Digital Inclusion

A discussion of the Evidence Base

Prepared for UK online centres

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Foreword

For as long as we've been talking about digital, we've been talking about divide. And perhaps that seems to some to be rather passé - yesterday's news. Surely digital inclusion is an old, tired and not terribly urgent or interesting problem? Some people are using ICT, some people aren't. What more can there actually be to understand?

That's where this research comes in. For the first time it gathers together and analyses information from more than 80 sources - research into digital skills, ICT usage and internet penetration from the Office of National Statistics, Ofcom, The Oxford Internet Institute, and different government departments to name but a few. I believe the result is a unique view of the true face of digital inclusion today.

In 2007, digital inclusion is not the transitory problem it was once thought to be. Many people have assumed the digital divide was actually an issue of age, and the digitally excluded would therefore drop (dead) out of the equation if we all just had enough patience. But longer life expectancy means a lower rate of demographic change. Age is in fact something of a red-herring. Not all older people are ICT illiterate, just as not all young people are ICT literate – 11% of 16 to 24 year olds are in fact digitally excluded. There must be something more complex at work.

Technological change has been grasped by other digital divide doubters as the *key* to digital inclusion, rather than a factor of exclusion. Given enough time, they say, market forces will naturally close the divide, with digital television and mobile-phone internet connections mopping up the late-adopters. Not so. The truth is web take-up has plateaued, with no more people using the internet now than were using it in 2004. In addition, less than 1% of mobile phone or digital television surfers aren't already regular internet-users from the comfort of a computer terminal.

In short, digital exclusion isn't going away, and it certainly isn't as simple as your common-or-garden generation gap. Neither is it a small problem, with 39% of the population still not taking advantage of the opportunities and benefits computers and the internet can offer. But it isn't just about numbers. In focussing on counting digitally excluded people we do the digital divide the disservice of thinking it a one dimensional issue. One of the most useful models in this research looks at digital divide 2007 not just as a wide problem, but also a deep one. The fact is that those left on the wrong side of the divide today are more deeply excluded, harder to reach and further away from inclusion than ever before. What we've got is a complex, ever-evolving tangle of a divide, one which this research helps to unravel.

The digital divide is still a problem, and it's not going to respond to the ostrich treatment. But why does it matter? Aren't there bigger social, economic and political issues of the day to take up our time and energy? Isn't digital inclusion a bit, well, peripheral? Certainly the digital divide isn't making the headlines in the way education, health, employment and crime do, but I believe it has an underlying impact on all of these areas, and more. Connecting people to ICT skills can connect them to new or better jobs, to new forms of communication and social interaction, to community infrastructures and government services, to information to help with homework, to consumer power and convenience. It can save people time and money, open new doors and new worlds. Digital inequality matters because those without the right combination of access, skill, motivation or knowledge to make digital decisions are missing out in all areas of life. And that doesn't just impact on individual lives but on families, communities, on political processes, democracy, public services and the economic and social health of the nation as a whole.

These may sound like very big claims, but this research shows an overwhelming correlation between digital and social exclusion. Indeed, one of the key figures in this report is that a staggering three quarters of people counted as socially excluded are also digitally excluded. That means that people already at a disadvantage – and arguably with most to gain from ICT

- are the least likely to be making use of it and most likely to be further disadvantaged by their non-use. It may sound like a Catch-22, but actually it's an opportunity. If digital and social exclusion are inter-related, positive action on one front can affect the other, and greater equity be the result.

So if the digital divide is both real and relevant, it can no longer be allowed to sit on the periphery of political, charitable and industrial agendas, a poor and undervalued relation to the real work of the day. Far from a red-herring, this is a big fish. Digital inclusion is relevant and important to all sectors. For government there are social, financial and economic benefits, for the third sector added philanthropic value to their current work, and for industry the chance to sell to *new* customers rather than just selling more to existing ones.

For me, this research report is a line in the sand, a chance to shake-up the digital inclusion status quo, and a platform from which to call for a step-change in how the public, private and third sectors interact on inclusion. While the efforts of all three to date should not be underestimated, by working alone none have achieved the level or consistency of change now obviously needed. To move forward, we must pool resources and expertise. If we can share the load and work together there are very real gains to be made.

This report pulls together a vast amount of research and knowledge which has already fed into the Digital Strategy Review, and I hope it will help to shape future thinking on digital inclusion. A new understanding of what it means to be digitally excluded and the factors at work in exclusion gives us new reason, impetus and ammunition to achieve digital equity. We not only know how many are affected, but how excluded they are, what excludes them, where, and why. That knowledge gives us the tools we need to take action.

To set that process in motion, I have taken the evidence from this report and from the wider work of UK online centres, and put together five next steps for consideration.

1. Greater co-ordination through a digital inclusion 'task group': Perhaps the most compelling evidence for cross-sector synchronisation is the bibliography at the end of this research. Fragments of digital inclusion expertise, best practice and insight are scattered far and wide. These must be brought together if the cumulative experience of different organisations, agencies and departments is to make a real difference to the divide. A digital inclusion task group or agency should be set up to start planning, collaborating and acting on digital inclusion. Defining and agreeing areas of focus will be key. An obvious split would be for industry to target the digitally determined, and government and third sector organisations to focus on the harder-to-reach – people who are both socially and digitally excluded.

2. Clearer ownership within Government: Government policy in the area of digital inclusion currently sits across several departments, separating social exclusion, skills development and transformational government. Clear ownership of digital inclusion issues in government must be established so that investment can have measurable impact and the work in partnership with industry and third sector partners can be co-ordinated. A new Government strategy for digital inclusion would provide a focus for action, measurable targets, and investment to obtain the step change that is required to reduce exclusion.

3. Greater opportunities to share best practice: The sharing of best practice should be achieved through an online portal or forum, getting the agencies, companies and departments involved in digital inclusion talking. Setting up and hosting such a forum should be a priority for the digital inclusion community.

4. Further research: Understanding soft impacts and the social effects of digital inclusion is a key area for further research. Certainly future research must co-ordinate how figures from different organisations are collected and collated to achieve an accurate picture of digital inclusion. Working together, a task group has the opportunity to commission research to help further understand, segment and target the complex digitally excluded audience. Why, for instance, do people *stop* using the internet? How could we find out what non-users might

want out of ICT, to help market its benefits? How big are the financial and other benefits to individuals or the state of digitally including excluded citizens? How do these benefits compare with the cost per head of engagement?

5. Partner campaigns: All sectors should work together to promote digital inclusion through consumer campaigns. Co-ordinating activity could help us engage with more hard-to-reach groups, and raise general awareness of the benefits of being online.

These five steps won't necessarily be easy to implement, but I believe they are necessary. While there is clear leadership recommended for the Government, this must be backed by co-ordinated support from the private and third sectors. At UK online centres we commit our ongoing support to help decrease the digital divide, and increase digital inclusion and social equity. I look forward to the feedback, suggestions and corresponding pledges of cross-sector colleagues both to this research and to my suggestions for future action.

Helen Milner
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UK online centres

Introduction

Background

The research underpinning this report was commissioned by UK online centres in order to review the available evidence pertaining to issues of digital inclusion and the digital divide. This report aims to inform the debate led by the Digital Strategy Review team, and has several aims:

- To assess the current evidence base on digital inclusion and the digital divide
- To discuss the how digital inclusion and the digital divide are currently conceptualised
- To explore and evaluate the existing frameworks for measuring digital divide
- To profile the segments of the population affected by digital divide
- To discuss the factors which may influence the future evolution of digital divide
- To examine the case for market failure and public sector intervention to bridge digital divide
- To suggest some ways of addressing gaps in the current evidence base

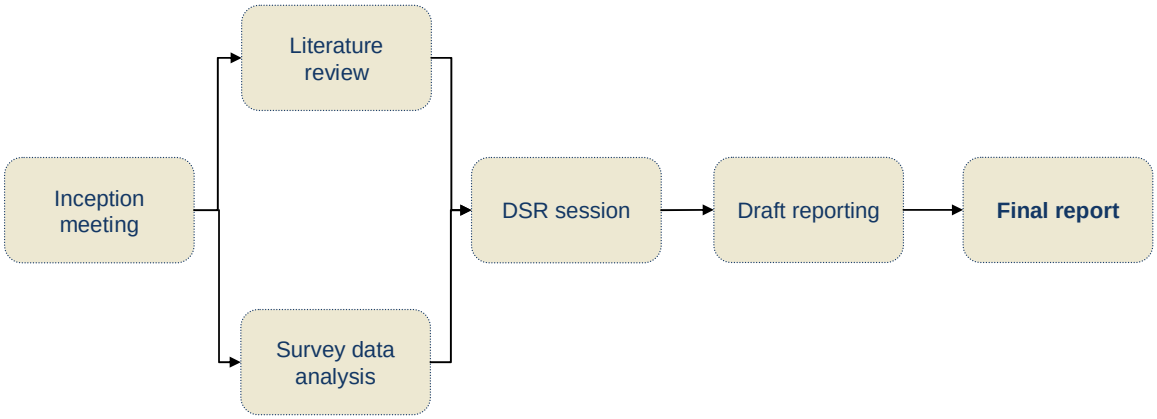
Approach and methodology

The data for this report has been collected through an extensive literature review of over 80 sources on digital inclusion. FreshMinds assumed an iterative approach to the review using bibliographies of core texts to identify further sources, and referring for guidance to experts in the field in order to get an idea of relative weight and robustness of the emerging evidence.

This approach was combined with an in-depth analysis of the available survey data, which was used in order to segment the population based on the patterns of use (and non-use) of the internet and determine the relative size of each segment. To this end, FreshMinds used two datasets: the **Oxford Internet Survey**, which was then supplanted by the **ONS Omnibus Survey**. While the former was of great direct relevance, the latter offered larger sample sizes and therefore more robust breakdowns of the data.

The initial set of findings was presented during a peer review session organised by UK online centres in London on 8 February 2007. The discussions of this session were subsequently used to refine the findings of the research, and fed into the final drafting of this report.

The draft version of this report was then reviewed by senior experts in the field, and their comments were incorporated into this final version. The diagram below summarises the research process.



1. Headline findings

Key findings of this report indicate that:

- Despite developments in technology the uptake of ICT has largely plateaued.
- Access to ICT is not enough – a proportion of non-users of the internet reside in connected households.
- There is a demonstrable correlation between social and digital exclusion.
- Digital exclusion is unlikely to be adequately addressed in isolation from other policy areas.
- A significant proportion of the digitally excluded is at risk of deepening its exclusion.
- Penetration by market forces is unlikely to eliminate digital exclusion.
- Digital exclusion is also unlikely to be disappear over time through by demographic developments.
- Extending digital inclusion can have tangible beneficial impact for national productivity and GDP (Gross Domestic Product).
- All sectors (public, private and the Third sector) must work together to address digital exclusion.
- The current focus of private sector organisations is on easy-to-reach groups, while the government policy in this area is spread across several departments. At the same time the leverage of charitable organisations working in this area is limited without additional recognition, funding and support.
- A starting point could be to urge the major players to publish their contributions to alleviate digital exclusion. This could serve as a platform for developing a coordinated and measurable action plan for tackling the challenges of digital exclusion.

2. Why be concerned about digital inclusion?

Summary

Digital technologies can and do assist people in their daily lives. The widespread adoption of technologies raises the question of why significant numbers of people are still not engaged with new technologies. The fact that these unengaged people are frequently also at risk of social exclusion presents a challenge for public policy: evidence suggests that socially excluded people often have as much or more to gain from new technologies as anybody else.

2.1 Benefits to individuals

The accelerating adoption of information and communications technologies (ICT) in the workplace and in everyday life is having important impacts on the lives of the majority of people in the UK. Those who are able to communicate, interact and transact through ICT can benefit in many ways, including:[1]

- Facilitating **communication** – allowing people to stay in touch more easily, more cheaply, and in new ways.
- **Consumer empowerment** – more convenient, cheaper retail opportunities have become available, with a greater range of products available, and more information and price transparency.
- Easier **access to information** of all types – from public-sector service providers, private-sector companies, voluntary bodies, or social or community groups.
- Reducing the burden and costs of **transacting** with service providers.
- Improved **productivity** at work: the majority of jobs now require some use of ICT. Technology is also helping to make the workplace more inclusive, with better opportunities for flexible working, homeworking, and improved access for disabled people.
- Making and maintaining contact with interest groups.
- Improved access to **learning opportunities**.

Rapid growth in the use of digital technologies in recent years indicates that large numbers of people are convinced of these benefits, and take advantage of them in their day-to-day lives. For example, nearly nine out of ten adults in the UK own a mobile phone, and six out of ten use the internet (Ofcom 2006; ONS 2006a). The UK e-commerce market grew to over £100 billion in 2005, accounting for 5.5% of the total sales of non-financial sector businesses (ONS 2006b).

It is perhaps surprising, then, that there are still large numbers of people who do not make full use of ICT. The observation that non-users tend to be also among socially excluded groups has concern for the digitally excluded in society, and is why HM Government has adopted a Digital Strategy (PMSU/DTI 2005).

In principle, socially excluded people have as much or more to gain from effective application of digital technologies as anyone else: *Inclusion Through Innovation* (Social Exclusion Unit 2005) highlights that ICT can help individuals to 'address some of the key drivers of social exclusion', including:

[1] This list draws largely on *Enabling a Digitally United Kingdom* (Cabinet Office 2004) and *Inclusion Through Innovation* (Social Exclusion Unit 2005).

- Early years disadvantage
- Educational underachievement
- Worklessness: with easier access to information on employment opportunities
- Homelessness
- Health and health inequalities: improved access to advice and treatment information (Cabinet Office 2004, p. 21)
- Crime and being a victim of crime
- Reducing isolation, especially for those with mobility problems, or people who feel confined by geographic communities (Loader & Keeble 2004)

In this paper, we focus on the use of technology, either directly or indirectly, to improve the lives and life-chances of people and the places in which they live. The particular focus is on the use of the internet as the most interactive ICT, which is justified in the context of the relatively low uptake of interactive features of other technologies, for instance digital television (IPSOS Mori 2006).

2.2 Wider benefits

Aside from the benefits to any individual, increasing adoption of ICT can have important impacts on society as a whole:

- Improving social cohesion (Davies 2004)
- Facilitating and reducing the cost of delivering public services (Varney 2006)
- Improving the UK skills base, and particularly the potential of businesses to make productive use of ICT – which in turns leads to an improvement in productivity, economic competitiveness, and therefore economic growth (PMSU / DTI 2005)

We will examine these issues in more depth in section 7 of this paper.

3. What is digital exclusion?

Summary
This is not a simple question to answer:

- There is no single, simple way to understand digital inclusion: there are differences in usage for various technologies, and in different dimensions.
- These differences are also relative: the increasing use of a technology by others in society tends to increase the exclusion of those without.
- Digital inclusion policy would ideally focus on capabilities: enabling people to achieve the functions they require in their lives.
- In this research we typically measured the usage of technologies as an indicator of these functional capabilities.
- The digital exclusion is not only about use of computers and the internet – but the lack of engagement with the internet presents uniquely complex difficulties which make it of particular concern

3.1 What is meant by digital exclusion?

There is a wide variety of perceptions about what is meant by the term 'digital exclusion', and what the most important features are. Studies of digital inclusion and exclusion have highlighted differences in:

- **Access** to equipment or connections – which can be considered as ownership of a technology or having a connection at home (eg. BT 2004), availability of a connection at convenient locations in everyday life (eg. UK online centres/Simpson Carpenter/Regeneris 2006) or having access to the internet anywhere, including public access points.

- **Capability** to use information technologies – since unmet primary needs may present barriers to effective use: literacy difficulties, for example, make use of the internet problematic, and some disabilities may present challenges.

- **Engagement** with technologies – including perceptions of the relevance of ICT to individuals' lives (van Dijk and Hacker 2003) and expectations of what sort of interaction is possible (Cabinet Office 2004).

- **Use** of technologies – whether differences of degree, quantity, or quality of use (Liff and Shepherd 2004; Cullen, Hadjivassiliou and Junge 2006). Differential usage of ICT is arguably an even more significant factor than differential access (van Dijk and Hacker 2003; Hüsing and Selhofer 2004).

- **Skills** in using technologies – for example, the Riga Ministerial Declaration focuses on 'digital literacy and competence' (EU 2006).

- **Confidence** in using technologies – particularly for those without family members of friends from whom they are able to learn (Foley *et al.* 2003).

- Application of **creativity**, in the sense of being able to interact effectively and flexibly with technologies – this is particularly important for promoting confidence and self-esteem among users (Loader and Keeble 2004; Carey 2007b).

- Finally, all these factors are influenced by **speed of access** for interfacing with ICT. As more and more internet content requires a high-speed connection, there has been talk of a new 'digital exclusion' between those who use fast broadband connections and those who have only slower, dial-up access (Fox 2005). Internet users with broadband connections (in the US, at least) use the internet more and in more sophisticated ways than those without – particularly in terms of creating new content (Loader and Keeble 2004; Horrigan 2006).

There is, then, no simple way to describe or measure 'digital exclusion': these issues form 'a complex web of interconnected social, economic and cultural factors' (Becta 2001). Differences in each of these factors are gradual: there is no simple divide between 'haves' and 'have-nots' (Warschauer 2002; DiMaggio *et al.* 2004).

Further, differences in digital inclusion and exclusion are *relative*: the importance of making effective use of ICT depends significantly on the extent to which the rest of society are using those technologies (van Dijk and Hacker 2003). For example, as using e-mail for written communications increasingly becomes the norm, it may become more difficult to contact public or private bodies by telephone, by letter, or in person. There are already a range of retailers who sell only via the internet, and – due both to their lower overheads and the intense competition created by enhanced price transparency – at lower prices than traditional retailers are able to do. Those without use of the internet, then, are already finding the cost of books, music and air travel to be relatively higher (in price and perhaps also in transaction costs) than internet users. These differentials are likely to increase over time, as those who can make effective use of ICT take advantage of the greater convenience of the information society, leaving those without behind.

From that perspective, we are interested not just in the *width* of any digital exclusion (which we can think of as the quantitative difference between those who are included and those who are excluded), but also with the *depth* (the severity of exclusion for those who remain excluded).

Figure 1: Reducing digital exclusion risks deepening exclusion for those who are left behind

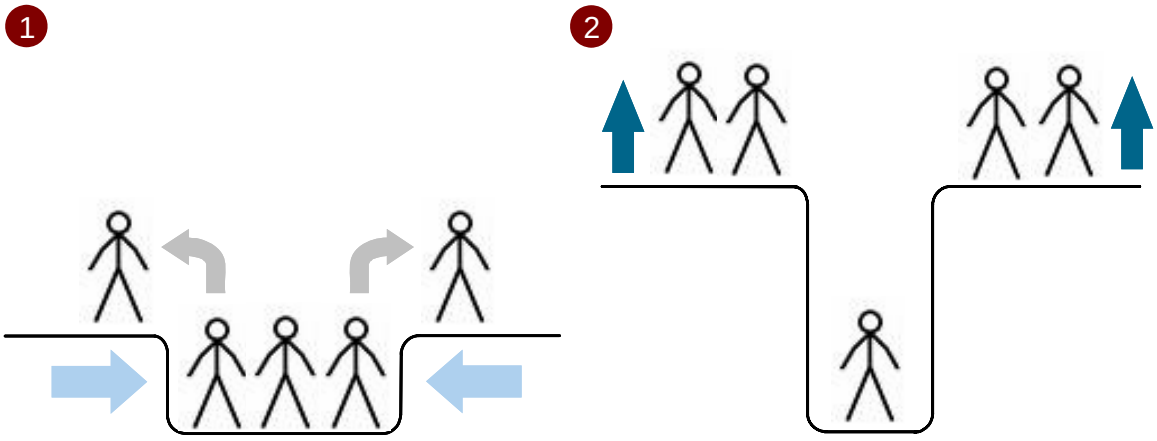


Figure 1 illustrates graphically that, as more and more people become digitally included, the remaining excluded people will fall further behind the rest of society. The severity of their exclusion will deepen – meaning that they will miss out on the convenience, reduced cost of living, increased access to social networks, and access to employment opportunities which ICT can enable.

Another factor of digital exclusion could be said to be the rate of technological change itself. Already, new Web 2.0 and social networking technologies are transforming the internet into something that isn't just passively consumed but actively produced by its users. As technology advances, there are more steps added to the digital journey of non-ICT users. Those without the skills to operate a mouse or use a keyboard have even further to go to

reach what increasingly constitutes 'inclusion'. Indeed, even those with basic ICT skills must keep developing their knowledge or risk being left behind.

One example of this happening in practice (though on a small scale) is provided by the pilot 'wired community' development conducted in the suburb of Toronto known as 'Netville' in the late 1990s. In the course of that project, the majority of residents were given free high-speed internet access, while a minority were not connected. In-depth study over the course of two years found that those residents who were connected to the network had increased social interactions: they knew three times as many of their neighbours, talked with twice as many, and visited 50% more of their neighbours than those who were not connected. Those without connections appeared to have been, to some extent, left behind as the rest of the community came to know each other through a communal email list (Hampton 2003; Davies 2004).

3.2 What needs to be measured?

From a policy perspective, we are less interested in the take-up or use of technologies themselves than the impacts which they have on peoples' lives.[2]

An ideal method of evaluating digital inclusion and exclusion would concentrate on capabilities: whether people can achieve certain tasks, whatever their means of doing so. For example, to understand the extent to which an elderly person benefits from ICT and whether they could potentially benefit more, we would like to know how easily that person can, for example:

- do their grocery shopping
- stay in contact with friends and relations
- access information about their pensions and benefit entitlements
- make applications for benefits to which they are entitled
- access medical advice and treatment.

Each of these functions can potentially be achieved in a variety of ways: for example, pensions information can be obtained by phoning a helpline, visiting a Citizen's Advice Bureau, looking up information on a Department of Work and Pensions website, or asking a relative to look at the website on their behalf. Each of these methods could potentially result in success in finding the information required. It is the *outcome* which is of interest, rather than the means by which that outcome is achieved.

ICT can provide potential means of achieving these outcomes: a telephone can enable someone to call an enquiry line to request information, and an internet connection to search for that information on a website. In general, those who do not have access to some or all ICT have fewer potential ways to achieve these outcomes. Further use of ICT may enable people to achieve these outcomes with a smaller transaction cost than by other means – in terms of time, convenience, or travel costs.

It is important to note, though, that for the service provider, the means of delivery is of crucial importance: services provided face-to-face are likely to be much more expensive to deliver than using a 'one-to-many' system, such as an interactive website. There may therefore be efficiency gains to be made from increasing the use of ICT in service delivery.[3]

3.3 Which technology?

[2] Section 3.2 particularly draws on comments made by participants at the UK online centres Digital Strategy Review workshop on 6 February 2007, to whom the authors are grateful.
[3] Again, this point will be discussed further in section 7.

This paper will use the terms *digital technologies* and *ICT* interchangeably to refer to all technologies which enable users to communicate, interact and carry out transactions remotely. This definition includes not just the internet and personal computers, but also telephones and new interactive technologies, including digital television.[4] *Inclusion Through Innovation* highlights that, for many people, the telephone is still (and will probably remain) the preferred method of getting in touch with service providers (Social Exclusion Unit 2005). Innovative use has been made of 'blended' transactions, using a combination of telephone and internet to interact with service users to maximum effect (Carey 2007a).

In spite of this, discussion about 'digital exclusion' has tended to focus almost exclusively on the use of internet via conventional personal computers. Some of the reasons for this are circumstantial – one is that research has often been conducted on behalf of computer industry firms which are not active in telecommunications markets (eg. EIU 2006, Intel/Gov3 2005). There are, however, a number of arguments for treating the internet as a particular special case:

- Other ICT, including the telephone and television, have achieved much **wider coverage** than the internet. Significant minorities were always excluded from telephone landlines (Speak and Graham 2000), but penetration of mobile phones has been high even among socially excluded groups: mobile-only households are concentrated among those with low income (Ofcom 2006). Conversely, internet penetration among groups at risk of social exclusion is much lower.

- Those who do not own a telephone are at least aware of the **costs and benefits** of ownership. Non-ownership is mainly what Ofcom define as 'voluntary' (Ofcom 2006): it is the result of an informed assessment of the costs and benefits. In contrast, non-users of the internet may not have a clear idea of what the internet is and how it is possible to make use of it.

- Use of a personal computer requires a **specific set of skills**, which are not trivial to obtain. It requires more time to learn to use a computer and find information on the internet effectively than it does to learn how to make a call on a mobile phone.

- Basic computer skills may be becoming increasingly important to **employability**, since employers increasingly see these skills as the employee's responsibility, rather than something that should require specific training (Leitch 2006; Longley, Li and Webber, in press). This point, however, is questionable: the most extensive study on the recruitment of unemployed and inactive people suggests that 'overall, employers are less demanding of technical skills, considering them trainable, if candidates exhibit employability, soft skills, and positive attributes' (Newton *et al.* 2005). The National Employer Skills Survey has found that, of the skills shortages experienced in recruiting staff, very few employers identified general IT skills as a significant problem. Much more important skills shortages were experienced in technical and practical skills required for specific jobs (other than IT), followed by 'soft skills' including customer handling, communication and problem solving (LSC 2006). Evaluations of the effectiveness of UK online centres, for example, have found that the context and structure in which ICT training is provided is an important factor in affecting clients' employability, rather than purely the skills learned (Wyatt *et al.* 2003, Goodison *et al*. 2004).

For at least the first three of these reasons, it appears that there are much clearer exclusions in the context of the internet and personal computers than there are with other technologies. This paper will largely follow existing research in focusing particularly on the case of the internet, but it is important to remember that this is done in the context of considering the

[4] Following *Inclusion Through Innovation*, we do not consider technologies (such as smart card payment systems and remote health monitoring systems) which may be used to provide benefits to socially excluded people but which do not require any active technical interaction on the part of the user.

impact of digital technologies more broadly – and that the means (the technology) is less important than the impact it has on users' lives.

3.4 Concluding remarks

- There is no single 'digital divide': inequalities exist in many aspects of the application of ICT in society, but these differences are complex and interconnected.
- Digital exclusion is relative: increased take-up of technologies may deepen the exclusion of those left behind.
- For understanding the size and nature of the digital exclusion, we are most interested in individuals' functional capabilities – what they can achieve, rather than how they achieve it.
- However, knowledge about the access, engagement and use of specific technologies may provide an indication of capabilities, since ICT can provide means to achieve desired outcomes.
- There are reasons why discussion has usually focused on the internet rather than other communications technologies – but other technologies also have a significant impact on peoples' lives, this is expected to increase in the future.
- Interactivity is most common with internet use on the PC, therefore this is often the focus of much of the research.

4. Measurement frameworks

Summary

The ideal measurement of digital inclusion would focus on normative capabilities – whether people are able to achieve the functions they need, at work and in daily life. Section 4.1 proposes a framework for this form of measurement.

In the absence of current data for assessing normative capabilities, this chapter assesses the use of technologies as a proxy indicator for functional ability:

- Section 4.2 examines the data for ownership and numbers of users directly
- Section 4.3 examines more sophisticated models for usage, based on consideration of the requirements for access, motivation, skills and confidence.

4.1 Measuring functional capabilities

Carey (2007b) proposes a system to evaluate ICT skills acquisition by measuring the ability of individuals to carry out functions appropriate to their needs. This proposal is focused on skills required for unemployed people to find effective employment in jobs requiring some level of ICT skills. It emphasises the end result (whether individuals have the necessary skills) rather than measuring inputs (how many individuals have passed through ICT training courses).

Carey's proposal is based on evaluating tasks which are normative to specific groups. These groups are:

- Activity-based: centred around employment areas.
- Opt-in: it is the individual who defines his or her membership of a particular group, according to his or her aspirations for employment.

What will actually be measured is task completion against peers: the ability to complete the requirement to a required standard – possibly with a time element included. The definition of tasks requires a clear understanding of the processes required of specific groups, with a focus on the end rather than the means used to achieve it. For example, there may be an automated process for locating customers using a database, but operatives may find that it is quicker to use the back-up card index – it is the end result which is of interest. Task definition should be clear and simple, so as to facilitate this measurement.

Professional bodies already define clear standards for candidates seeking to enter training to become (for example) a doctor, teacher or accountant. Most groups, however, do not have clearly-defined skills requirements. Further, these requirements are usually highly dynamic, as technologies and their applications change. The normative tasks, therefore, will also change periodically, adjusting to the current requirements of the group. Carey proposes that the policy-makers should define a framework for skills measurement along these lines, which would then be taken to employers, trade unions and professional bodies for task definition and implementation.

Such a system would provide a detailed picture of how far the skills of people seeking employment are meeting the needs of the workplace. It is possible to extend these principles to measuring the ability of individuals to fulfil tasks which are normative to interest groups (not only employment-related groups), or tasks which are normative for living in society in general.

This would allow us to understand better the effects which access to or exclusion from ICT actually has on peoples' lives. We will return to this point in section 8.

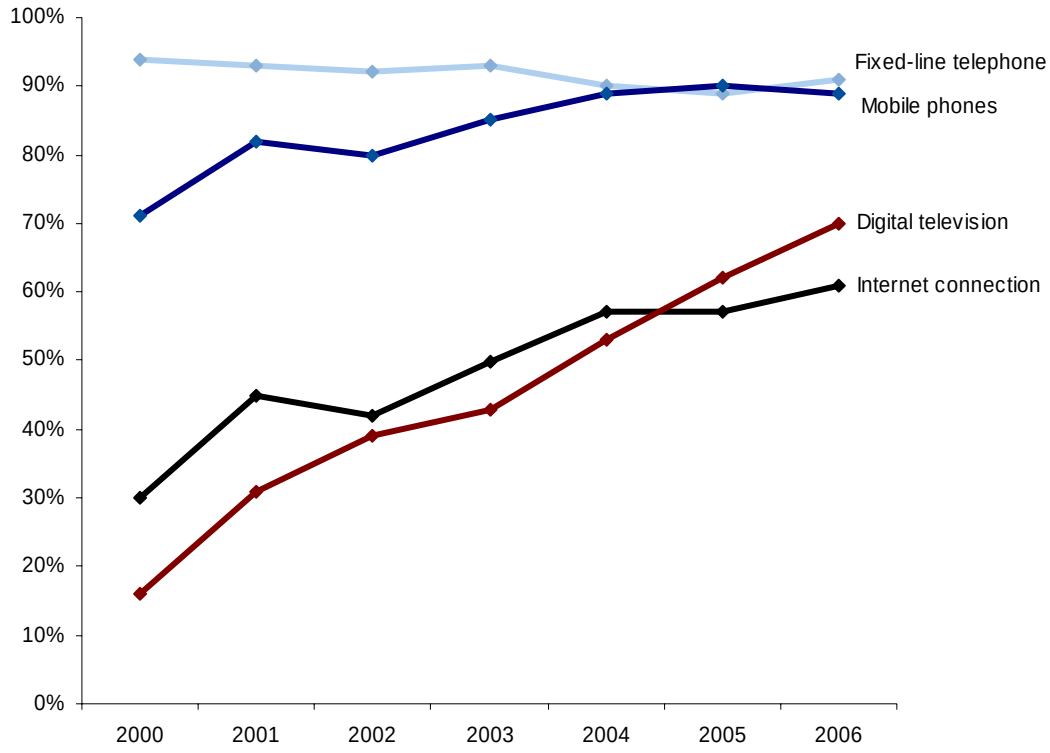
4.2 Measuring use of technologies

In the absence of data on functional capacities, this section investigates how the usage of digital technologies can be measured. In doing so, we are focussing explicitly (but necessarily) on the *means* rather than the *end*. It should be borne in mind that this does not imply that technology usage is an end in itself.

4.2.1 Ownership of technologies

Figure 2 shows how the home ownership of various ICT in the UK has changed over the last few years, as reported by Ofcom. The growth in mobile phone ownership has been accompanied by a slight decline in ownership of fixed telephone lines – but ownership rates for both these devices appear now to have stabilised. The number of home internet connections has grown rapidly since 2000, but that rate of growth also appears to be slowing. Digital television ownership has been growing rapidly: the switch-off of the analogue television signal in 2012 will almost certainly lead to the penetration for digital television increasing to the almost-universal level of all forms of television today.

Figure 2: Trends in ownership of technologies among UK consumers



Source: Ofcom 2006, Figures 7 and 28. Base: 700+ individuals per month for telephone and internet connection ownership. Base for digital television ownership figures not known.

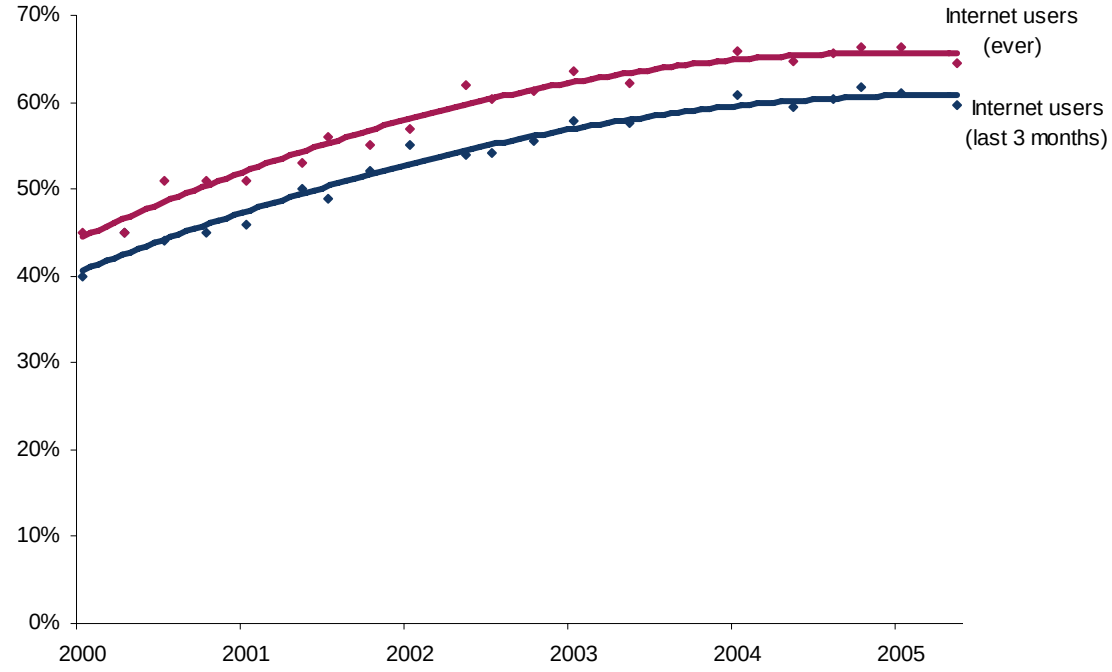
4.2.2 Numbers of users

For mobile phones and digital television, ownership appears to be roughly equivalent to use: these items do not tend to be accessed publicly, used only at work, or shared between households. This is confirmed by the available market research data on the numbers of users. For example, we know that, as of late 2006, around 80 – 85% of the UK adult population were users of mobile phones, and that this figure has grown very little over two or three years (Ofcom 2006; Ipsos MORI 2006).

68% of UK adults in 2006 used digital television – not significantly different from the ownership level reported by Ofcom as 72%. Of particular interest, however, is that although the number of digital television viewers grew by more than a fifth between early 2004 and late 2006, the number of people who use interactive digital television services has remained roughly constant in that time – at around 21% of the total population (Ipsos MORI 2006). There does not yet appear to have been any more research carried out into the differential take-up of these interactive features, but this question will become very important for digital inclusion: is low take-up of interactive services due to poor content provision, or is it the result of resistance to using a familiar technology in a new way?[5]

Compared to other technologies, internet use may be expected to diverge more from ownership of an internet connection, since the internet is also widely used at work, places of education, or in UK online centres, internet cafés or other public access points. The most detailed source of data on internet use is the quarterly ONS Omnibus Survey. The ONS data, summarised in Figure 3, shows that although the number of users has increased over some years, the rate of growth has been slowing. Since 2004, there has been little or no increase in the number of users.

Figure 3: Trend in proportion of UK population who use the internet



Source: ONS 2006a. Base: approximately 2000 households quarterly.

It appears that the number of users has reached a plateau – there has been statistically no increase in the number of users since late 2004. The final figure of roughly 61% of the

[5] We will return to this question in section 6.3.

population who are 'current' internet users (those who have used the internet within the last three months) agrees very closely with the other reliable sources of data:

- Ofcom: 61% are current internet 'owners' as of Quarter 2, 2006 (Ofcom 2006).
- Oxford Internet Survey: 60% are internet users as of 2005 (Dutton, Gennaro and Millwood Hargrave 2005).
- Ipsos MORI: 63% use the internet as of late 2006 (Ipsos MORI 2006).

These overall figures give us some indication of the size of the access barrier to digital inclusion. They do not, however, give us any useful information about the non-users. What are the reasons that a consistent 15% of people do not use mobile phones, and that 39% do not use the internet? Is this a conscious choice, or are those technologies not available to them? How can a public sector actor encourage take-up among these large numbers of non-users, and is there a case for doing so?

Adding to the complexity of this picture, the Oxford Internet Survey found that a large majority (73%) of non-users who needed to send an e-mail could 'probably' or 'definitely' ask somebody else to do this for them. Nearly half (45%) could 'definitely' do so. Many of these people, then, may have some of the advantages of internet use without needing to be users themselves. On the other hand, the fact that this access is theoretically available to them when asked in a survey does not necessarily mean that they actually ask others to do this on their behalf more than occasionally: only 19% of non-internet users had actually asked others to do something for them on the internet, and only 7% had done this more than once or twice in the past year (Dutton, Gennaro and Millwood Hargrave 2005, p. 31). Perhaps family members or those in the same household are most likely to be called on in this way – again, there are differences within these groups.

Similarly, those who are counted as 'users' of a technology are not a single homogenous group. From a service deliverer's point of view, it is of interest to know what activities these people carry out online, what their level of skill is in interacting with the technology, and how willing they are to trust these technologies with important transactions. Investigating these issues requires a more sophisticated understanding of ICT use.

4.3 Access, motivation and skills

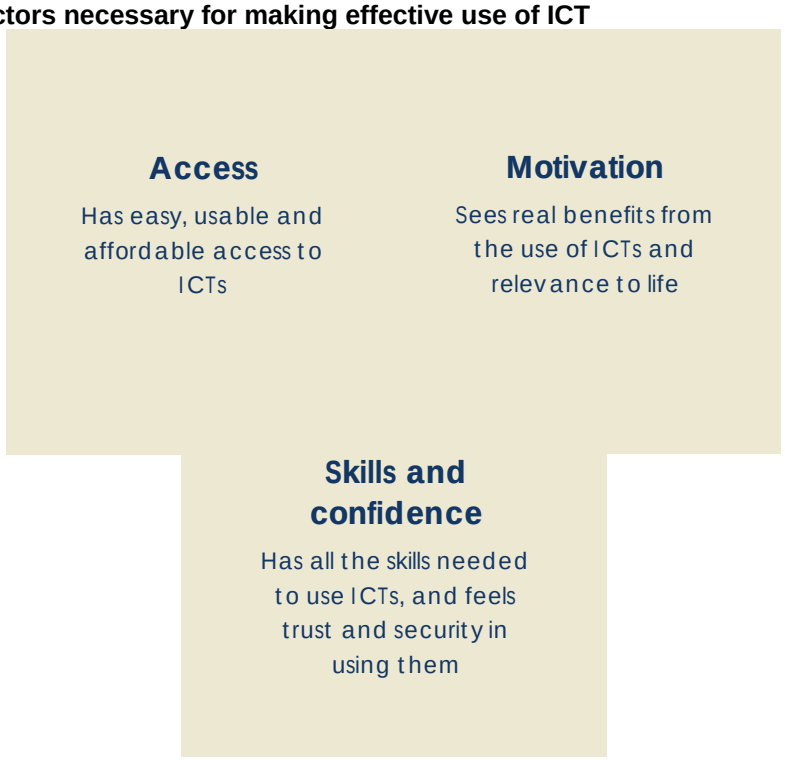
Considering any specific technology, the elements necessary for using a technology effectively can be categorised as:[6]

- **Access** – whether an individual has some means to access digital technologies
- **Motivation** – whether the individual sees some benefit from or has interest in accessing these technologies
- **Skills and confidence** – whether the individual is able to, and feels able to, make effective use of technologies

This implies that those who do not use a technology, or who do not use it effectively, are restricted from doing so by at least one of these factors.

[6] Alternative classifications of the conditions necessary for inclusion (or, alternatively, of the barriers preventing inclusion) are possible. This one has been used by de Haan 2004, Intel/Gov3 2005, Hüsing 2006, and others.

Figure 4: Factors necessary for making effective use of ICT



Source: Gov3 (2006)

Access

- **Affordability** of equipment or usage. Even though prices for ICT equipment and connection time will almost certainly continue to decrease, BT (2004) believe that cost will remain a significant barrier for some excluded groups, even in the long term. Pricing structures, as well as price itself, has an effect on take-up: the rapid adoption of mobile phones even by low-income groups is probably largely as a result of more flexible and non-excluding pricing structures (such as 'pay-as-you-go' packages) than of traditional fixed-line telephone services. The contrast with internet adoption – for which take-up among low-income groups has been much lower – is interesting: research has shown that non-users of the internet estimate the cost of use to be far higher than it really is (Foley *et al.* 2003).

- **Lack of time** to take training courses, or to travel to an internet café or UK online centre – or prioritising other activities over learning how to make use of technologies (Selwyn n.d.; Johnston and Toland 2006).

- **Lack of training or support** in learning how to use a personal computer or the internet.

- **Low literacy levels**. People are sometimes more willing to admit to a lack of knowledge about computers than to illiteracy (Foley *et al.* 2003). On the other hand, evaluation of UK online centres has found that engaging with computers and the internet has enabled people to identify and discuss literacy and numeracy difficulties which they had never addressed before (Wyatt et al. 2003).

- **Disabilities** which may make accessibility devices or improvements in design necessary in order to make effective use of technologies (Pilling, Barrett and Floyd 2004; Carey 2006).

- **Poor usability of interfaces** – such as relevant websites – may also be an issue preventing effective use (Williamson 2003; Pilling, Barrett and Floyd 2004).

Motivation

- **Lack of interest or perceived need**. Large numbers of people report that the reason they do not use the internet is that they have no need for it, or no interest. These numbers have fallen as the numbers of people using the internet has increased – but, as of February 2006, the ONS still found that 39% of non-internet users (representing 13% of the total adult population) said that they do not want to, need to, or have an interest in using the internet (ONS 2006a; see also Selwyn n.d.). On the other hand, as the focus groups carried out in support of *Inclusion Through Innovation* revealed, socially excluded people, including older people, have engaged enthusiastically with some forms of ICT – primarily the telephone (Social Exclusion Unit 2005, para. 2.23).

- **Cost/benefit ratio too high**. Even if some benefit or interest in using the internet is assumed, it may be judged that the benefit is too small to justify what may be a high-value investment in computer equipment. Again, more affordable pricing schemes and flexible technologies may change this.

- **Lack of appropriate content**. Provision of stimulating and/or useful content is crucial in attracting new users to ICT (Information Age Partnership 2006). The bias of existing content towards the social, cultural and economic priorities of earlier-adopters (Williamson 2003; Loader and Keeble 2004) may act as a considerable disincentive to people trying to engage in new technologies. As a special case, the dominance of the English language in internet content may be a problem for some minorities in the UK with poor English skills.

Skills and confidence

- **Skills** – Use of all ICT, and particularly of a traditional personal computer, is not straightforward, and may not be intuitive. The *Skills for Life* survey in 2003 found that large proportions of the population were not able to complete a series of basic functions using a Windows-based computer – even among regular computer users (DfES 2003). In the consultations conducted as part of the *Inclusion Through Innovation* study, more respondents cited lack of training or skills as a problem which may prevent some groups from benefiting from ICT than those who cited lack of access (Social Exclusion Unit 2005).

- **Confidence in ability** is particularly a problem among those who do not have immediate family or friends who are internet users, and so do not have the help and guidance which many new users find valuable (Foley *et al.*, 2003).

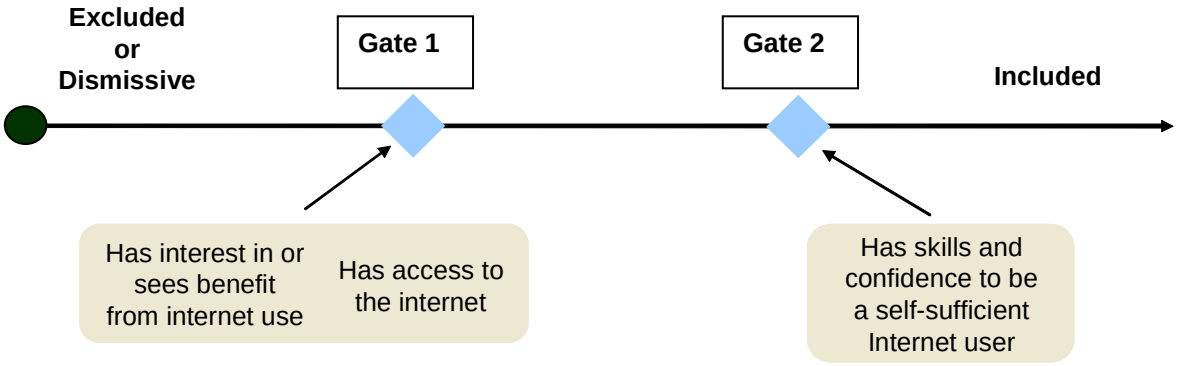
- **Concerns about security** or undesirable material being available on the internet may affect both take-up and willingness to transact effectively among existing users. The Oxford Internet Survey in 2005 found that, among existing users, majorities are concerned about viruses (82% of computer users), unpleasant experiences when using e-mail (60% of e-mail users), and putting their privacy at risk (54% of internet users) (Dutton, Gennaro and Millwood Hargrave 2005). Non-users have also been reported to have similar (though less specific) concerns – although also often recognising that these are factors to be aware of, rather than insuperable barriers to internet use (Foley *et al.*, 2003; Dutton and Shepherd 2003).

4.3.1 The path to digital inclusion: the UK online centres model

UK online centres views the process of extending digital inclusion as a pathway with two significant 'milestones' or 'gateways':

- The first gateway is when a non-user of the internet is engaged and introduced to the internet – this step requires them to have some level of access and motivation to become engaged.
- The second gateway is that of an individual becoming a self-sufficient internet user, able to find the information and carry out the transactions they require without assistance.

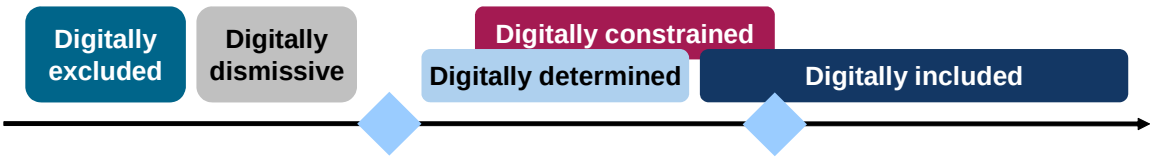
Figure 5: UK online centres path to digital inclusion



In order to evaluate where people stand according to this model, UK onlines centres have defined the following groups (UK online centres/Simpson Carpenter/Regeneris 2006). Each individual is modelled as being one of the:

- Digitally **excluded**: those who perceive themselves to have no access to the internet
- Digitally **dismissive**: those who have access to the internet, but choose not to use it for a number of reasons, principally that they perceive they have no need to use it.
- Digitally **included**: those who have the desire to use the new technologies and have the access to ICT and have the skills and confidence to use these new tools.
- Digitally **determined**: those who have access to the internet but not at readily accessible locations (such as home or work) and who have to travel to a public access location such as an internet café, public library or UK online centre.

Figure 6: Digital behavioural groups



In practice, it is hard to examine the split between the digitally dismissive and digitally excluded groups with data from existing surveys. In order to use the most comprehensive and robust dataset currently available, i.e. the ONS Omnibus Survey data, it is necessary to modify the UK online centres definitions slightly. To this end, we divide non-users of the internet into:

- Those who live in a household which has internet access, but do not use it: henceforth referred to as **connected non-users**;
- Those who do not have internet access at home: henceforth referred to as **disconnected non-users**.

The first of these two groups includes only people who are *digitally dismissive*, in terms of the UK online centres. The latter group includes some of those who are *dismissive* (that is, those who recognise that they could make use of the internet at work, at a place of education, at a

public access point or elsewhere, but choose not to), as well as all those who are *digitally excluded*.

It is important to recognise that approximately half of those who claimed to be digitally dismissive in the Ufi/UK online centres research do not have access to the internet at home but do consider that they could access the technology if they chose to outside the home.

Since we are measuring use of the internet as an indicator of functional capability, we should focus on the non-users who do *not* have an internet connection at home, i.e. the disconnected non-users. The connected non-users are likely to be able to take advantage of some of the benefits of internet access (admittedly with greater transaction cost) by asking other family members to find information or carry out transactions for them.

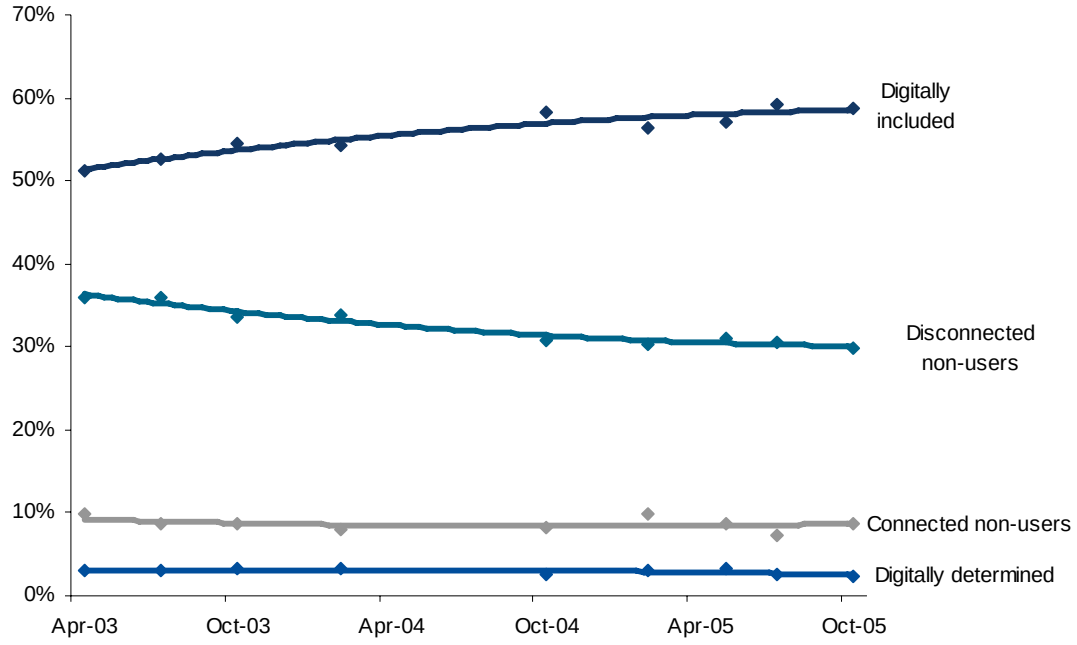
In order to account for the possibility of skills and confidence barriers, even among those who have both access and the motivation to use the internet, UK online centres make a further definition:

- Digitally **constrained**: are internet users (that is, they are already included in either the digitally included or digitally determined groups), but report that they are constrained in what they can achieve by their level of skills and/or confidence.

Note that the composition of this group is largely dependent on self-perception: the digitally constrained are those who *feel themselves* to be restricted in their use of the internet. This definition captures some of the sense of normative capacity: people will probably only report themselves to be constrained if they cannot achieve things which they want or need to do in daily life.

The UK online centres model has been applied to data from both the ONS Omnibus Survey (from 2003 to 2005) and that from the Oxford Internet Survey (from 2005). The results from the two sources broadly agree: the results derived from the ONS data are shown in Figure 7

Figure 7: Trend in sizes of digital behavioural groups



Source: ONS 2006a; FreshMinds analysis. Base: approximately 2000 households quarterly.

While the number of non-users has declined between 2003 and 2005, there remains a consistent 9% of the population who live in households with internet access, but do not take advantage of it. Similarly, the 3% of people who are digitally determined (who go out of their way to use the internet, even though they do not have easy access) has been roughly constant over this period.[7] We cannot tell whether these groups in fact have the same membership over the time period: the assumption behind UK online centres gateway model is that the natural progression is from digital exclusion to being digitally determined, then becoming included probably as a result of investing in a personal computer and internet connection for the home. The constant size of the determined group, however, suggests more that growth in digital inclusion has mostly come directly from non-users without a connection at home.

Figure 7 also shows the levelling-off in growth of internet users which was reported in section 4.2. If the hypothesis that the number of users has reached its natural saturation level is correct, then we should expect the number of non-users without home access to the internet to remain constant at approximately 30% of the population.

The digitally constrained group, while important for our understanding of ICT use, is much more difficult to measure from existing data than the other groups. Research for UK online centres in the South West of England found that 28% said that they 'wish they could use a computer and the internet better' (UK online centres/Simpson Carpenter/Regeneris 2006). In the Oxford Internet Survey, only 4% of internet users described their ability to use the internet as 'poor', though another 30% described them as 'fair', rather than 'good' or 'excellent' (Dutton, Gennaro and Millwood Hargrave 2005).

Further indications of the incidence of digital constraint comes from the DfES *Skills for Life* survey, carried out in 2003. This focused on basic skills in operating a personal computer, rather than on the internet or other online technologies. While bearing in mind Carey's (2007b) reservations about the usefulness and relevance of a 'basic skills' approach, this

[7] The small changes in the sizes of these groups are within the margins of error for the data being used, so should not be considered to be significant.

survey provides the only comprehensive snapshot available of ICT skills in the UK at the level of the individual.

Skills for Life found that 61% of the members of their sample were not able to fulfil a basic series of functions which may be considered essential to make use of a conventional personal computer. Of particular interest is that even among frequent computer users (those who use computers twice a week or more), still 40% did not achieve this benchmark (DfES 2003).

4.3.2 Digital Inclusion Panel framework

The Digital Inclusion Panel (DIP) in 2004 created a model to measure digital inclusion on two axes (Cabinet Office 2004):

- **Access** – including the use of internet via computer, mobile phone and digital television.
- **Engagement** – combining both motivation (whether people are using these technologies or not) and the level of sophistication of their use.

The Panel's definitions are shown on the following page.

Access

Very high: Access to internet at home, as well as access to a computer, mobile phone and digital television.
High: Access to internet at home, as well as to at least one of a computer, mobile phone and digital television.
Moderate: Internet access in communal facilities only, not at home. Home access to at least one of a computer, mobile phone and digital television.
Low: Internet access at communal facilities only, not at home. No home access to a computer, mobile phone and digital television.

Engagement

Unengaged: Have never been digitally engaged, or have not been engaged in the last three months.

Digital communicators: Digitally engaged to communicate in new ways (eg. text messages or e-mail).

Digital harvesters: Digitally engaged and use interactive content, as well as communicating in new ways.

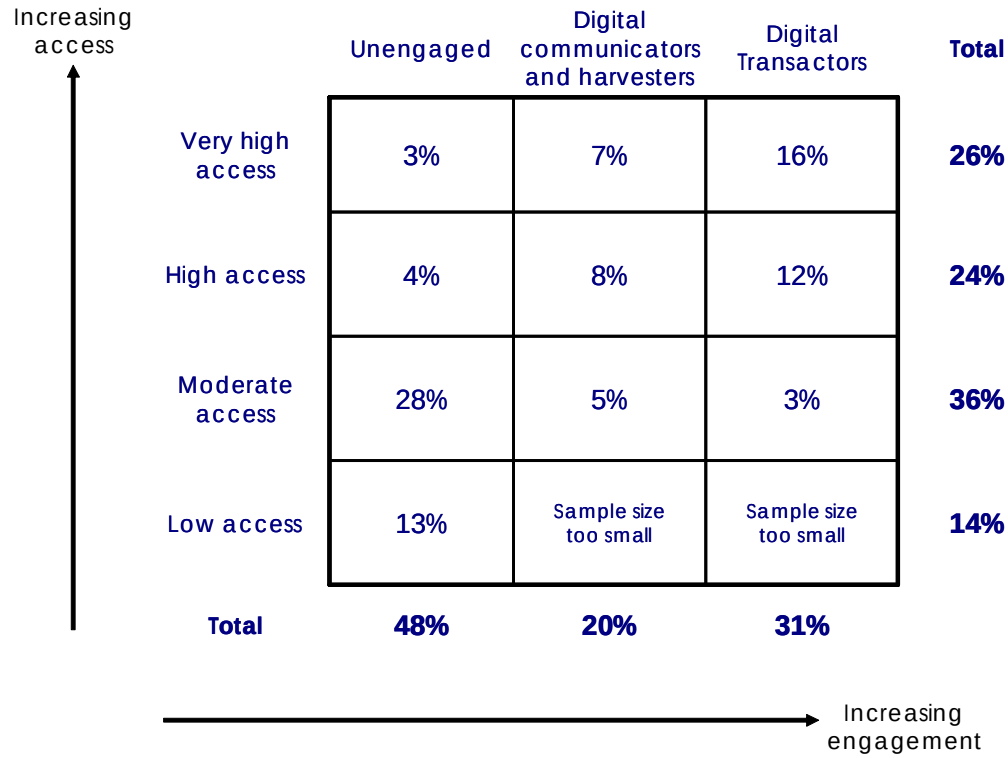
Digital transactors: Digitally engaged to transact, as well as using interactive content and communicating in new ways.

This model is broader than the UK online centres model in that it takes account not just of internet use via a conventional personal computer, but also of new interactive technologies: mobile phones and digital television. The 'engagement' dimension captures some of the sense of the question of 'digital constraint' in the UK online centres model. Where the digital constrained question is based on a self-perception, however, the DIP model assumes a hierarchy in types of usage: new users will begin as digital communicators before they move on to become harvesters, and then finally acquire the skills and/or confidence necessary to become digital transactors.

This is a top-down model of usage, which is explicitly focused on service deliverers, who (as will be discussed in section 7.2) are likely to benefit from cost savings if more of their clients transact online.

The DIP framework was used to analyse ONS survey data from 2002, producing the results shown in Figure 8. Since this data is older than the sources we have examined above (section 4.3.1), the figures cannot be directly compared – the 48% who are 'unengaged' (non users), for example, has since decreased. However, the DIP model is interesting for the information it gives on differences in use of digital technologies: the figures at the bottom of Figure 8 tell us, for example, that 20% of the sample (accounting for 39% of internet users) remain as digital communicators or harvesters, whereas 61% have progressed to become digital transactors. This result is roughly in line with the 34% in the Oxford Internet Survey who described their internet skills as 'poor' or 'fair'.[8]

Figure 8: Access and engagement of UK adults, using the Digital Inclusion Panel's framework



Source: Cabinet Office 2004, from 2002 ONS data. Base: 6932 individuals. (Figures are rounded)

[8] We will return to the DIP framework when examining who the people that are affected by digital constraint, in section 5.2.

4.4 Concluding remarks

- Technologies tend to reach a 'plateau' at which their market penetration levels off. This appears already to have happened for both mobile phones (at around 85–90% of the population as owners and users) and for the internet (at 60–61% of the population as users). Digital television is still increasing in penetration (and is likely to become universal by 2012), but the number of users of interactive digital television services has also been unchanged for some years.

- Take-up of any technology requires the individual to have access, motivation, skills and confidence. A better understanding of the characteristics of both users and non-users of a technology can be gained by examining the barriers which restrict peoples' access motivation, skills or confidence.

- Considering the Digital Inclusion Panel framework for measurement, as well as the results of the *Skills for Life* survey shows that lack of skills presents a barrier to making sophisticated use of ICT, even among regular users.

5. Who is affected?

Summary

Following the models developed in section 4.3, we seek to examine the characteristics of those affected by barriers to digital inclusion, in two different respects:

- Access and motivation barriers – who is digitally excluded?
- Skills and confidence barriers – who is digitally constrained?

National Statistics data provides a detailed picture of those who are digitally excluded, showing a clear link between social exclusion and digital exclusion. The second question is harder to answer with the data currently available, but it is clear that there is also a link between skills and confidence in using the internet and social exclusion.

5.1 Who is digitally excluded?

5.1.1 Characterisation of non-users of the internet

The models of digital inclusion presented in section 3 allowed quantification of the four main digital behavioural groups: the included, the determined, non-users in connected households, and non-users without connection at home. This data can also provide information on the composition of those groups – and specifically, on the characteristics of those people who are most subject to digital exclusion.[9]

This focusing on non-users should not be taken to imply that everybody in this group miss out on the full range of advantages to be derived from the internet. Those who live in connected households are particularly likely to derive some indirect benefit from ICT. As stressed in sections 3 and 4, we would prefer to examine directly those who are limited in their capabilities to carry out functions useful or necessary to them in their lives. At the present time however, the best indicator of who is likely to be negatively affected by digital exclusion is to consider those non-users who do not have an internet connection at home.

From analysing ONS survey data from 2005, we find that non-users without home internet connections are particularly likely to be:

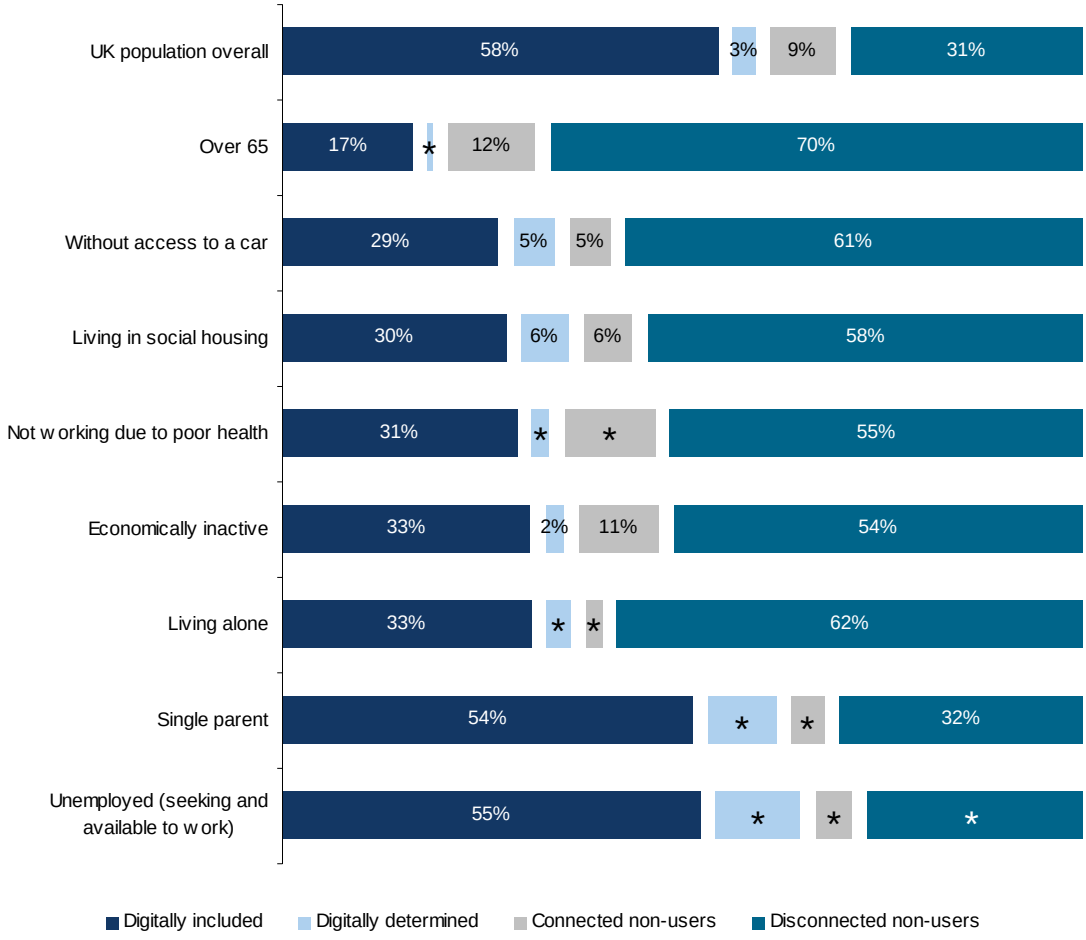
- **Aged over 65**: nearly half of this group are aged over 65. Exclusion increases with age, so that, while 60% of the 65—74 age-group are non-users without home access, the rate among those over 75 is 79%.
- **Economically inactive**: two thirds of the non-users without home access are economically inactive. Even controlling for the presence in this group of those aged over 65, the economically inactive people are still very likely to be non-users.
- **Low-qualified**: 62% of those with no educational qualifications are non-users without home access, compared to only 6% of those with a degree.
- **Living alone**: 69% of those who live alone are non-users.

As would be expected, digitally included people and those non-users who live in connected households (who, by definition, live in the same house as included people) are much less likely to be linked to indicators of social exclusion.

[9] All results in section 5.1 are from ONS 2006a, with analysis by FreshMinds.

Figure 9 shows the size of the four first digital behavioural groups among various population groups which may be at risk of social exclusion.

Figure 9: Digital behavioural groups of those with various social needs



Source: ONS 2006a;[10] FreshMinds analysis. Base: approximately 6052 (weighted) individuals.
** Small sample sizes for these groups prevent estimation of the group size.*

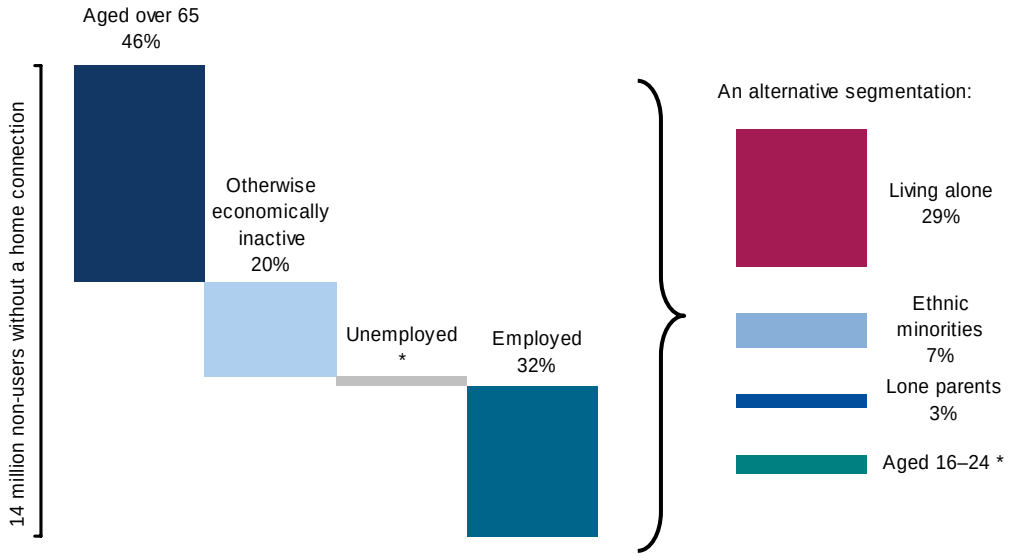
The gender difference in the behavioural groups is only slight: 51% of disconnected non-users and 53% of connected non-users, are female.

Despite being seen as at risk of social exclusion, unemployed people and lone parents are actually slightly more likely than average to be internet users. They are, in fact, much more likely than average to be digitally determined – to go out of their way to use public internet access points.[11]

[10] The ONS Omnibus datasets are based on adult population in Great Britain

[11] This effect cannot be explained wholly by these groups being younger than the population average. Even among the youngest age group (16–24-year-olds), the rate of digital exclusion is still only 9% (ONS 2006a).

Figure 10: Non-users of the internet who do not have access at home



Source: ONS 2006a; FreshMinds analysis. Base: approximately 1807 (weighted) non-users without home access to the internet.
** Small sample sizes for these groups prevent estimation of the group size.*

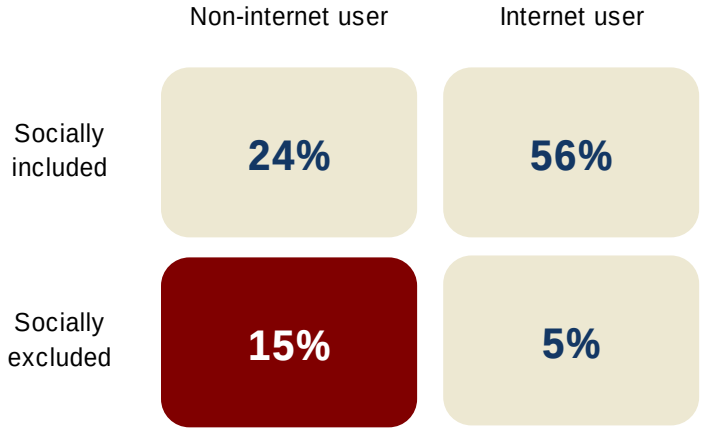
The left-hand side of Figure 10 is a cross-section of non-users who do not have home access, by employment status. On the right-hand side several other demographic groups are shown. While we are able to identify and quantify some of these groups – the 3% who are lone parents, for example, and the 4% who are aged 16-24 – this still leaves large numbers of these non-users who are either employed or economically inactive, but who we are not able to characterise in any more detail given the data available. Some of these people may fall into indefinable groups which are too small to show up in national surveys, such as offenders, gypsies or travellers, or people with severely limiting learning difficulties.

5.1.2 Digital exclusion and social exclusion

An analysis of the links between social exclusion and engagement with the internet has been conducted by the Digital Inclusion Team (2007). They define social exclusion as suffering from three or more of the following forms of deprivation:

- Income deprivation: living in social housing, or in a workless household
- Employment deprivation: never worked, economically inactive, unemployed, in routine or manual work, in part-time work only, or in a workless household
- Health deprivation: not working because of poor health
- Education deprivation: no qualifications
- Barriers to services: living alone without access to a car, or a lone parent
- Living deprivation: living alone, or living in crowded housing.

Figure 11: The link between social exclusion and internet use



Source: ONS 2006a; analysis by the Digital Inclusion Team. Base: approximately 6052 (weighted) individuals.

The results, as shown in Figure 11, indicate that three-quarters of socially excluded people are non-users of the internet: there appears to be a significant overlap between those suffering social and digital disadvantage.

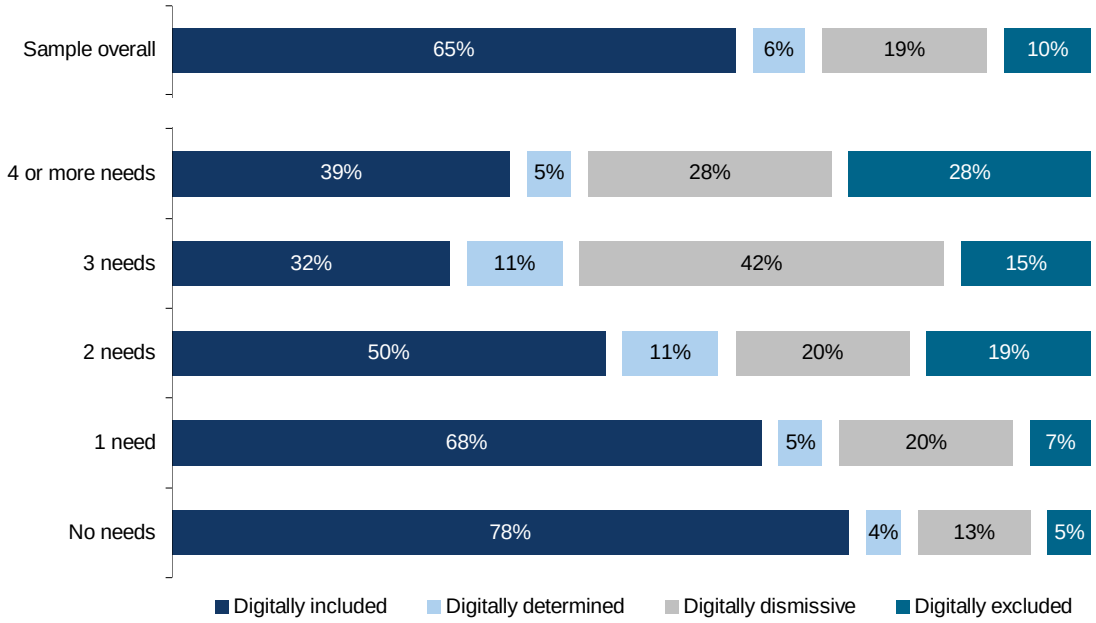
The link between social exclusion and digital exclusion implies that the digital divide is not a problem which can be solved easily by the free market, and it is unlikely to be solved in isolation from broader policy aimed at tackling exclusion and disadvantage. There is a clear potential to combine interventions and to reduce both social and digital exclusion concurrently. As highlighted in section 1, technology has the potential to address some of the drivers of social exclusion: digital exclusion reduces the opportunities available to policy makers.

5.1.3 Consequences for public service provision

Confirmation of the impact of digital exclusion on service delivery can be gained by examining how individuals' level of internet use is correlated with the demands they make on public services.

In a market sizing survey conducted for UK online centres in South West England, respondents were categorised according to the number of 'social needs' they have (whether they receive benefit payments, whether they live in social housing, whether they are in poor health, whether they are looking for a new job, or are registered disabled people). The results, shown in Figure 12, are that those who have more social needs – and so require more interaction with public services – are less likely to be digitally included.

Figure 12: Need for contact with public services, by digital behavioural groups



Source: UK online centres/Simpson Carpenter/Regeneris 2006. Base: 1028 individuals.

UK online centres considers those with two or more of these 'social need' indicators to be of particular concern to public service deliverers. Together, those with two or more needs account for 30% of the sample – and nearly half (47%) of these people are non-users of the internet (that is, they are either digitally *excluded* or *dismissive*). This survey therefore implies that a total of 14% of the population have high social needs but do not use the internet – a close agreement with the Digital Inclusion Team's finding (above, section 5.1.2) that 15% of the population are both socially excluded and non-users of the internet. Applied to the total UK working age population this produces an estimate of 5.6m (4.96m for England and Wales) people who fall into this bracket (ONS 2006c).

5.2 Who is digitally constrained?

Recall that, according to the UK online centres model of digital inclusion (Figure 6), there are two 'gateways' to pass through before an individual becomes a self-sufficient internet user. In order to establish whether an individual is fully able to use the internet, we need to know not only whether he or she has passed through the access and motivation barriers (implying that he or she has become an internet user), but also whether he or she has the skills and confidence necessary to make full use of the internet. This means that we need to know whether he or she is also *digitally constrained*.

The extent of digital constraint is much harder to define and quantify than that of the other behavioural groups. As noted in section 4.3, the best definition we have available is to examine the digital *communicators* and *harvesters* in the Digital Inclusion Panel's model – which account for 39% of all internet users (Cabinet Office 2004). It should also be remembered that some of these may not have graduated to becoming digital *transactors* because they do not feel the need to do so, rather than because they lack the skills or confidence.

The Digital Inclusion Panel's report includes some segmentation by demographic groups. It appears, for example, that those of working age (25–64 years old) are less likely to be digitally constrained (that is, more likely to be digital transactors rather than merely

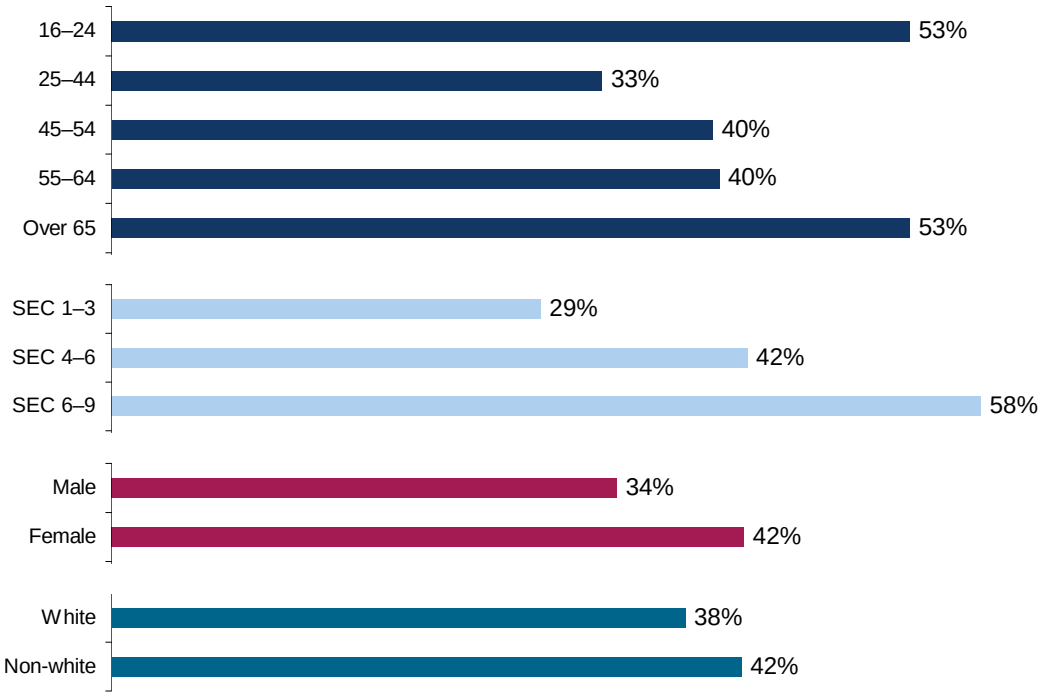
communicators or harvesters) than either people aged over 65, or than the 16–24 age group (Cabinet Office 2004). That this last age group should be more digitally constrained than the average is unlikely: perhaps this result reflects other barriers to transacting digitally – such as the need for a credit card to engage in online commerce – or perhaps it reflects a lower *requirement* for transacting.

Where the DIP model shows considerable variation in patterns of internet use based on demographic variables, there are very clear differences across different socio-economic groups. Among internet users in the top three of the ONS's socio-economic classifications (those in managerial, professional or intermediate occupations), 61% are digital transactors, compared to only 42% among the lowest three groups. Again, there may be barriers other than digital skills and confidence at work here (such as access to credit cards), it is likely that digital skills are at least part of the explanation.

Further, male internet users were significantly more likely to be digital transactors than female internet users. The data used to derive this result dates from 2002, when there was still a small gender divide in use of the internet – but the difference in probability of being a transactor was even more marked.

Finally, members of non-white ethnic minorities were significantly more likely to be digital transactors than those who described themselves as white. As with the higher likelihood of ethnic minorities being internet users, it is likely that this result is accounted for by the younger age profile of ethnic minority groups – though we are not able to confirm this with the data available.

Figure 13: Proportions of internet users in 2002 who were digitally constrained (had not become digital transactors), by demographic groups, according to the Digital Inclusion Panel model



Source: Cabinet Office 2004. Base: 6932 individuals.

The 2003 *Skills for Life* survey provides some more information on those who are restricted by digital skills. Recalling that this survey tested all participants (not only computer users) against a common benchmark, the results show that people more likely to have poor digital skills are:

- More likely to be female (35% achieved the benchmark standards, compared to 44% of men)
- More likely to have lower educational attainment (74% of those with a degree reached the benchmark standard, compared to 6% of those with no qualifications)
- More likely to have a low income (only 7% of those with an income of less than £10,000 reached the benchmark)
- More likely to have a first language other than English: unless their command of spoken English is 'very good'.
- More likely to have problems with literacy or numeracy
- More likely to have limiting learning difficulties

This survey also contains some data which is restricted only to frequent computer users. Specifically:

- Digital constraint was inversely related to socio-economic classification even among frequent computer users. For example, 82% of computer users in higher managerial or professional occupations reached the benchmark standard, but only 31% of users in routine occupations.
- Frequent computer users who lived in deprived areas were less likely to reach the benchmark standard than users who lived in areas of low deprivation.

It appears, then, that digital constraint is linked to social exclusion and place-based deprivation in the same way that digital exclusion is. This has important consequences for

digital divide projects: surmounting the access and motivation barriers is not enough – there will still be divides in skills and usage of ICT.

The reasons why digital skills and usage appear to be linked to social exclusion are not clear, and warrant further investigation. One possibility is that, as cited by Liff and Shepherd (2004), 'the ability to use available access, and ultimately the type of access achieved, can be affected by the social networks of which one is already a member and by those that exist at the place where one has access'.

Finally, both the DIP framework and the *Skills for Life* survey found a gender difference in use of the internet or computers which cannot be ignored. While the difference in usage (DIP) and skills (*Skills for Life*) has probably closed to some extent since these surveys were conducted, it has probably not been eliminated completely. Part of the explanation may be that female internet users have, on average, been users for less time than male internet users, and so have had less time to build up to the acquire the skills and develop more sophisticated uses – but we do not have enough information to know the extent to which this factor explains the differences. As noted by Liff and Shepherd (2004), assuming too readily that gender differences in usage will be eliminated with the passage of time could mean missing more subtle reasons for choices on how to interact with technology.

5.3 Concluding remarks

- The incidence of digital exclusion is highest among some groups who are at risk of social exclusion, including those who are elderly, economically inactive, low qualified, or living alone.
- Conversely, those who are socially excluded are three times more likely to be non-users than users of the internet.
- There is also evidence that those who make the greatest demands on public services also tend to be less likely to be digitally included.
- Some groups at risk of social exclusion are particularly likely to rely on public internet access points, including unemployed people and lone parents.

6. Drivers for change

Summary

The picture of digital inclusion and exclusion is changing. The factors which are likely to have an impact on digital inclusion in the foreseeable future are:

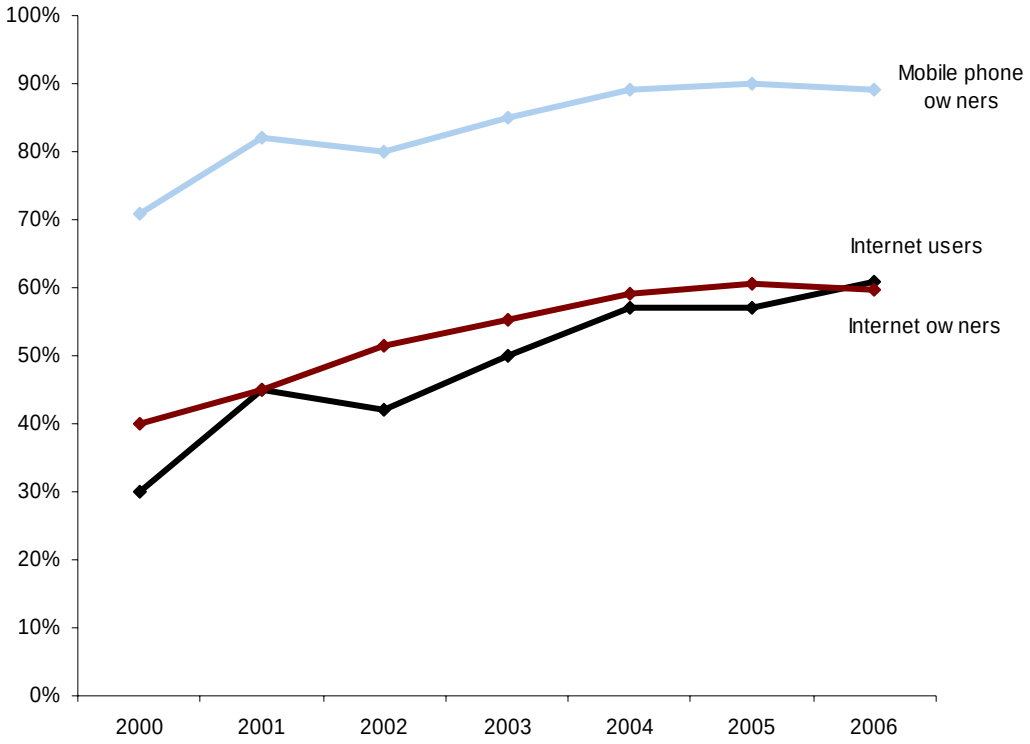
1. Market forces: while the penetration of digital television will increase and become near-universal within the next few years, the markets for mobile phones and internet connections appear to have reached a natural ceiling.
2. Demographics: the aging of the UK population, together with a persistent non-user segment among all age groups, means that generation change will not be enough to eliminate the problem of digital exclusion.
3. Technology: digital television and mobile phones create new opportunities for engaging non-internet users in interactive technologies. Providing attractive and useful content is the key to driving engagement.

6.1 Market forces

One important feature of the market for ICT is that the cost of ownership and use of ICT has fallen over time. Naturally, the ownership and use of those technologies would be expected to rise as the costs fall. However, as seen in section 4.2, in recent years, the number of users of both mobile phones and the internet has stopped growing (shown again in Figure 14), even as cost reductions have continued – these markets appear to have plateaued.

Carey (2006) proposes that the reason for this is connected with market incentives for the ICT industry. Those who adopt technologies early tend to be young, affluent people – so the design and marketing of devices focuses on them. A successful technology will increase in sales until it has been widely adopted among the general population. However, ICT products (both hardware and software) tend to have short lifetimes, typically of 18—72 months. After enough time has elapsed, the opportunity will arise to sell upgrades and new models to those early adopters: and the returns from selling new models to those early adopters are likely to be greater than from producing new models and marketing focused on the people who have not yet been reached (who are likely to be older, less affluent, harder to reach, and with disabilities which require specific design adaptations). There is, then, little incentive to focus on these latter groups as a source of revenue for each new iteration of technology.

Figure 14: Growth in mobile phone and internet ownership



Source: Ofcom 2006 (ownership) and ONS 2006a (internet use); Base: 700+ individuals monthly (ownership) and approximately 2000 individuals quarterly (internet use).

This argument (that markets become 'cyclical' before they have achieved universal penetration) implies that there may remain, even in the long term, a minority who do not participate. This may have already happened in the case of mobile phones, where there have been few new customers since 2004, even though the majority of people aged over 65 still do not own a mobile phone (Ofcom 2006). While almost all of that non-ownership is what Ofcom describe as 'voluntary', it is not hard to imagine new uses of – for example – text messaging which (combined with easier-to-use keypads for some) many older people would appreciate. The reason that there has been little investment in this area is probably due to the richer rewards to be gained from younger consumers.

Similar arguments probably apply in the case of personal computers and internet connections, leading to the plateau in growth of internet users seen in Figure 14. This suggests that there will be few new users recruited in the future. We should be careful, however, in claiming definitively that growth in internet use has ended: in the US (where markets for technologies are generally a few years ahead of the UK), the growth in users appeared to have fallen off in 2002–04, but has increased again since then (Pew Internet & American Life Project 2006). On the other hand, the same surveys show that the 22% of US adults who have never used the internet and do not live in a household with an internet connection has remained roughly constant since 2002 (Fox 2006) – which does indeed suggest cyclicality in the market.

If the markets for mobile phones, computers and internet connections have become cyclical, then the benefits of continuing cost reductions are being felt largely by existing users and owners of these technologies. Evidence for this comes from Figure 14 (above), which shows that the number of internet *owners* has grown faster since 2000 than the number of internet *users*, and that the two figures have become roughly equal. This is probably accounted for by people who previously used the internet only at public access points or at work taking advantage of more affordable options to install a connection at home.

Although non-users of the internet often cite cost as an important barrier to use of the internet, continuing cost reductions have resulted in few new internet users since 2004. While improvements in affordability may have some effect on digital exclusion, it is likely that the focus of the ICT industry is now elsewhere – and that other barriers to digital inclusion (highlighted in section 4.3) are having an effect.

6.2 Demographic trends

6.2.1 The effect of the aging population

The concentration of digital exclusion among older age groups is sometimes taken to imply that digital exclusion will be eliminated in years to come with demographic change. To an extent this is true: many of the most excluded people will not be alive in 10 or 20 years' time, leaving behind younger people who are more likely to be digitally included.

However, there are two reasons why this demographic effect on digital inclusion is likely to be slower than is often expected:

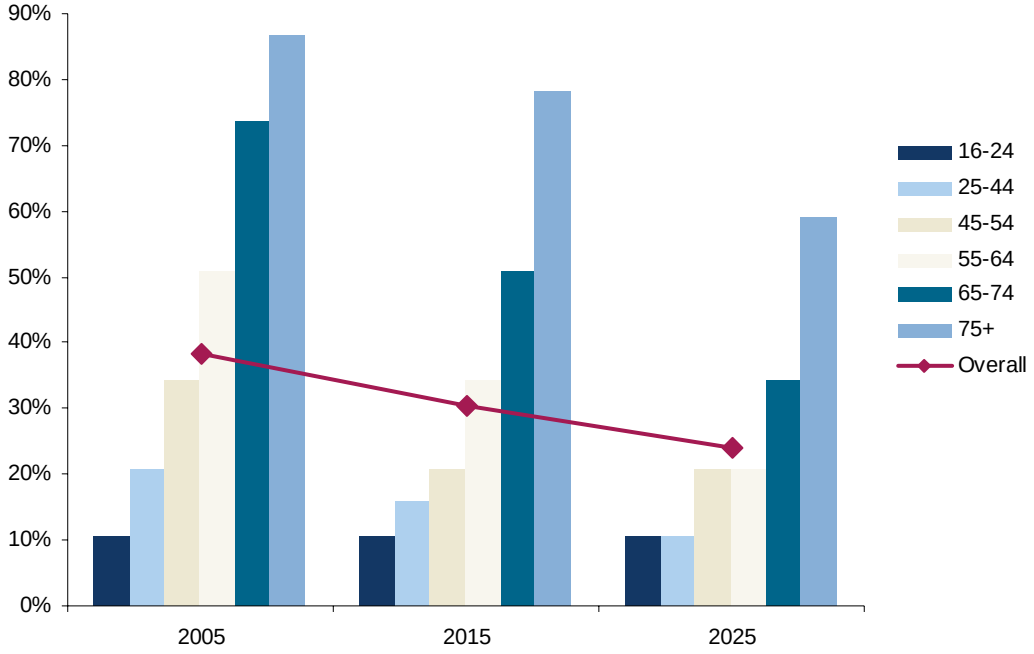
- Increasing longevity is leading to a lower rate of demographic change. In the next 10 or 20 years, there will be fewer younger people and more older people.
- There are significant numbers of excluded people even among younger age groups: 11% of the 16–24 age group are non-users of the internet, most of them in unconnected households (ONS 2006a).
- Age is not the only significant determinant of digital exclusion.

The effect on digital exclusion which can be predicted from generational change alone is shown in Figure 15. The age distribution of the 2005 population has been used to estimate the total number of non-users in 2015 and 2025, assuming that mortality rates will be constant at 2004 rates and that the current patterns of internet use will continue among each age cohort. New generations of 16–24-year-olds are assumed to have the same rate of exclusion as the current 16–24 age group, at 11%.

The overall proportion of the adult population who are non-users, then, will reduce from 39% in 2005 to 31% in 2015, and to 24% in 2025.

This aging effect is of consequence not only for service provision, but also for the skills base. As the Leitch Review of Skills (2006) highlighted, more than 70% of the 2020 workforce has already left full-time education. If ICT skills do have a consequence on economic competitiveness, employers must concentrate on improving the skills base of the current workforce, not only on training the next generation.

Figure 15: Projections for the number of non-users of the internet in 2015 and 2025[12]



Source: ONS 2006a and ONS 2006c; FreshMinds analysis. Base: approximately 2316 (weighted) non-users of the internet.

Two other factors are of consequence when examining the impact of aging on public service delivery:

- The number of older people living alone will continue to increase (53% women aged over 75 live alone): so fewer will have the opportunity to learn ICT skills from younger family members (HM Treasury 2006).
- This aging population and decreasing household size will also continue to increase demand for – and expectations of – public services (HM Treasury 2006). This will further increase the potential efficiency gains to be made from encouraging more users of public services to interact via digital technologies.

6.2.2 Effect of immigration

A second important demographic driver in the UK for the foreseeable future will be net inward immigration: migration is expected to account for half of the UK's population growth between 2007 and 2017. Government analysis suggests that net immigration will have, overall, a small positive effect on the UK's skills base (HM Treasury 2006; Leitch 2006) – which probably includes a net positive effect on ICT skills.

Given the overall high levels of ICT adoption among migrants, this implies that the overall effect from migration on digital inclusion will be positive. However, a further implication is that there are likely to be significant minorities of inward migrants who do not have exposure to or skills in using ICT: this implies some requirement for digital inclusion projects on a continuous basis in the future.

[12] In reality, the discussed factors are likely to understate the rate of exclusion in future years: people are probably more likely to become excluded as they get older and ill health or mobility problems arise. For example, poor dexterity has been shown to be a significant factor affecting ICT use in older people (Hüsing 2006). This suggests that the graph may actually underestimate the future rates of digital exclusion.

6.3 Technology trends

6.3.1 Interactive digital television

One technology which is expected to reach near-universal coverage in the foreseeable future is digital television. The switch-off of the UK's analogue television signal in 2012 will mean that all people who wish to watch television will, by that date, have the choice of a device in their household which is capable of interactive, internet-like services. The income- and age-differentials in ownership of digital televisions are already much smaller than the differentials in internet use discussed in section 5.1 (Ofcom 2006).

Digital television clearly provides opportunities to encourage use of interactive content through a familiar, broadcast-led medium. It will be present in the homes of most of the non-internet users discussed in section 5.1, including those who are older and/or socially excluded – so many of the barriers which have prevented take-up of the internet via personal computers will be overcome (Cabinet Office 2004).[13]

On the other hand, it should be recalled that only 21% of people are as yet users of interactive digital television services, and that this figure has not changed significantly since 2004. With the wide range of viewing options available to digital television owners, take-up of these services will depend on demand pull (Naughton 2006): widespread take-up will be achieved only when providers invest in the content, format and effective marketing of interactive services. The public sector is already leading in this area, with the availability of the Government's information portal Directgov on some digital television networks, and the launch of NHS Direct universally in February 2007 – but there has been, as yet, little emphasis on promoting these services specifically to people who are not already users of existing internet services. Foley *et al*. (2005) estimated that, use of local authority digital television interactive sites has averaged only a quarter of a page per viewer per year.

6.3.2 Convergence of technologies

The term *convergence* is used to describe the various ways in which information and communications technologies are tending to integrate and overlap in the functionalities they provide (*The Economist* 2006). For example, telephone voice calls can now be made internationally at low cost using a computer and a Voice over Internet Protocol (VoIP) provider.

The most significant aspect of convergence for digital inclusion is likely to be that of mobile phones being increasingly used to access the internet and internet-like interactive information portals. Market research indicates that the proportion of people who used a mobile phone to access the internet increased threefold during 2006, to 16% (Point Topic 2007). At present mobile phone interfaces and slow data transfer speeds limit internet functionalities, but this is already changing. This is especially likely to be affected by Apple's launch of the iPhone and competitor products: mass-market devices specifically intended to facilitate browsing websites as well as sending and receiving e-mail.

As noted in section 4.2, mobile phones have achieved high penetration among many groups who are currently excluded from internet use – so making more internet functionality available over mobile phones is a positive development. However, the effect of this should not be overstated: as recently as October 2005, almost everybody who had accessed the internet using a digital television or mobile phone had also used a standard personal computer (ONS 2006a), implying that the impact of these devices on digital inclusion had been marginal. Even the most recent data shows that 8% of households still do not own any of these technologies (internet computer, mobile phone or digital television) (ONS 2007).

[13] It is worth noting that there is no interactive element in the most accessible digital TV package, i.e. Freeview

As with digital television, whether mobile phones can be used to engage people in interactive technologies, which go beyond simply communication, will depend on providing useful and attractive content, and on targeted marketing of these services to excluded groups.

6.4 Concluding remarks

- The market for internet access and mobile phones may already have become cyclical: it is likely that the ICT industry's focus is now on existing customers, rather than extending its market penetration to harder-to-reach groups.
- Generational change will help to reduce the incidence of digital exclusion – but only slowly. Allowing for the effect of generational change alone (while holding all other factors constant), 31% will still not be internet users in 2015, and 24% in 2025.
- Furthermore, the existence of a core of excluded young people means that this phenomenon will endure.
- However, opportunities for engaging more people exist, in the form of new technologies – particularly an interactive digital television.

HM Treasury's *Long-term opportunities and challenges* report in November 2006 stated that:

> *In the decade to 2017, continued reductions in the price of ICT, an increasingly ICT literate population and the convergence of technologies – such as more internet connections on mobile phones – are all expected to increase uptake of ICT generally and reduce the digital divide further*. (HM Treasury 2006)

While price reductions and technological convergence certainly present opportunities for extending digital inclusion, it is not at all clear (as the Treasury report implies) that this will be an inevitable, organic process. Encouraging use of these technologies among those who are currently excluded from communicating, transacting and interacting online will require outreach activities, backed up by useful and useable content. Public sector service deliverers have an incentive to lead in this area.

7. Case for public-sector action

Summary

It is becoming clear that the private sector alone will not address digital exclusion. Profit-maximisation strategies preclude focusing on unattractive sections of the population. This digital exclusion, combined with the often-accompanying social exclusion and deprivation, create a powerful call for intervention from a social enterprise, charity or public body. The opportunities offered by such an intervention include:

1. Dealing with the drivers of social exclusion and deprivation.
2. Improving the efficiency of public service delivery, by encouraging interactions with customers through interactive technologies.
3. An upgrading of the ICT skills base, with a consequent boost to the UK's international competitiveness and so to economic growth.

7.1 Tackling social exclusion

We have shown that there is a clear link between digital exclusion and social exclusion. While this undoubtedly makes promoting digital inclusion a more complicated matter – as it requires dealing simultaneously with a whole range of other needs – it also provides opportunities for addressing the causes of social exclusion through promoting digital inclusion.

The opportunities available to extend digital inclusion have not yet been fully exploited, and may include:

- Actively promoting access and learning opportunities (to demographic groups and in geographic areas at risk of social exclusion), with a focus on the benefits and possibilities available to people who are willing to engage.
- Encouraging people to engage with interactive features of new technologies (particularly digital television) through the provision of genuinely useful and accessible content.

Using these means to extend digital inclusion to some of those most affected by social exclusion will allow those individuals – as well as public service deliverers and society as a whole – to realise the benefits of digital interaction (as discussed in section 1).

7.2 Efficiency of public service delivery

Using ICT as a way of communicating and interacting with public service users has the potential to save considerable sums in transaction costs. Varney (2006) quotes the example of Tameside Metropolitan Borough Council, which uses the intenet as its primary channel for contact with customers. Data from Tameside shows that, in 2004–05, serving the 105,000 face-to-face customer visits incurred a total cost of over £1,500,000. In contrast, the council's website received 680,000 visits, at a total cost of around £170,000. This implies that the cost per visit for personal visits was £14.65, compared to £0.25 per visit to the website. In contrast, the cost per call to the council's call centre was £1.39.

While the Varney Report makes clear that there will be a continuing requirement for face-to-face services in many areas of work, it is also reasonable to assume that local authorities and other public service providers can expect to make large cost savings by encouraging take-up of online and call-centre-based delivery mechanisms. Further, this can be acheived without

service quality suffering: the Tameside case is particularly compelling because the increased take-up of online services actually resulted in an increase in customer satisfaction (Varney 2006).

In the context of the aging population and the increasing demands from public services, improving efficiency is essential to reduce the burden on service deliverers. A failure to increase adoption of the internet among older people and other heavy users of public services will mean that these opportunities will be missed.

Encouraging take-up among these groups will, as we have already highlighted, depend on providing useful and engaging content. There is a recognition that simply making services available online has not been successful in extending outreach or realising the gains which are potentially available (Cabinet Office 2005; Accenture 2005; Lomas 2006):

> *The challenge ahead is … about … building services which are more joined-up, more personalised, more efficient and more effective in terms of policy outcome.* (Cabinet Office 2004, para. 20)

In addition to the potential cost savings from switching from one-to-one to one-to-many delivery mechanisms, increasing the use of ICT in service delivery can also result in productivity gains in back-office systems, as well as improving targeting of and reporting on services, and reduced duplication. This has the potential to increase the effectiveness and trust in public services (Gershon 2004; Cabinet Office 2005; Varney 2006; Gov3 2007).

Of course, investment by public service providers in technology happens within the context of the broader economy. The European Commission's eGovernment Economics Project (eGEP 2006) has constructed an economic model which takes account of public sector productivity gains on private sector productivity and investment. This model suggests that planned expenditure on 'e-government' projects by European Union governments for 2005–2007 would result in a boost to GDP of between 1.14% and 1.54% by 2010. In the UK context, this means that each additional digitally-engaged citizen could add more than £200 to GDP over three years (Gov3 2007). In addition, a study by European Commission found that ICT accounted for 0.5% of the annual productivity growth in the EU between 2000 and 2004, and 1.1% of total productivity increase in that period (Commission of the European Communities 2007).

Creating a monetary value for digital inclusion is a complex equation, and GDP just one example of how to calculate its effect. The relation of digital exclusion to social exclusion factors means that costs could also be tracked against multiple social indices. For instance, there are arguably potential savings for government in moving someone from benefits to employment, and from face-to-face channels of communication to online government services.

7.3 ICT skills base

The link between ICT skills and employability was discussed in section 3.3: employers apparently do not, in general, consider shortage of ICT skills to be a major problem in recruitment, and consider ICT use to be trainable in employees with appropriate 'soft' skills (Newton *et al*. 2005; LSC 2006). However, these perceptions should be seen in the light of evidence that, in aggregate, ICT skills and usage may be a significant driver of performance. Farooqui (2005) finds a clear link between companies' use of ICT and their productivity, and a link is often made between ICT adoption and national productivity (Gov3 2007). The importance of ICT skills for international competitiveness will intensify in coming years:

> *Globalisation will intensify competition across a wide range of sectors, increasing the importance of having a flexible, highly skilled economy … Those countries that are able to apply new technologies, particularly ICT, to existing production processes can expand*

their production possibilities, improve their efficiency, and enhance their attractiveness as centres for high value investment. (HM Treasury 2006, para. 4.11 and 4.26)

For this reason, the Leitch Review of Skills (2006) expressed concern about the UK's lack of a 'world class skills base' – one element of which is a low aggregate level of ICT skills. Despite the willingness of employers to train new employees in ICT skills, 27% report that they have an ICT skills gap (LSC 2006). Forth and Mason (2006) find that ICT skills shortages have acted as restraints on UK companies' ability to adopt ICT, and on their intensity of ICT use after adoption.

On this basis, there appears to be a clear benefit to both individual companies and to the economy as a whole from improving in ICT skills. Businesses are certainly already investing considerably in the ICT skills of their employees – but training tends to be focused disproportionately on highly-skilled workers (Leitch 2006, para. 2.34), and existing action is not enough to improve the UK's position relative to international competitors by 2020.

The reason for this is that the optimal level of investment in skills from individual companies' perspectives is not the same as the optimal level of investment from a national perspective. Each company's optimal behaviour is to provide its employees with just the skills they require to do their jobs efficiently. International competitiveness, however, requires a surplus of potential workers with the skills required by businesses making decisions on where to invest. Relative to the needs of the UK economy, therefore, the private sector will tend to underinvest in ICT skills.

This argument implies that public-sector spending on digital divide projects should focus on those people who are likely to be able to apply their ICT skills in the workplace and contribute to economic development – including students, young unemployed people, and people in low-skilled jobs. Assisted purchase schemes for computer equipment (such as the former Home Computing Initiative in the UK) have concentrated on existing employees and on students, for this reason (EIU 2006). It is important to recall, however, that increasing skills or access for some population groups implies increased (deeper) exclusion for others. The optimal level of ICT access and skills required for international competitiveness, therefore, is necessarily lower than the optimal level required to realise the social and service delivery benefits described above. Focussing exclusively on the macroeconomic argument for ICT is not sufficient for extending digital inclusion.

7.4 Concluding remarks

There are clear benefits to be gained for the UK as a whole from promoting the use of interactive digital technologies:

- Tackling some of the causes of social exclusion and deprivation, by enabling people with new opportunities to interact and improve their life chances.
- Efficiency gains to public service providers from increased interaction with their clients through technologies.
- Improved international competitiveness, as a result of upgrading the national skills base and increased efficiency.
- Increased economic growth as a result of increased efficiency in both the public and private sector.

There are, however, complexities in planning the type and extent of public-sector intervention:

- The greatest potential benefit to service deliverers is from engaging the most socially excluded groups in ICT: but these people are also likely to be the hardest to reach.
- Focusing on the ICT skills base for international competitiveness alone will not provide an argument for outreach to some of the most excluded and may worsen their exclusion.

8. Information gaps – and how to fill them

Summary

Our analysis has provided a comprehensive review of the extent of digital inclusion and exclusion in the UK. The opportunity should be taken to use the rich detail in regular ONS surveys to regularly update this picture.

Our understanding of the consequences and importance of digital exclusion on the lives of excluded people is still limited. In order to move towards a monitoring system based on ends rather than means, we recommend adding a simple question on functional capabilities to existing regular survey tools.

8.1 The current state of knowledge

Analysis of the data collected in regular surveys by the Office for National Statistics has provided a wealth of information on about individuals' use of digital technologies, and particularly of the internet. The frameworks used for measurement have been:

- Number of users and non-users of technologies
- The UK online centres model of digital inclusion
- The Digital Inclusion Panel framework

The results have shown that:

- There has been little or no growth in the number of internet users since 2004. The remaining 39% of adults who do not use the internet are unlikely to be reached through organic, market-based outreach (sections 4.2 and 6.1).
- One in four non-users lives in a household with internet access (section 4.3).
- Digital exclusion is highly correlated with social exclusion: social excluded people are three times as likely to be non-users of the internet as they are to be users (section 5.1).
- Those with more requirements to interact with public sector providers are generally less likely to be digitally included (section 5.1).
- Nearly half of non-users without home internet access are over 65 – but demographic change will only extend digital inclusion very slowly (sections 5.1 and 6.2).
- People who are socially excluded or living in areas of high deprivation are likely, even if they are internet users, to have lower skills and use the internet for less-sophisticated uses than others (section 5.2).
- The gender divide in use of the internet has almost closed, but differences between men and women in ICT skills and type of use probably persist (section 5.2).

Recommendation: Data on internet use by individuals which is already collected in regular surveys by ONS, Ofcom and the Oxford Internet Institute should be regularly analysed using one of the frameworks we have used, in order to assess if and how the patterns of internet use are changing.

While we expect that private-sector activity will make little change to the pattern of internet use in the foreseeable future, monitoring will be crucial to determine whether projects to promote digital inclusion are having an impact.

8.2 The knowledge gaps

There remain, however, significant areas in which our understanding of digital inclusion and exclusion is limited:

- *How* and to *what extent* do excluded people (and/or non-users of the internet) suffer from their exclusion? In what way does non-use of the internet act as a restriction on peoples' lives? How is this changing?
- *Who* are the people who lack digital skills and confidence, and *why* is this so? We have only some partial and outdated snapshots of the 'digitally constrained' group. A dynamic picture would enable us to determine how significant these constraints are, in terms of impact on what people are able to achieve using ICT, and impact on service providers trying to interact with them online.
- *Why* has there been so little use of the *interactive features of digital television*, despite it now being available in a majority of homes? Is this down to poor content provision, or is there some resistance to the technology itself?

8.3 Addressing the gaps: suggestions for future measurement

A comprehensive system for measuring group-normative functional capabilities as envisaged by Carey (2007b) would go a long way towards filling the information gaps related to use of ICT in employment. The development of such a system for practical measurement of task completion would perhaps require a large investment and considerable time for testing and implementation. A step towards this, however, would be to collect data on peoples' ability to complete tasks which are normative to life in society in general. This may include, for example:

- Staying in contact with someone in another country
- Finding information from a train or bus timetable
- Finding information on events in the local community
- Finding information on a medical condition, and deciding whether it requires a doctor's attention
- Finding information on tax or benefit allowances
- Applying for a tax rebate or a benefit to which you are entitled.

A survey question could list each of these functions in turn, and ask:

- Can the respondent successfully carry out this task?
- What means would he or she use to carry out this task (such as using a telephone, visiting an advice centre or doctors' surgery, accessing a website, or asking a friend or family member for assistance)?
- An evaluation of the cost of achieving the task, in terms of time, convenience and/or financial outlay.

Recommendation: Such a series of questions should be added to regular ONS surveys, in order to provide some information on the extent to which all people are able or have difficulty in fulfilling some basic tasks – and whether those not making use of ICT are subject to greater inconvenience or transaction costs.

This system would still be far from perfect: the results would, of course, be improved by using practical assessments rather than discussing hypothetical situations. However, adding such a question to surveys which are already regularly conducted would greatly improve our understanding of the degree of the problem caused by digital exclusion – and of the consequent benefits to be gained from extending digital inclusion.

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