are granted on the basis of role and rank. The biometrics employed range from simple fingerprint recognition for less secure material to more complex approaches for higher levels of access.

In this organisation, it is not only traditional data that is stringently managed – it is also contacts, email trails and communication logs. Compliance and regulation demand a high level of control and scrutiny, and corporate knowledge management procedures help enable this.

Management of the information network is outsourced to a reputable third-party organisation and security, service and consistency are all maintained by a consortium of consultants, network providers and software developers within the third party organisation (which is paid an annual retainer for its services, and handles several accounts similar to this – indeed, outsourced data handling has become something of a booming business).

IT and communication systems are well-linked globally as well as regionally. The system is partially bespoke to the organisation, but due to the sheer scale of the linked databases, standard systems have been used as a core. Many are built on top of open source applications. Individual devices across the firm are allocated according to job function. Drug development pharmacists communicate with their peers across the globe about new research findings, and top-level management executives are connected via their own mobile devices such that they rarely need to travel the world in order to come together.

Devices are owned by the organisation and usage protocols are strictly enforced. Personal use of devices is in theory acceptable for mobile workers, but there are no privacy rights and all communication is accessible to and monitored by the organisation, such that in practice, personal communication is kept to a minimum. In some cases, employees' actual movements are tracked via GPS and these movements logged and available for the relevant parties to see.

Employees work reasonably flexibly. There is some freedom in terms of location and time of work, facilitated by mobile technology. This allows for a degree of work-life balance for those who are able to manage their schedules, but the reality for mobile 'knowledge' workers is that work and personal life have become blurred. They feel (and indeed, are) 'always on' and at the mercy of the bleep of their mobile device. The pressure to be in contact with colleagues working on the other side of the world combined with the increasingly competitive environments (both internal and external) means that 'always on' is well accepted. Expected response times to communications have now shortened to under an hour, and indeed when somebody does exceed this, there are grounds for unease on the part of employers.

The organisation recruits from a global talent pool, not limited by geographical location. This has resulted in a diverse and dispersed workforce, with the official

location of office premises sometimes being rendered irrelevant – although in areas such as R&D, where face-to-face working is essential, place still matters. Members of some ‘teams’ may not meet more than a couple of times of a year, and yet still work in close collaboration. It is difficult for the organisation to embed the corporate values and culture that used to exist in offices, and the lack of real relationships in the workplace can prove isolating and un-motivating for some employees. Even those who are office-based, ‘hot desk’ in large buildings and do not build up long-term relationships.

As an organisation that is based on a strong, long-standing brand and reputation, recruitment and retention of young, bright individuals has become an increasingly arduous task. The dimensions of popularity have shifted, and being a ‘big brand’ is no longer sufficient to attract high calibre candidates. They often reject outright the rigid control and corporate culture, seeking real work-life balance, or veering towards the new public value companies whose ethical positioning is more than CSR spin. Yet there are always some employees for whom the financial rewards of this organisation is a sufficient draw, despite the demands on their personal lives.

While face-to-face contact within the organisation has decreased, relationships with clients remain crucial. The widespread introduction of ambient intelligence has meant that business travel is revolutionised. All aspects are pre-arranged within existing loyalty arrangements, and the process is wirelessly automated. Air travel, passport control, visas, car hire, navigation and hotel check-in all happen without personal interaction – efficient but soulless.

4.2 ‘Adhocracy’: Build Up, Break Down

Key characteristics:

Diffuse working relationships with power concentrated in a cell of one to five individuals. Creativity and public image are crucial to success. The organisation is built up and broken down on a project-by-project basis. Technology is constantly reconfigured in tandem with the organisation’s fluid working patterns, allowing for interdependence among independent contributors.

The ‘adhocracy’ is typically a creative organisation. Take, as an example, a small media design consultancy. It deals in the circulation of artistic and intellectual products, selling advisory services and creative thinking.

At the core of this organisation is a small cell of people, around whom are ‘floating’ contributors who are brought in on a project-by-project basis. These contributors are enlisted for their expertise and experience, and often have specialist skills that are particular to the project in hand. As a result, the same contributors might only be called upon once or twice per year by the organisation, but they are rarely without work.

The adhocracy openly rests its credibility on the quality of the people it can call on from this network of relationships. The workforce is fluid both in terms of time and location: the staff roll (but you can hardly call them ‘staff’) changes dramatically week on week, but this doesn’t disrupt the atmosphere in the workplace, because there is no workplace.

The majority of contributors work part-time from their own preferred locations – home, cafés, or abroad. This suits them because they can fit their assignments around the rest of their lives – their families, holidays and interests (and many of their interests overlap with work). They also find the flexibility an advantage because they can work when they are at their most creative – something they never used to be able to do when based in an office.

For most projects, contributors are physically unconnected to other parts of the organisation. The adhocracy is made up of disparate groups which, despite being well-connected electronically, may never meet. Once a creative contribution has been made, ‘employees’ go elsewhere – working independently or for other adhocracies that come from their ever-evolving network of contacts.

Because it offers the combination of flexible relationships and working arrangements, and also relatively interesting assignments, the adhocracy is able to lure highly qualified contributors, and it is this that gives it its competitive edge. Despite the flexibility offered to individuals, adhocracy work offers little by way of a work/life balance. People never expect to switch off completely at the end of the day (whenever that may be). Rather, the creative element of the work

defines contributors' interests and commitments, and there are few personal and professional boundaries.

Not all adhocracies are well managed. With only a small core of permanent staff, the organisation is often seen as a dictatorship, and the creative designers at its hub lack management skills. The experienced office manager is seen by some adhocracies as a luxury, but by others as a distinct source of competitive advantage.

The adhocracy has the ability to track its contributors down both ahead of and during projects, and there is streamlined multi-site collaboration that operates on a secure, efficient communications system. Project contributors depend upon one of the 'hub' workers to direct and edit final products and designs.

Slick communication is vital to its success and employees share a well-established, specialist language which allows them to work together in meeting goals. The exchange of ideas is central to production. Because employment is mostly freelance, technology frameworks have been put in place that allow for connections to be made quickly, for project networks to be established, and for links to be broken down just as fast once the work has been done. It is the technology that allows the adhocracy to work on an 'ad hoc' basis, and the technology now operates almost completely in secure online spaces. There is little IT infrastructure beyond storage. This is a world of wireless and broadband.

The adhocracy's technology creates and recreates teams by adapting and incorporating new employees' mobile identities into its system. Project platforms are only temporarily deployed. Links are located and created between collaborators, and then pulled quickly into team frameworks.

Because of the atomised nature of the workforce, 'employees' do not have common values, etiquette or working habits. They do however gravitate to organisations whose values are in line with their own, and consequently end up working in ways they are used to, alongside others who are similar to them. The adhocracy's leaders enforce certain constraints upon individuals, but the flow of ideas and practices is two-way, meaning that the organisation effectively 'learns' from its workers, evolving with the flow of employees.

4.3 Multi-layered organisation: Information Flow

Key characteristics:

Flows of information are two-way, both from users (consumers and citizens), and from the organisation. Information has enabled the emergence of an anticipatory approach to service provision. People have control over their own data, but that data is monitored more closely than ever before.

Imagine what a regional public service provider might look like in 2016 if it embraced the potential of ubiquitous data. For the sake of contrast, think of a health service organisation involving local, regional and national levels. Inevitably, the flows of information are central to the emergence of a truly multi-layered organisation.

The service provider of 2016 concentrates on predictive contact or intervention – keeping people connected proactively, rather than responding only if, and after, they are contacted. It is seen as more cost-effective than playing catch up with service users.

At the heart of this organisation is a new contract between service providers and users. Users consent to updating their personal data (income figures, health or lifestyle information) from the comfort of their own homes, at least once a fortnight. It is a condition of service provision and it takes no time at all. In exchange, behaviour and needs are monitored; there is 'light touch' intervention when the system throws up an exception or other signs of extreme behaviour. In the healthcare example, a phone or video message will pop up when people seem to be living too hard for their own good – or when they have forgotten to purchase an essential item, or meet a personal deadline.

Of course this has its disadvantages: you do not want to send your service providers data that might limit your eligibility for services, or lead to criticism of your behaviour, but people have got used to managing that. The more serious issues are about people whose lifestyles are irredeemably unhealthy; the smokers,

the drugs users, those who do not provide their personal information, or alter it. There comes a point when they are simply excluded from the system.

But there are also big advantages. If you have significant needs, the quality of the relationship between citizen and state is far higher than it ever was before, for two reasons. The first is that services know where to find you, and know your complete history, almost as soon as they reach you. The other is that the great volume of data which is now available has created new opportunities for social research and analysis.

Information has replaced all of the traditional service provision models. There is still great demand within the system for personal contact and personal support. The availability of data and information has resulted in benefits for employees: a wider range of people involved in outreach, and in some instances, the return of specialists. There is a complex system of sign-off and approvals, however, to reduce the risk of litigation.

A second trend, which some say is going 'back to the future' is that much more care is occurring locally, in smaller, less capital-intensive buildings closer to people's homes. Some of this transition was forced upon organisations by the impact of climate change, meaning that people can no longer drive long distances when they needed extensive consultation. But localised service was made possible by the fact that the data and analysis was everywhere within the network, thanks to the use of mobile data.

One of the issues which took time to resolve was who controlled the data. At first, it was managed by the state, but there were too many mistakes. Now people are allowed to look after their own data, they spot mistakes faster, and it has generated more trust in the system.

The performance metrics for these organisations are no longer based on response-based information (such as waiting times), but on whether the overall level of need among service users is falling. Information and diagnostic tools have almost done away with the idea of the consumer. Instead service providers track what is happening to individuals, and within communities, and intervene before the moment of personal need, not afterwards.

5. Conclusion

Organisations of the future will be hugely different from those of today in terms of what they do, how they function and how employees work within them. One of the main facilitators (and some say, drivers) of this will be the advancement of technology, and more specifically, the development of mobile data solutions that enable people to do things 'on the move'.

There is already a range of products and services that allow business users to check emails, connect to the internet, send data files and perform more complex operations from outside their company premises. 'Mobile data' is not a new concept. But despite this, many organisations are at a very early stage on the adoption curve. Forty-one percent of organisations provide their commuting office staff with no form of mobile device whatsoever. Indeed, the level of technology adoption in general is low; a third of UK businesses surveyed by Henley Centre HeadlightVision do not even have their own company website.

End users within organisations are wary of new technologies, particularly ones that change the way in which they work – as mobile solutions undoubtedly do. There is reluctance to adopt the 'always on' lifestyle that is seen as the result of carrying around a permanent connection to the office.

Decision-makers in small organisations are poorly informed of the technical solutions on offer, and as a result suffer from 'device fixation', pouncing on the first product they hear about without thorough assessment of the alternatives. In contrast, those in larger organisations are better-informed in this respect, but tend to be less aware of the genuine needs facing their users, and consequently, make decisions that are not optimal for their business.

Take-up of mobilising technology has thus far been patchy. There are sectors where adoption has been rapid and mobile technology is already relatively entrenched in the operation of organisations (professional services and utilities being just two key sectors). There are also sectors that have been left almost untouched by the introduction of such technologies (particularly in the case of small businesses).

Despite this uneven pattern of adoption, it is apparent that mobile data will play an important part in the future of our organisational lives. We will see some dramatic changes in the way we lead our lives – in work and at home, as well as in between.

There will be a blurring of the 'work' and 'home' life, with elements of each leaking into the other thanks to the use of mobile data. We will have to learn a new discipline, switching between 'on' and 'off' mode at appropriate times, where 'on' represents your businesswoman identity and 'off' represents your persona as a mother or equivalent.

The world will become 'digitised', with employers and employees speaking a language of digital rights. Information will become more freely available but there will be strict rules governing the transferral and use of it. Privacy, intellectual property and accountability will be important issues for organisations in 2016 and will represent big business for third parties.

Many elements of the workplace as we know it today will be unrecognisable in ten years' time. In some cases, the 'workplace' will cease to exist altogether, and employers will have to take care to prevent isolation of employees – either through poor technological literacy (the 'digital underclass') or through lack of human contact caused by digitisation of communications.

The organisations of 2016 will fall into broad categories just as organisations do at present – divided by their function, size and structure. Use of mobile data within these organisations will be extensive but will vary in form according to these divisions. Multinationals will implement large-scale rollouts of mobile services in order to improve organisational responsiveness, agility and innovation. Large 'multi-layered' service providers will employ mobile technology to engage in two-way information exchanges with consumers and citizens, facilitating an anticipatory approach to service provision. There will also be small, 'ad-hoc' organisations that operate on a project-by-project basis, using mobile technology to link disparate contributing groups and individuals.

'Mobile data is here, and here to stay. In the future, as work itself becomes more mobile and working patterns continue to change, this mobility becomes both an enabler and a necessity'

6. Response by Alan Standley, The global future forum

'Changing attitudes, fundamental demographic trends and the inexorable grind of new technology are conspiring to create a totally new environment.'

Whilst Dr James Bellini was discussing changes in consumer attitudes in the 2005 global future forum survey 'Pulse', the same comment applies to changing employee and business attitudes. This report, Organisational Lives: Inventing the future with mobile technology, goes a long way towards establishing the key drivers for these changes and predicting some of the major implications for the future.

I still feel nervous with an empty briefcase, one not stuffed with documents I might need on a trip. It seems only yesterday when paper was the norm. Then, for many, paper was replaced by a large, overweight laptop, entangled with yards of cables – power, telephone and so on. Today, the technically savvy slip a high capacity, universal hard disk (the size of a cassette) or a USB stick holding their office, into their pocket. A mobile phone/PDA and an internet-enabled PC anywhere in the world, is their office. The fact that all of these changes have taken less than five years to occur is testimony to the exponential rate of technological change.

Mobile data is here, and here to stay. In the future, as work itself becomes more mobile and working patterns continue to change, this mobility becomes both an enabler and a necessity. Writing in his recent book, The Future of Music, Gerd Leonhard writes:

'June 1 2015. Our Universal Mobile Devices are "always on" and we have anytime-anywhere access to music, films, games, books, news, streaming video, on-line banking, stock market transactions, instant messaging, email and chats. It is a global telephone, a digital communication and data transfer device, a GPS, a personal digital assistant... and much more that we haven't gotten around to thinking about yet.'

But there are problems. A colleague of mine in the global future forum is giving a talk to a group of chief executives. His question is '...has the technology engine that has powered business development for the last 50 years finally run out of steam?' The answer, of course is 'No.' The real question today though is '...has business run out of the ability to exploit new technology?' 76% of respondents to a recent GFF survey agreed that '...organisations are unable to effectively manage and deploy new technology due to rapid change and constant innovation.' (GFF Pulse 2005)

In our move into a world of 'always on digital data' we must look to our children – tomorrow's employees and customers.

Today's teenage population, the so-called 'digital natives', are self-assured and highly literate when it comes to technology. They embrace it as an essential part of their daily lives, just as we used to use pen and paper – music, video, pictures, chat, text and the mobile phone, not tools but part of the fabric of their lives. When they come to make their decisions on where to work and who to work for, they will expect business to be using the technologies they use for leisure.

However, there is a downside: security. It was recently reported that the average business laptop held about £1 million of commercial data! As business is beginning to take advantage of data mobility in many different ways – outsourcing for example, the daily war against illegal access to data intensifies.

'If it is to benefit, business will need to understand far more than the mechanics of new technologies. They will need to understand the way that people – their employees and customers, will use and interact with them'

We, as individuals, are becoming increasingly sensitive to the security of our personal data and reacting against its indiscriminate distribution and use. People will demand assurance that they will retain control over their data and how it will be used. Whilst technically data becomes increasingly mobile, so will constraints on its use. Data protection is in its infancy today.

There are countless technologies today on the verge of commercial use, many based on or using mobile data. Some are already used in military and security environments. Readers of near-term science fiction will be familiar with some of these! Some indeed might sound like science fiction – wearable computing, nanotech applications, city- and region-wide WiFi are some examples. Tomorrow, these technologies will be available commercially. All will add to the mobility of data, making it ever easier to work and play on the move. How these (and other) technologies will come together to create commercial products is almost impossible to forecast. We know as well that there will be astounding new developments that today we cannot predict. It was Donald Rumsfeld who said ‘...and we don’t know what we don’t know’ – very true. The key will be how we, and more importantly our children, embrace new technologies and how they change their lives. Business needs to be watching this space, carefully.

Writing in his book ‘Smart Mobs’ Howard Rheingold predicts:

‘...The killer apps of tomorrow’s mobile infocom industry won’t be hardware devices or software programmes but social practices. The most far-reaching changes will come, as they often do, from the kinds of relationships, enterprises, communities and markets that the infrastructure makes possible.’

If it is to benefit, business will need to understand far more than the mechanics of new technologies. They will need to understand the way that people – their employees and customers, will use and interact with them. In their 2005 report, *Working in the Twenty-First Century*, Michael Moynagh and Richard Worsley conclude:

‘There will be dramatic changes in how people work. Today over five million people, almost a fifth of employees, spend some time working from home or on the move. Mobile workers, who work in a hotel, an airport lounge, or a motorway service station, will be one of the fastest growing groups of employees. New techniques to manage these workers will transform how employees are supervised.’

‘The killer apps of tomorrow’s mobile infocom industry won’t be hardware devices or software programmes but social practices. The most far-reaching changes will come, as they often do, from the kinds of relationships, enterprises, communities and markets that the infrastructure makes possible’

Appendix: Methodology

This Guideline is based on the findings of a six-month study by Henley Centre HeadlightVision for Orange Business Solutions in 2005/06, which looked at the impact of mobilising technology on the enterprise. The project was comprised of four parts:

1. Formation of the Orange Future Enterprise Coalition (OFEC)

OFEC is a group of individuals from a range of business backgrounds whose attendance at regular meetings generates cutting-edge thought leadership on the future of the enterprise. Members include academics, journalists, consultants, lawyers, public sector representatives, business decision-makers, business users and industry pundits.

The range of backgrounds and combined breadth of experience within the coalition makes OFEC a powerful body, and much of the content of this paper is derived from the output of discussions held in OFEC meetings in workshops or with individual members. OFEC will continue to generate insight into the future of mobile technology. A full list of members is given below:

Robert Ainger, Orange	Alan Harrison, Yorkshire Water Co.	Louise Potter, The British Chambers of Commerce
Stuart Brough, Strathclyde University	Charlotte Lacey, Henley Centre HeadlightVision	Andrew Rook , SHL Group
Alex Butler, DirectGov	Peter McInerney, Sheridans	Mark Taylor, Avanade
Polly Courtney, Henley Centre HeadlightVision	Paul Miller, Demos	Phil Whitfield, Kings College London
Andrew Curry, Henley Centre HeadlightVision	Nico Macdonald, Spy	Kay Winsper, Siemens
Mark Curtis, Fjord Consultancy	Rebecca Nash, Henley Centre HeadlightVision	Tunc Yorulmaz, Accenture
Tony Gerrard, DTI	Duncan O’Leary, Demos	
Karen Gill, Everywoman	Shaun Orpen, Orange	

2. Secondary research

Several sources, including the existing Henley Centre HeadlightVision knowledge base, were exploited in order to build up a picture of today’s organisations in terms of how they use mobilising solutions, why some do not, where they are on the adoption curve for various technologies and what they are planning for the future. Many of these sources are referenced throughout the report; some are touched on in the literature review (Section V) and others contributed to opinion and thinking but are not referenced directly.

3. Qualitative research

In order to gain an understanding of the ways in which mobilising devices are used in the workplace, Henley Centre HeadlightVision conducted in-depth primary research on six business users from a range of organisations. Participants, all of whom used some form of mobilising device for their job but whose roles and positions varied widely, were shadowed for a day and questioned on their use (or otherwise) of mobile data. They were also asked to fill out a ‘time diary’ for a typical day, which noted every instance in which they employed or could potentially have employed the use of mobile technology. Research participants were as follows:

- Head of Projects, HSQE, Tubelines
- Telecoms Manager, Tubelines
- IT Engineer, Tubelines
- Director of IT, Strathclyde University
- Head of Information Resources, Strathclyde University
- Group IT Director, Go-Ahead Group


4. Quantitative research

Henley Centre HeadlightVision commissioned proprietary research for a telephone omnibus survey that went out to 550 business decision-makers. This research looked into existing and forward-looking strategies for adoption of mobilising technologies and the reasons behind these strategies. The sample consisted of:

- 300 small businesses (turnover of less than £1m)
- 100 medium businesses (turnover between £1m - £5m)

Henley was founded in 1945 as a place for the development of senior managers in British industry, and as such was the first business school in the UK.

<http://www.henleymc.ac.uk/>



The content of this report has been drawn from a range of sources including the output from OFEC discussions. OFEC's aim is to generate fresh, penetrating insight into the future of the enterprise, society and the economy as a whole, as brought about by the transformative powers of mobile data. Following the release of this publication, OFEC will continue to meet on a regular basis. The next topic for discussion will be decided by members. For more information about the Coalition, please contact:

- Jenny Thorpe – Orange Business Solutions, UK: 0870 3731750
- Polly Courtney – Henley Centre HeadlightVision: 020 7955 1847



The National Computing Centre
Oxford Road
Manchester
M1 7ED
www.ncc.co.uk/principia
e-mail: principia@ncc.co.uk

Principia 